DOCTOR OF PHILOSOPHY

Wood Extractives as Natural Preservatives against Termites and Fungi

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Appendixes

Appendix A2: Chapter 2 Literature review

Table A2.1: Durability and permeability ratings for some structural hardwoods (Anon, 1991)

Timber species	Country of origin	Durability	Permeability*
Balau (***Shorea*** sp.)	S E Asia	D	Extremely resistant
Red Balau (***Shorea*** sp.)	S E Asia	MD	Extremely resistant
Basralocus (***Dicorynia guianensis***)	Surinam & F Guyana	D	Extremely resistant
Beech-European (***Fagus sylvatica***)	Europe	P	Permeable
Belian (***Eusideroxylon zwageri***)	S E Asia	VD	Resistant
Bintangor (***Calophyllum curtisii, C. inophyllum, C. retusum***)	S E Asia	MD	Moderately resistant
M. utilis (***Madhuca utilis, Palaquium ridleyi***)	S E Asia	VD	Moderately resistant
Dahoma (***Piptadeniastrum afrcanum***)	W, C & E Africa	D	Very resistant
Danta (***Nesogordonia papaverifera***)	W Africa	MD	Resistant
Ekki (***Lophira alata***)	W Africa	VD	Extremely resistant
Elm (***Ulmus procera, U.hollandica***)	Europe	ND	Resistant
Greenheart (***Ocotea rodiaei***)	Guyana	VD	Extremely resistant
Idigbo (***Terminalia ivorensis***)	W Africa	D/MD	Extremely resistant
Iroko (***Milicia excels, Chlorophora excelsa***)	W Africa	VD/D	Extremely resistant
Jarrah ***Eucalyptus marginata***)	Australia	VD	Extremely resistant
Kapur (***Dryobalanops* sp.**)	S E Asia	VD/D	Extremely resistant
Karri (***Eucalyptus diversicolor***)	Australia	D	Extremely resistant
Kempas (***Koompassia malaccensis***)	S E Asia	D	Resistant
D. grandiflorus (***Dipterocarpus*** sp.)	S E Asia	MD	Resistant
Makoré (***Tieghemella heckelii***)	W Africa	VD	Extremely resistant
Mengkulang (***Heritiera*** sp.)	S E Asia	ND	Resistant
Dark red meranti- (also includes dark red *S. curtisii* & dark red lauan) (***Shorea*** sp.)	S E Asia	Variable - generally ND/D	Resistant/Extremely resistant
Merbau (***Intsia*** sp.)	S E Asia	D	Extremely resistant
Missanda (***Erythrophleum*** sp.)	W Africa	VD	Very/Extremely resistant
Mora (***Mora excels***)	C America	VD	Very/Extremely resistant
Nargusta (***Terminalia amazonia***)	C America	VD	Very resistant
Niangon (***Heritiera utilis***)	W Africa	MD	Extremely resistant
Oak-European (***Quercus petraea, Q. robur***)	Europe	D	Extremely resistant
Okan (***Cylicodiscus gabunensis***)	W Africa	VD	Extremely resistant
Opepe (***Nauclea diderrichii***)	W Africa	VD	Moderately resistant
Padauk, African (**Pterocarpus soyauxii**)	W Africa	VD	Moderately resistant/Resistant
Purpleheart (***Peltogyne*** sp.)	S America	D/MD	Extremely resistant
Sepetir (***Sindora*** sp.)	S E Asia	D	Extremely resistant
Teak (***Tectona grandis***)	S E Asia	VD	Extremely resistant

VD- Very durable, D-Durable, MD- Moderately Durable, P-Perishable, ND- Non Durable

Table A2.2 Mean percent mass loss of some Malaysian timbers species due to termite attack against *Coptotermes curvignathus* (Cc) and *C. gestroi* (Cg) for 30 days (Ngee *et al*, 2004)

Species	Scientific name	*Cc*	*Cg*
Balau	*Shorea* sp.	1.18	0.44
Angsana	*Pterocarpus indicus*	2.79	0.74
C. scortechinii	*Cinnamomum sp.*	5.82	1.37
Teak	*Tectona grandis*	5.26	2.67
Merbau	*Intsia palembanica*	5.63	3.38
White meranti	*Shorea* sp.	1.69	3.83
Membatu	*Parinari* sp.	3.15	4.42
Melunak	*Pentace* sp.	1.52	7.91
Perah	*Elanteriospermum tapos*	14.63	8.20
Jelutong	*Dyera costulata*	72.99	21.23
Red meranti	*Shorea* sp.	36.89	25.72
Terentang	*Campnosperma auriculata*	80.49	46.02
Nyatoh	*Ganua* sp.	20.69	15.75
H. brasiliensis	*Hevea brasiliensis*	30.20	45.08

Table A2.3 Mean percent mass loss of some Malaysian wood species due to decay against *Coriolus versicolor* (CV), *Tyromyces palustris* (TP), *Pycnoporus coccineus* (PC) and *Ganoderma lucidum* (GL) for 12 weeks (Yamamoto and Hong, 1994)

Species	Scientific name	*CV*	*PC*	*PC*	*GL*
Balau	*Shorea* sp.	0.5	3.2	1.2	0.7
N. heimii	*Neobalanocarpus heimii*	0.4	0	1.3	0
Giam	*Hopea* sp.	1.3	1.3	1.9	0.8
D. kunstleri	*Dialum* sp.	2.4	2.9	3.3	3.1
Merbau	*Intsia palembanica*	3.4	0.2	3.5	1.3
C. lanceolatum	*Vatica* sp.	1.3	7.6	1.6	1.4
Kapur	*Dryobalanops aromatica*	5.9	4.4	1.9	1.7
Kempas	*Koompassia malaccensis*	11.9	19.5	4.6	6.7
D. grandiflorus	*Dipterocarpus* sp.	10.5	45.1	5.3	5.1
Mata ulat	*Kokoona* sp.	25.5	39.0	11.4	7.2
Punah	*Tetramerista glabra*	26.1	46.0	15.3	12.0
Rengas	*Anacardiaceae* sp.	3.4	2.8	3.5	3.3
Bintangor	*Calophyllum* sp.	31.0	27.8	16.3	3.1
Durian	*Durio* sp.	22.8	47.7	6.2	1.1
Jelutong	*Dyera costulata*	30.5	54.3	30.3	20.5
Meranti bakau	*Shorea rugosa*	16.7	37.2	9.5	7.7
Dark red meranti	*Shorea* sp.	19.5	37.1	3.5	9.2
White meranti	*Shorea* sp.	42.2	46.9	9.4	1.9
Yellow meranti	*Shorea* sp.	27.5	44.7	25.7	17.9
Merawan	*Hopea* sp.	3.1	3.7	0.5	1.0
Mersawa	*Anisoptera* sp.	16.8	44.0	15.0	16.3
Perupok	*Lophopetalum* sp.	53.7	48.7	25.1	35.7
Ramin	*Gonystylus* sp.	37.3	57.4	33.2	32.4
H. brasiliensis	*Hevea brasiliensis*	42.5	58.6	49.4	54.3

Table A2.4 Subclassification within the terpenoids (Harborne, 1999)

Terpenoid class	Description
Monoterpenoids	Volatile, essential oil constituents
Iridoids	Bitter tasting lactones, usually in glycosidic form
Sesquiterpenoids	Higher boiling essential oil constituents
Sesquiterpene lactones	Characteristic of the family Compositae
Ditrpenoids	Resin acids and gibberellins
Triterpenoid saponins	Haemolytic glycosides
Steroid saponins	Haemolytic glycosides
Cardenolides and bufadienolides	Heart poisons and toxins
Phytosterols	Membrane constituents
Cucurbitacins	Bitter principles, especially of the Cucurbitaceae
Nortriterpenoids	Limonoids and quassinoids
Other triterpenoids	Lupanes, hapanes, ursanes, etc.
Carotenoids	Yellow to red pigments

Table A2.5 Classification of phenolic constituents (Harborne, 1999)

Subclass	Description
Anthocyanins	Red to blue flower pigments
Anthochlors	Yellow flower pigments: chalcones and aurones
Benzofurans	Occur in higher plants and in lichens
Chromones	A small group of therapeutic importance
Coumarins	Over 700 structure, widespread in plants
Minor flavonoids	Flavonones and dihydroflavonols
Flavones and flavonols	Many structures, especially in glycosidic combination
Isoflavonoids	Characteristic of the Leguminosae, in the free state
Lignans	Commonly present in wood and bark
Phenols and phenolic acids	Some acids are universal in plants
Phenolic ketones	Notable occurances in hops and in ferns
Penylpropanoids	Many structures, widespread
Quinonoids	Benzoquinones, naphthoquinones and anthraquinones
Stilbenoids	Includes also dihydrophenanthrenes
Tannins	Condensed and hydrolysable
Xanthones	Mainly in Gentianaceae and Guttiferae

Table A2.6 Effect of extracts from different parts of plants/trees against termites (Verma *et al,* 2009)

Species	Part	Active component	Termite species	Activity/ Effect
Adina racemosa Miq.	Bark	Benzoic acid	-	Toxic
Phellodendron amurense	-	-	*Reticulitermes speratus* Kolbe	Antifeedant
Pinus resinosa, P. strobes, Carya ovata Mill., *Quercus rubra* and *Acer rubrum*	Bark	-	-	Toxic
Neem oil, *Azadirachta indica, A. Juss.*	-	-	*R. speratus* Kolbe	Antifeedant
Aframomum meleguata	Seed	Gingerol [5-hydroxy-L-(4-hydroxy-3-methoxyphenyl)decan-3-one] and shogaol [1-(4-hydroxy-3-methoxyphenyl)dec-5-en-3-one]	*R. speratus* Kolbe	Antifeedant
Detarium microcarpum	Leaves	Clerodane diterpenes, 3,13*E*-clerodien-15-ioc acid, 4(18),13*E*-clerodien-15-ioc acid, 18-oxo-3, 13*E*-clerodien-15-ioc acid	*R. speratus* Kolbe	Antifeedant
Xylopia aethiopica	Fruits and seeds	Diterpenes and amides	*R. speratus* Kolbe	Antifeedant
Azadiratcha excelsa and *Piper guineense* Schum and Thonn	Seed	-	*Microtermes* sp., *Macrotermes bellicosus* Smeathman and *M. subhyalinus* Rambur	-
Azadiratcha excelsa	Leaves, bark extractives and timber	-	*Coptotermes curvignathus*	Antifeedant and inhibitory
Moneses uniflora	Aerial parts	Naphthoquinones, 2,7-dimethyl-1, 4-naphthoquinone and 3-hydroxy-2,7-dimethyl-1,4-naphthoquinone	*C. formosanus* Shiraki	Toxic
Tarbush *(Flourensia cernua)*	Leaves	Monoterpenes and sesquiterpenes	*Reticulitermes* sp.	Toxic
Calotropis procera	Leaves	-	*Odontotermes obesus*	
C. gigantean	Leaves	-	-	
Musa paradisiacal	Leaves	-	-	
Diospyros sylvatica	Root	2-methyl-anthraquinone, plumbagin, diosindigo, isodiospyrin and microphyllone (quinones)	*O. obesus*	
Picea glehnii (Sieb. Et Zucc)	Bark	Stilbine glucosides and isorhapontin (3'-methoxy-3,4',5-trihydroxystilbene-3-β-ρ-glucoside)	*R. speratus* Kolbe	
Lantana camara var. aculeate	Leaves	Triterpenoid, 22 β-acetoxylantic acid	*O. obesus*	Toxic

Table A2.6 (continued)

Species	Part	Active component	Termite species	Activity/ Effect
Withania somnifera, Croton tiglium and Hygrophila auriculata	Seed and leaf	-	*Microtermes obesi*	Toxic
Echinops ritro L., *E. spinossissimus* Turra subsp. *Spinosissimus, E. albicaulis Kar., Kir.* and *E. transiliensis* Golosh	-	Thiophenes, 2,2':5'-(3-buten-1-ynyl)-2,2'-bithiophene	*C. formosanus* Shiraki	Toxic
Piper nigrum	Seed	Guineensine	*C. formosanus* Shiraki	Toxic
Sophora flavescens Aiton	-	Alkaloids, matrine and oxymatrine	*C. formosanus* Shiraki	Antifeedant and acute residual toxicity

Table A2.7 Some of termiticides and fungicides compounds and their resources

Compounds	Functions	Source
Cedrol	Fungicides	Chang (2003)
Stilbenes	Fungicides	Hart and Shrimpton (1979)
α-cadinol and α-cedrol, hinokiol and sugiol	Fungicides	Chang *et al* (1999a)
Ferruginol	Fungicides	Rudman (1965a)
α-cadinol and cedrol	Fungicides	Chang (2003)
Cadinane skeletal sesquiterpenoids	Fungicides	Kondo and Imamura (1986)
τ-muurolol, τ-cadinol, azulene, hexadecadienoic acid	Fungicides	Gao *et al* (2008)
Napthoquinone	Fungicides	Thulasidas and Bhat (2007)
Chamaecynone and isochamaecynone	Termiticides	Saeki (1973)
Nootkatone	Termiticides	Zhu *et al* (2001a), Maistrello *et al* (2001a)
Cedrol and alpha-cadinol	Termiticides	Chang *et al* (2001a)
7-methyljunglone, isodiospyrin	Termiticides	Carter *et al* (1978)
Terpene	Termiticides	Sharma *et al* (1994)
Aphtthalene	Termiticides	Henderson and Jian (1998)
2-phenoxyethanol	Termiticides	Laine *et al* (1998)
α-terpineol and three sesquiterpene alcohols T-cadinol, torreyol (δ-cadinol), and α-cadinol	Termiticides	McDaniel *et al* (1989), Chang *et al* (2000), Liu (2004)
Sesquiterpenoids, T-cadinol and T-muurolol	Termiticides	Chang *et al* (2000)
β - thujaplicin and γ-thujaplicin	Termiticides	Soung *et al* (2000), Yen *et al* (2007)
terpenoids	Termiticides	Fang *et al* (1985)
Stilbenols and hydroxylated stilbenes	Termiticides	Kindl (1985)
Ferruginol, helioxanthin, savinin, taiwanin and hinokiol	Termiticides	Chang *et al* (1999b)
Loganin, scopoletin and nimbolin A	Termiticides	Yaga (1977), Yaga and Kinjo (1985; 1986)
Cedrol and isoeugenol	Termiticides	Yaga (1980)
Saponins and terpenoids	Termiticides	Watanabe *et al* (1966),

Appendix A3. Chapter 3 Moisture content and wood density variation

The average moisture content of twelve Malaysian wood species based on air-dry samples is presented in Figure A3.1 below. The details of the result are presented in Table A3.3.

Moisture content from air-dry samples of twelve selected Malaysian wood species were extremely high in all of the species tested where all of the woods contain more than 12% of moisture content. Its also vary considerably between the species even though the variations is not in bigger range. The highest moisture content was observed in *C. scortechinii* (19.01% at basal and top 28.97%) and *H. brasiliensis* (25.30% at middle). The lowest was in *F. fragrans* (14.00% at basal), *D. grandiflorus* (19.28%) and *C. lanceolatum* (21.85%). The wood species that had high moisture content at the basal are not necessary had higher moisture content at middle and top portion. Conversely, the species that had lower moisture content at basal, also not necessary had lower moisture content at the middle and top portion. However, all of the wood species showed that moisture content increased from the basal to top portion.

Analysis of variance (ANOVA) (Table A3.1) showed that within the species, all the wood species showed highly significantly variation at $P \leq 0.001$with the variation ranging from 72.3% to 89.7%. The highest variation of the samples for moisture content determination was found in *N. heimii* (r^2 = 89.7). *H. brasiliensis* showed the lowest variation among its samples (r^2 = 72.3). The ANOVA table is presented in the Table A3.4.

Analysis of variance was conducted to show the difference in moisture content among the species tested (Table A3.2). A pairwise comparison showed that there was no single wood species that are totally different with others in moisture content either in basal or middle portion of the tree. However, at top portion, only a comparison of *C. lanceolatum* with other wood species showed significantly differences to the other wood species at $P \leq 0.05$. The other species were not significantly different. The ANOVA table is presented in Appendix Tables A3.5 to A3.7.

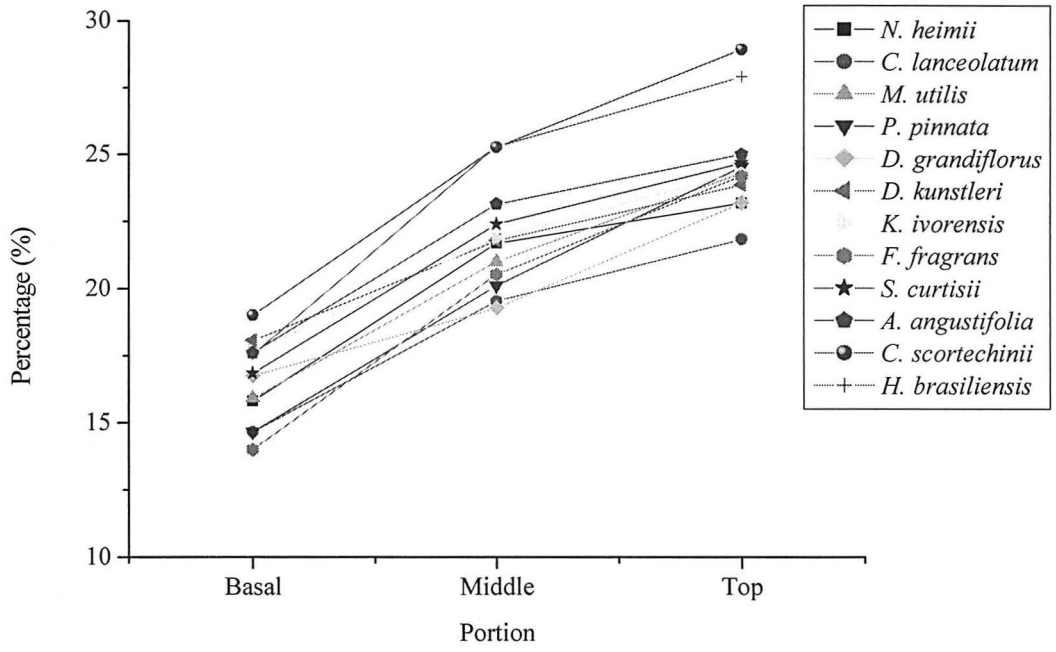

Figure A3.1 Moisture content at different height of twelve Malaysian wood species

Table A3.1 ANOVA results showing the proportion of total variation in moisture content accounted for samples within wood species

Species	r^2
N. heimii	64.6***
C. lanceolatum	77.7***
M. utilis	86.0***
P. pinnata	89.7***
D. grandiflorus	80.9***
D. kunstleri	79.0***
K. ivorensis	79.1***
F. fragrans	73.1***
S. curtisii	69.7***
A. angustifolia	77.4***
C. scortechinii	75.7***
H. brasiliensis	72.3***

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$, ns – not significant.

Table A3.2 ANOVA results showing the proportion of total variation in moisture content accounted for samples between species for each portion

Wood species	Basal	Middle	Top
A. angustifolia	17.61^{bc}	23.16^{b}	25.03^{b}
C. lanceolatum	14.66^{e}	19.53^{f}	21.85^{c}
C. scortechinii	19.01^{a}	25.29^{a}	28.97^{a}
D. grandiflorus	16.76^{cd}	19.28^{f}	23.21^{b}
D. kunstleri	18.06^{ab}	21.79^{c}	23.89^{b}
F. fragrans	14.00^{e}	20.53^{de}	24.22^{b}
H. brasiliensis	17.89^{b}	25.30^{a}	27.94^{a}
K. ivorensis	17.64^{b}	21.89^{c}	24.37^{b}
M. utilis	15.91^{d}	21.00^{d}	24.32^{b}
N. heimii	15.81^{d}	21.69^{cd}	23.20^{b}
P. pinnata	14.66^{e}	20.11^{ef}	24.56^{b}
S. curtisii	16.84^{c}	22.40^{bc}	24.71^{b}

Mean (± SD) of 5 replicates for each species. Means within each column followed by the same letter is not significantly different at the 5% level of ANOVA test.

3.4.1 Variation of moisture content between species

Results of moisture content from this study showed that the differences of moisture content between wood species are so pronounced. Table A3.2 showed that the variation of basal is 5.01%, middle 6.02% and top; 7.12%. The moisture content tends to have a larger variation with the increasing of height level.

Larger variation of specific gravity and moisture content of the wood is probably due to genetic variation (Roeder, 1981). The variation also depends on the tree location, age of the tree, season of harvest and also tree size. In fact, the proportion of cells (cell wall thickness, fibre lengths, cell diameters, cellulose-lignin ratios or percentage of cell types) may vary widely between species and genera which contributed to the variation of moisture content (Panshin *et al*, 1964; Bowyer *et al,* 2003).

Early studies by Kollmann and Côté (1968) and Preston (1974) found that the variation in cellulose, hemicelluloses and lignin may give some impact to the variations in moisture content between timber species as well as within trees. On the other hand, Hillis (1984) found that the variations of these three major components not only occurred between species but also in the same species/tree. Hill *et al* (2009) further explained that these three components together with pectic component and that which related with cell wall macromolecules are responsible to the atmospheric moisture absorption due to presence of hydroxyl (OH) groups.

Meanwhile studies by Fengel (1971) and Kerr and Goring (1975; 1977) reported that the the lamellae of pectic component which are not continuous around the cell wall showed a moisture content variation either between or within timber species. They also

found that the amount of water in a stem/trunk varies from the cambium to the pith as well as along the stem/trunk.

3.4.2 Variation of moisture content for samples within trees

Table A3.3 showed that all of wood species had more than 70% of total variation within trees samples. Simpson and TenWolde (1999) reported that a variability of moisture content exists not only between wood species, trees from the same species but also within the individual board that was obtained from the same tree. Zobel and Van Buijtenen (1989) added that the moisture content not only varies greatly from juvenile to mature woods but also with height of the tree. The variations arise from the anatomical structure and an associated physical property as wood is heterogeneous in structure and distribution within the cell walls to cell cavity (Panshin *et al*, 1964; Fengel and Wegener, 1989).

In addition, Bowyer *et al* (2003) found that, the differences portion between sapwood and heartwood also contributed to variation in moisture content. When the formation (changes from sapwood to heartwood) and secondary maturation occured, the amount of moisture in cell wall decreases due to the deposition of extractives within the cell wall increases. It tends to replace water molecules that are associated with cellulose and hemicellulose. The same situation also happened between the basal, middle and upper portion of the trees. Thus make the density of basal/heartwood is often slightly higher than of middle/sapwood because of the higher concentrations of these materials. He also add that the variations of moisture content were also influenced by factors such as growth rate, site conditions and probably other growth factors as yet not fully investigated.

3.4.3 Conclusions

1. Moisture content was found between the ranges of 14.00 % to 28.97%.
2. *F. fragrans* had the lowest moisture content (14.00%) at basal, *D. grandiflorus* (19.28%) at middle and *C. lanceolatum* (21.85%) at top portions. The highest was found in *C. scortechinii* (basal; 19.01% and top; 28.97%) and *D. grandiflorus* (middle; 25.30%).

Table A3.3 Moisture content of twelve Malaysian wood species (%) at different height level

Species	Portion	Mean moisture content	Range
N. heimii	Basal	15.81 (1.06)[b]	13.10-17.93
	Middle	21.70 (1.81)[a]	17.68-26.65
	Top	23.20 (0.62)[a]	18.82-29.14
C. lanceolatum	Basal	14.66 (1.39)[c]	13.19-17.35
	Middle	19.53 (1.07)[b]	16.49-20.68
	Top	21.85 (0.85)[a]	19.69-25.06
M. utilis	Basal	15.91 (0.92)[c]	13.39-17.13
	Middle	21.00 (0.58)[b]	19.09-23.42
	Top	24.32 (1.01)[a]	21.44-29.32
P. pinnata	Basal	14.66 (1.24)[c]	12.36-16.40
	Middle	20.11 (0.70)[b]	18.18-22.27
	Top	24.56 (0.91)[a]	21.11-26.85
D. grandiflorus	Basal	16.76 (1.16)[c]	15.65-19.51
	Middle	19.28 (0.69)[b]	17.30-22.01
	Top	23.21 (1.18)[a]	20.48-25.68
D. kunstleri	Basal	18.06 (1.28)[c]	15.62-19.35
	Middle	21.79 (0.68)[b]	20.07-24.67
	Top	23.89 (0.60)[a]	22.83-25.27
K. ivorensis	Basal	17.64 (1.02)[c]	16.31-19.62
	Middle	21.89 (0.56)[b]	20.31-26.24
	Top	24.37 (0.37)[a]	20.56-26.82
F. fragrans	Basal	14.00 (0.93)[c]	13.08-16.51
	Middle	20.53 (0.44)[b]	14.92-24.86
	Top	24.22 (1.43)[a]	20.53-31.81
S. curtisii	Basal	16.84 (0.72)[c]	15.18-17.75
	Middle	22.40 (1.39)[b]	19.28-26.35
	Top	24.71 (0.86)[a]	20.57-30.43
A. angustifolia	Basal	17.61 (0.96)[c]	16.07-19.07
	Middle	23.16 (0.64)[b]	21.02-26.05
	Top	25.03 (0.79)[a]	21.58-27.36
C. scortechinii	Basal	19.01 (1.35)[c]	16.86-21.26
	Middle	25.29 (1.15)[b]	20.19-33.12
	Top	28.97 (1.01)[a]	26.80-30.50
H. brasiliensis	Basal	17.55 (0.77)[c]	16.34-20.63
	Middle	25.30 (0.89)[b]	21.16-28.78
	Top	27.94 (0.78)a	23.17-33.97

Mean (± SD) of 5 replicates for each species. Means within each column followed by the same letter is not significantly different at the 5% level of ANOVA test.

Table A3.4 Analysis of variance (ANOVA) table for sample within species of moisture content of twelve Malaysian wood species

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	1	408.68	408.68	78.57	0.000
	Error	43	223.66	5.20		
	Total	44	632.33			
C. lanceolatum	Replicates	1	387.38	387.38	150.00	0.000
	Error	43	111.05	2.58		
	Total	44	498.42			
M. utilis	Replicates	1	530.24	530.24	263.96	0.000
	Error	43	86.38	2.01		
	Total	44	616.62			
P. pinnata	Replicates	1	735.71	735.71	374.52	0.000
	Error	43	84.47	1.96		
	Total	44	820.18			
D. kunstleri	Replicates	1	255.24	255.24	161.31	0.000
	Error	43	68.04	1.58		
	Total	44	323.28			
D. grandiflorus	Replicates	1	312.49	312.49	182.14	0.000
	Error	43	73.77	1.72		
	Total	44	386.26			
K. ivorensis	Replicates	1	338.93	338.93	162.90	0.000
	Error	43	89.47	2.08		
	Total	44	428.39			
F. fragrans	Replicates	1	782.51	782.51	116.68	0.000
	Error	43	288.37	6.71		
	Total	44	1070.88			
S. curtisii	Replicates	1	464.19	464.19	98.93	0.000
	Error	43	201.76	4.69		
	Total	44	665.96			
A. angustifolia	Replicates	1	412.44	412.44	147.14	0.000
	Error	43	120.53	2.80		
	Total	44	532.97			
C. scortechinii	Replicates	1	745.08	745.08	133.61	0.000
	Error	43	239.79	5.58		
	Total	44	984.88			
H. brasiliensis	Replicates	1	756.51	756.51	112.08	0.000
	Error	43	290.25	6.75		
	Total	44	1046.76			

Table A3.5 Analysis of variance (ANOVA) table for sample between species of moisture content of twelve Malaysian wood species (basal)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	3.314	3.314	11.32	0.010
	Error	8	2.342	0.293		
	Total	9	5.656			
N. heimii vs *M. utilis*	Species	1	0.023	0.023	0.06	0.811
	Error	8	2.961	0.370		
	Total	9	2.983			
N. heimii vs *P. pinnata*	Species	1	3.343	3.343	5.66	0.045
	Error	8	4.724	0.591		
	Total	9	8.067			
N. heimii vs *D. grandiflorus*	Species	1	2.218	2.218	4.39	0.069
	Error	8	4.041	0.505		
	Total	9	6.260			
N. heimii vs *D. kunstleri*	Species	1	12.587	12.587	20.96	0.002
	Error	8	4.804	0.600		
	Total	9	17.390			
N. heimii vs *K. ivorensis*	Species	1	8.380	8.380	17.90	0.003
	Error	8	3.745	0.468		
	Total	9	12.124			
N. heimii vs *F. fragrans*	Species	1	8.186	8.186	22.01	0.002
	Error	8	2.976	0.372		
	Total	9	11.162			
N. heimii vs *S. curtisii*	Species	1	2.648	2.648	11.25	0.010
	Error	8	1.884	0.235		
	Total	9	4.532			
N. heimii vs *A. angustifolia*	Species	1	8.071	8.071	16.96	0.003
	Error	8	3.808	0.476		
	Total	9	11.879			
N. heimii vs *C. scortechinii*	Species	1	25.485	25.485	42.60	0.000
	Error	8	4.785	0.598		
	Total	9	30.270			
N. heimii vs *H. brasiliensis*	Species	1	10.818	10.818	19.80	0.002
	Error	8	4.371	0.546		
	Total	9	15.190			
C. lanceolatum vs *M. utilis*	Species	1	3.884	3.884	12.24	0.008
	Error	8	2.539	0.317		
	Total	9	6.423			
C. lanceolatum vs *P. pinnata*	Species	1	0.000	0.000	0.00	0.992
	Error	8	4.303	0.538		
	Total	9	4.303			
C. lanceolatum vs *D. grandiflorus*	Species	1	10.956	10.956	24.21	0.001
	Error	8	3.620	0.453		
	Total	9	14.576			
C. lanceolatum vs *D. kunstleri*	Species	1	28.818	28.818	52.61	0.000
	Error	8	4.382	0.548		
	Total	9	33.200			
C. lanceolatum vs *K. ivorensis*	Species	1	22.234	22.234	53.52	0.000
	Error	8	3.324	0.415		
	Total	9	25.557			
C. lanceolatum vs *F. fragrans*	Species	1	1.082	1.082	3.39	0.103
	Error	8	2.556	0.319		
	Total	9	3.638			

Table A3.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	11.890	11.890	65.02	0.000
	Error	8	1.463	0.183		
	Total	9	13.353			
C. lanceolatum vs *A.angustifolia*	Species	1	21.730	21.730	51.32	0.000
	Error	8	3.387	0.423		
	Total	9	25.117			
C. lanceolatum vs *C. scortechinii*	Species	1	47.180	47.180	86.48	0.000
	Error	8	4.365	0.546		
	Total	9	51.545			
C. lanceolatum vs *H. brasiliensis*	Species	1	26.108	26.108	52.87	0.000
	Error	8	3.951	0.494		
	Total	9	30.059			
M. utilis vs *P. pinnata*	Species	1	3.915	3.915	6.36	0.036
	Error	8	4.922	0.615		
	Total	9	8.837			
M. utilis vs *D. grandiflorus*	Species	1	1.793	1.793	3.38	0.103
	Error	8	4.239	0.530		
	Total	9	6.033			
M. utilis vs *D. kunstleri*	Species	1	11.543	11.543	18.46	0.003
	Error	8	5.001	0.625		
	Total	9	16.545			
M. utilis vs *K. ivorensis*	Species	1	7.533	7.533	15.28	0.004
	Error	8	3.943	0.493		
	Total	9	11.477			
M. utilis vs *F. fragrans*	Species	1	9.068	9.068	22.86	0.001
	Error	8	3.174	0.397		
	Total	9	12.242			
M. utilis vs *S. curtisii*	Species	1	2.182	2.182	8.39	0.020
	Error	8	2.082	0.260		
	Total	9	4.263			
M. utilis vs *A.angustifolia*	Species	1	7.240	7.240	14.47	0.005
	Error	8	4.004	0.500		
	Total	9	11.243			
M. utilis vs *C. scortechinii*	Species	1	23.993	23.993	38.51	0.000
	Error	8	4.984	0.623		
	Total	9	28.977			
M. utilis vs *H. brasiliensis*	Species	1	9.854	9.854	17.25	0.003
	Error	8	4.570	0.571		
	Total	9	14.425			
P. pinnata vs *D. grandiflorus*	Species	1	11.008	11.008	14.67	0.005
	Error	8	6.003	0.750		
	Total	9	17.011			
P. pinnata vs *D. kunstleri*	Species	1	28.903	28.903	34.18	0.000
	Error	8	6.765	0.846		
	Total	9	35.669			
P. pinnata vs *K. ivorensis*	Species	1	22.308	22.308	31.28	0.001
	Error	8	5.706	0.713		
	Total	9	28.014			
P. pinnata vs *F. fragrans*	Species	1	1.066	1.066	1.73	0.225
	Error	8	4.937	0.617		
	Total	9	6.004			

Table A3.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	11.944	11.944	24.85	0.001
	Error	8	3.845	0.481		
	Total	9	15.790			
P. pinnata vs *A.angustifolia*	Species	1	21.803	21.803	30.23	0.001
	Error	8	5.769	0.721		
	Total	9	27.573			
P. pinnata vs *C. scortechinii*	Species	1	47.289	47.289	56.07	0.000
	Error	8	6.747	0.843		
	Total	9	54.036			
P. pinnata vs *H. brasiliensis*	Species	1	26.189	26.189	33.08	0.000
	Error	8	6.333	0.792		
	Total	9	32.522			
D. grandiflorus vs *D. kunstleri*	Species	1	4.237	4.237	5.57	0.046
	Error	8	6.082	0.760		
	Total	9	10.319			
D. grandiflorus vs *K. ivorensis*	Species	1	1.975	1.975	3.15	0.114
	Error	8	5.023	0.628		
	Total	9	6.998			
D. grandiflorus vs *F. fragrans*	Species	1	18.926	18.926	35.58	0.000
	Error	8	4.255	0.532		
	Total	9	23.181			
D. grandiflorus vs *S. curtisii*	Species	1	0.019	0.019	0.05	0.832
	Error	8	3.162	0.395		
	Total	9	3.182			
D. grandiflorus vs *A.angustifolia*	Species	1	1.827	1.827	2.87	0.129
	Error	8	5.087	0.636		
	Total	9	6.913			
D. grandiflorus vs *C. scortechinii*	Species	1	12.665	12.665	16.71	0.003
	Error	8	6.064	0.758		
	Total	9	18.729			
D. grandiflorus vs *H. brasiliensis*	Species	1	3.239	3.239	4.59	0.065
	Error	8	5.650	0.706		
	Total	9	8.889			
D. kunstleri vs *K. ivorensis*	Species	1	0.426	0.426	0.59	0.465
	Error	8	5.787	0.723		
	Total	9	6.213			
D. kunstleri vs *F. fragrans*	Species	1	41.073	41.073	65.50	0.000
	Error	8	5.017	0.627		
	Total	9	46.090			
D. kunstleri vs *S. curtisii*	Species	1	3.688	3.688	7.52	0.025
	Error	8	3.925	0.491		
	Total	9	7.613			
D. kunstleri vs . *A.angustifolia*	Species	1	0.500	0.500	0.68	0.432
	Error	8	5.847	0.731		
	Total	9	6.347			
D. kunstleri vs *C. scortechinii*	Species	1	2.252	2.252	2.644	0.143
	Error	8	6.827	0.853		
	Total	9	9.079			
D. kunstleri vs *H. brasiliensis*	Species	1	0.067	0.067	0.08	0.780
	Error	8	6.413	0.802		
	Total	9	6.480			

Table A3.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	33.128	33.128	66.95	0.000
	Error	8	3.958	0.495		
	Total	9	37.086			
K. ivorensis vs *S. curtisii*	Species	1	1.606	1.606	4.48	0.067
	Error	8	2.866	0.358		
	Total	9	4.471			
K. ivorensis vs *A. angustifolia*	Species	1	0.003	0.003	0.00	0.946
	Error	8	4.790	0.599		
	Total	9	4.793			
K. ivorensis vs *C. scortechinii*	Species	1	4.638	4.638	6.43	0.035
	Error	8	5.767	0.721		
	Total	9	10.405			
K. ivorensis vs *H. brasiliensis*	Species	1	0.156	0.156	0.23	0.643
	Error	8	5.353	0.669		
	Total	9	5.509			
F. fragrans vs *S. curtisii*	Species	1	20.147	20.147	76.84	0.000
	Error	8	2.098	0.262		
	Total	9	22.245			
F. fragrans vs *A. angustifolia*	Species	1	32.512	32.512	64.67	0.000
	Error	8	4.022	0.503		
	Total	9	36.533			
F. fragrans vs *C. scortechinii*	Species	1	62.555	62.555	100.10	0.000
	Error	8	4.999	0.625		
	Total	9	67.554			
F. fragrans vs *H. brasiliensis*	Species	1	37.822	37.822	65.99	0.000
	Error	8	4.585	0.573		
	Total	9	42.408			
S. curtisii vs *A.angustifolia*	Species	1	1.472	1.472	4.02	0.080
	Error	8	2.929	0.366		
	Total	9	4.401			
S. curtisii vs *C. scortechinii*	Species	1	11.701	11.701	23.96	0.001
	Error	8	3.907	0.488		
	Total	9	15.607			
S. curtisii vs *H. brasiliensis*	Species	1	2.760	2.760	6.32	0.036
	Error	8	3.493	0.437		
	Total	9	6.253			
A.angustifolia vs *C. scortechinii*	Species	1	4.872	4.872	6.68	0.032
	Error	8	5.831	0.729		
	Total	9	10.703			
A.angustifolia vs *H. brasiliensis*	Species	1	0.201	0.201	0.30	0.601
	Error	8	5.417	0.677		
	Total	9	5.618			
C. scortechinii vs *H. brasiliensis*	Species	1	3.095	3.095	3.87	0.085
	Error	8	6.394	0.799		
	Total	9	9.489			

Table A3.6 Analysis of variance (ANOVA) table for sample between species of moisture content of twelve Malaysian wood species (middle)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	11.67	11.67	5.27	0.051
	Error	8	17.71	2.21		
	Total	9	29.38			
N. heimii vs *M. utilis*	Species	1	1.19	1.19	0.66	0.441
	Error	8	14.46	1.81		
	Total	9	15.56			
N. heimii vs *P. pinnata*	Species	1	6.29	6.29	3.34	0.105
	Error	8	15.04	1.88		
	Total	9	21.33			
N. heimii vs *D. grandiflorus*	Species	1	14.60	14.60	7.78	0.024
	Error	8	15.01	1.88		
	Total	9	29.61			
N. heimii vs *D. kunstleri*	Species	1	0.02	0.02	0.01	0.916
	Error	8	14.94	1.87		
	Total	9	14.96			
N. heimii vs *K. ivorensis*	Species	1	0.10	0.10	0.05	0.882
	Error	8	14.36	1.79		
	Total	9	14.46			
N. heimii vs *F. fragrans*	Species	1	3.37	3.37	1.94	0.201
	Error	8	13.87	1.73		
	Total	9	17.23			
N. heimii vs *S. curtisii*	Species	1	1.26	1.26	0.48	0.507
	Error	8	20.86	2.61		
	Total	9	22.11			
N. heimii vs *A. angustifolia*	Species	1	5.38	5.38	2.92	0.126
	Error	8	14.74	1.84		
	Total	9	20.12			
N. heimii vs *C. scortechinii*	Species	1	32.32	32.32	14.06	0.006
	Error	8	18.39	2.30		
	Total	9	50.71			
N. heimii vs *H. brasiliensis*	Species	1	32.48	32.48	15.98	0.004
	Error	8	16.26	2.03		
	Total	9	48.73			
C. lanceolatum vs *M. utilis*	Species	1	5.415	5.415	7.28	0.027
	Error	8	5.954	0.744		
	Total	9	11.370			
C. lanceolatum vs *P. pinnata*	Species	1	0.828	0.828	1.01	0.343
	Error	8	6.532	0.816		
	Total	9	7.360			
C. lanceolatum vs *D. grandiflorus*	Species	1	0.163	0.163	0.20	0.666
	Error	8	6.501	0.813		
	Total	9	6.665			
C. lanceolatum vs *D. kunstleri*	Species	1	12.722	12.722	15.83	0.004
	Error	8	6.427	0.803		
	Total	9	19.149			
C. lanceolatum vs *K. ivorensis*	Species	1	13.898	13.898	19.00	0.002
	Error	8	5.852	0.732		
	Total	9	19.750			
C. lanceolatum vs *F. fragrans*	Species	1	2.501	2.501	3.73	0.089
	Error	8	5.359	0.670		
	Total	9	7.860			

Table A3.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	20.59	20.59	13.34	0.006
	Error	8	12.35	1.54		
	Total	9	32.94			
C. lanceolatum vs *A.angustifolia*	Species	1	37.706	37.706	85.29	0.000
	Error	8	3.537	0.442		
	Total	9	41.243			
C. lanceolatum vs *C. scortechinii*	Species	1	82.84	82.84	67.07	0.000
	Error	8	9.88	1.24		
	Total	9	92.72			
C. lanceolatum vs *H. brasiliensis*	Species	1	83.095	83.095	85.79	0.000
	Error	8	7.749	0.969		
	Total	9	90.844			
M. utilis vs *P. pinnata*	Species	1	2.009	2.009	4.89	0.058
	Error	8	3.287	0.411		
	Total	9	5.296			
M. utilis vs *D. grandiflorus*	Species	1	7.458	7.458	18.31	0.003
	Error	8	3.258	0.407		
	Total	9	10.715			
M. utilis vs *D. kunstleri*	Species	1	1.536	1.536	3.86	0.085
	Error	8	3.183	0.398		
	Total	9	4.719			
M. utilis vs *K. ivorensis*	Species	1	1.962	1.962	6.02	0.040
	Error	8	2.607	0.326		
	Total	9	4.570			
M. utilis vs *F. fragrans*	Species	1	0.556	0.556	2.10	0.185
	Error	8	2.114	0.264		
	Total	9	2.670			
M. utilis vs *S. curtisii*	Species	1	4.89	4.89	4.29	0.072
	Error	8	9.10	1.14		
	Total	9	13.99			
M. utilis vs *A.angustifolia*	Species	1	11.623	11.623	31.10	0.001
	Error	8	2.990	0.374		
	Total	9	14.613			
M. utilis vs *C. scortechinii*	Species	1	45.895	45.895	55.31	0.000
	Error	8	6.638	0.830		
	Total	9	52.534			
M. utilis vs *H. brasiliensis*	Species	1	46.084	46.084	81.84	0.000
	Error	8	4.505	0.563		
	Total	9	50.589			
P. pinnata vs *D. grandiflorus*	Species	1	1.725	1.725	3.60	0.094
	Error	8	3.835	0.479		
	Total	9	5.560			
P. pinnata vs *D. kunstleri*	Species	1	7.058	7.058	15.02	0.005
	Error	8	3.760	0.470		
	Total	9	10.818			
P. pinnata vs *K. ivorensis*	Species	1	7.942	7.942	19.95	0.002
	Error	8	3.185	0.398		
	Total	9	11.127			
P. pinnata vs *F. fragrans*	Species	1	0.451	0.451	1.34	0.280
	Error	8	2.691	0.336		
	Total	9	3.143			

Table A3.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	13.16	13.16	10.88	0.011
	Error	8	9.68	1.21		
	Total	9	22.84			
P. pinnata vs *A.angustifolia*	Species	1	23.296	23.296	52.25	0.000
	Error	8	3.567	0.446		
	Total	9	26.863			
P. pinnata vs *C. scortechinii*	Species	1	67.108	67.108	74.40	0.000
	Error	8	7.216	0.902		
	Total	9	74.324			
P. pinnata vs *H. brasiliensis*	Species	1	67.336	67.336	106.00	0.000
	Error	8	5.082	0.635		
	Total	9	72.418			
D. grandiflorus vs *D. kunstleri*	Species	1	15.768	15.768	33.82	0.000
	Error	8	3.730	0.466		
	Total	9	19.498			
D. grandiflorus vs *K. ivorensis*	Species	1	17.074	17.074	43.31	0.000
	Error	8	3.154	0.394		
	Total	9	20.229			
D. grandiflorus vs *F. fragrans*	Species	1	3.943	3.943	11.85	0.009
	Error	8	2.661	0.333		
	Total	9	6.604			
D. grandiflorus vs *S. curtisii*	Species	1	24.42	24.42	20.25	0.002
	Error	8	9.65	1.21		
	Total	9	34.07			
D. grandiflorus vs *A.angustifolia*	Species	1	37.706	37.706	85.29	0.000
	Error	8	3.537	0.442		
	Total	9	41.243			
D. grandiflorus vs *C. scortechinii*	Species	1	90.362	90.362	100.61	0.000
	Error	8	7.185	0.898		
	Total	9	97.547			
D. grandiflorus vs *H. brasiliensis*	Species	1	90.626	90.626	143.52	0.000
	Error	8	5.052	0.631		
	Total	9	95.678			
D. kunstleri vs *K. ivorensis*	Species	1	0.026	0.026	0.07	0.802
	Error	8	3.080	0.385		
	Total	9	3.106			
D. kunstleri vs *F. fragrans*	Species	1	3.941	3.941	12.19	0.008
	Error	8	2.587	0.323		
	Total	9	6.528			
D. kunstleri vs *S. curtisii*	Species	1	0.94	0.94	0.79	0.401
	Error	8	9.58	1.20		
	Total	9	10.52			
D. kunstleri vs . *A.angustifolia*	Species	1	4.707	4.707	10.88	0.011
	Error	8	3.463	0.433		
	Total	9	8.170			
D. kunstleri vs *C. scortechinii*	Species	1	30.636	30.636	34.46	0.000
	Error	8	7.111	0.889		
	Total	9	37.748			
D. kunstleri vs *H. brasiliensis*	Species	1	30.790	30.790	49.49	0.000
	Error	8	4.978	0.622		
	Total	9	35.768			

Table A3.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	4.607	4.607	18.32	0.003
	Error	8	2.012	0.251		
	Total	9	6.619			
K. ivorensis vs *S. curtisii*	Species	1	0.66	0.66	0.58	0.467
	Error	8	9.00	1.13		
	Total	9	9.66			
K. ivorensis vs *A. angustifolia*	Species	1	4.034	4.034	11.18	0.010
	Error	8	2.888	0.361		
	Total	9	6.921			
K. ivorensis vs *C. scortechinii*	Species	1	28.876	28.876	35.35	0.000
	Error	8	6.534	0.817		
	Total	9	35.411			
K. ivorensis vs *H. brasiliensis*	Species	1	29.027	29.027	52.75	0.000
	Error	8	4.402	0.550		
	Total	9	33.429			
F. fragrans vs *S. curtisii*	Species	1	8.74	8.74	8.22	0.021
	Error	8	8.51	1.06		
	Total	9	17.25			
F. fragrans vs *A. angustifolia*	Species	1	17.262	17.262	57.69	0.000
	Error	8	2.394	0.299		
	Total	9	19.656			
F. fragrans vs *C. scortechinii*	Species	1	56.552	56.552	74.89	0.000
	Error	8	6.041	0.755		
	Total	9	62.593			
F. fragrans vs *H. brasiliensis*	Species	1	56.762	56.762	116.17	0.000
	Error	8	3.909	0.489		
	Total	9	60.671			
S. curtisii vs *A.angustifolia*	Species	1	1.44	1.44	1.23	0.301
	Error	8	9.38	1.17		
	Total	9	10.82			
S. curtisii vs *C. scortechinii*	Species	1	20.83	20.83	12.79	0.007
	Error	8	13.03	1.63		
	Total	9	33.86			
S. curtisii vs *H. brasiliensis*	Species	1	20.96	20.96	15.38	0.004
	Error	8	10.90	1.36		
	Total	9	31.86			
A.angustifolia vs *C. scortechinii*	Species	1	11.325	11.325	13.10	0.007
	Error	8	6.916	0.865		
	Total	9	18.242			
A.angustifolia vs *H. brasiliensis*	Species	1	11.419	11.419	19.09	0.002
	Error	8	4.784	0.598		
	Total	9	16.204			
C. scortechinii vs *H. brasiliensis*	Species	1	0.00	0.00	0.00	0.989
	Error	8	8.43	1.05		
	Total	9	8.43			

Table A3.7 Analysis of variance (ANOVA) table for sample between species of moisture content of twelve Malaysian wood species (top)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	4.530	4.530	8.22	0.021
	Error	8	4.412	0.551		
	Total	9	8.942			
N. heimii vs *M. utilis*	Species	1	3.147	3.147	4.51	0.066
	Error	8	5.578	0.697		
	Total	9	8.725			
N. heimii vs *P. pinnata*	Species	1	4.668	4.668	7.65	0.024
	Error	8	4.879	0.610		
	Total	9	9.547			
N. heimii vs *D. grandiflorus*	Species	1	0.001	0.001	0.00	0.980
	Error	8	7.116	0.890		
	Total	9	7.117			
N. heimii vs *D. kunstleri*	Species	1	1.211	1.211	3.24	0.110
	Error	8	2.989	0.374		
	Total	9	4.199			
N. heimii vs *K. ivorensis*	Species	1	3.432	3.432	13.18	0.007
	Error	8	2.083	0.260		
	Total	9	5.515			
N. heimii vs *F. fragrans*	Species	1	2.62	2.62	2.16	0.180
	Error	8	9.71	1.21		
	Total	9	12.33			
N. heimii vs *S. curtisii*	Species	1	5.736	5.736	10.16	0.013
	Error	8	4.518	0.565		
	Total	9	10.254			
N. heimii vs *A. angustifolia*	Species	1	8.379	8.379	16.73	0.003
	Error	8	4.007	0.501		
	Total	9	12.386			
N. heimii vs *C. scortechinii*	Species	1	83.478	83.478	119.22	0.000
	Error	8	5.601	0.700		
	Total	9	89.079			
N. heimii vs *H. brasiliensis*	Species	1	56.218	56.218	113.63	0.000
	Error	8	3.958	0.495		
	Total	9	60.176			
C. lanceolatum vs *M. utilis*	Species	1	15.230	15.230	17.61	0.003
	Error	8	6.919	0.865		
	Total	9	22.149			
C. lanceolatum vs *P. pinnata*	Species	1	18.395	18.395	23.66	0.001
	Error	8	6.221	0.778		
	Total	9	24.616			
C. lanceolatum vs *D. grandiflorus*	Species	1	4.63	4.63	4.38	0.070
	Error	8	8.46	1.06		
	Total	9	13.09			
C. lanceolatum vs *D. kunstleri*	Species	1	10.426	10.426	19.26	0.002
	Error	8	4.331	0.541		
	Total	9	14.757			
C. lanceolatum vs *K. ivorensis*	Species	1	15.845	15.845	37.02	0.000
	Error	8	3.424	0.428		
	Total	9	19.270			
C. lanceolatum vs *F. fragrans*	Species	1	14.04	14.04	10.16	0.013
	Error	8	11.05	1.38		
	Total	9	25.09			

Table A3.7 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	20.463	20.463	27.94	0.001
	Error	8	5.859	0.732		
	Total	9	26.322			
C. lanceolatum vs *A.angustifolia*	Species	1	25.232	25.232	37.74	0.000
	Error	8	5.348	0.669		
	Total	9	30.581			
C. lanceolatum vs *C. scortechinii*	Species	1	126.902	126.902	146.23	0.000
	Error	8	6.943	0.868		
	Total	9	133.845			
C. lanceolatum vs *H. brasiliensis*	Species	1	92.667	92.667	139.89	0.000
	Error	8	5.299	0.662		
	Total	9	97.967			
M. utilis vs *P. pinnata*	Species	1	0.149	0.149	0.16	0.698
	Error	8	7.388	0.823		
	Total	9	7.537			
M. utilis vs *D. grandiflorus*	Species	1	3.06	3.06	2.55	0.149
	Error	8	9.62	1.20		
	Total	9	12.69			
M. utilis vs *D. kunstleri*	Species	1	0.454	0.454	0.66	0.440
	Error	8	5.496	0.687		
	Total	9	5.950			
M. utilis vs *K. ivorensis*	Species	1	0.006	0.006	0.01	0.920
	Error	8	4.590	0.574		
	Total	9	4.596			
M. utilis vs *F. fragrans*	Species	1	0.02	0.02	0.02	0.903
	Error	8	12.22	1.53		
	Total	9	12.24			
M. utilis vs *S. curtisii*	Species	1	0.386	0.386	0.44	0.526
	Error	8	7.025	0.878		
	Total	9	7.411			
M. utilis vs *A.angustifolia*	Species	1	1.256	1.256	1.54	0.249
	Error	8	6.514	0.814		
	Total	9	7.770			
M. utilis vs *C. scortechinii*	Species	1	54.21	54.21	53.48	0.000
	Error	8	8.11	1.01		
	Total	9	62.32			
M. utilis vs *H. brasiliensis*	Species	1	32.762	32.762	40.54	0.000
	Error	8	6.465	0.808		
	Total	9	39.228			
P. pinnata vs *D. grandiflorus*	Species	1	4.56	4.56	4.09	0.078
	Error	8	8.92	1.12		
	Total	9	13.49			
P. pinnata vs *D. kunstleri*	Species	1	1.124	1.124	1.87	0.208
	Error	8	4.798	0.600		
	Total	9	5.922			
P. pinnata vs *K. ivorensis*	Species	1	0.095	0.095	0.19	0.671
	Error	8	3.892	0.486		
	Total	9	3.986			
P. pinnata vs *F. fragrans*	Species	1	0.29	0.29	0.20	0.663
	Error	8	11.52	1.44		
	Total	9	11.81			

Table A3.7 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	0.055	0.055	0.07	0.799
	Error	8	6.327	0.791		
	Total	9	6.382			
P. pinnata vs *A.angustifolia*	Species	1	0.539	0.539	0.74	0.414
	Error	8	5.816	0.727		
	Total	9	6.355			
P. pinnata vs *C. scortechinii*	Species	1	48.667	48.667	52.54	0.000
	Error	8	7.410	0.926		
	Total	9	56.077			
P. pinnata vs *H. brasiliensis*	Species	1	28.488	28.488	39.52	0.000
	Error	8	5.767	0.721		
	Total	9	34.255			
D. grandiflorus vs *D. kunstleri*	Species	1	1.159	1.159	1.32	0.284
	Error	8	7.035	0.879		
	Total	9	8.194			
D. grandiflorus vs *K. ivorensis*	Species	1	3.342	3.342	4.36	0.070
	Error	8	6.128	0.766		
	Total	9	9.470			
D. grandiflorus vs *F. fragrans*	Species	1	2.54	2.54	1.48	0.259
	Error	8	13.75	1.72		
	Total	9	16.30			
D. grandiflorus vs *S. curtisii*	Species	1	5.62	5.62	5.25	0.051
	Error	8	8.56	1.07		
	Total	9	14.18			
D. grandiflorus vs *A.angustifolia*	Species	1	8.24	8.24	8.19	0.021
	Error	8	8.05	1.01		
	Total	9	16.29			
D. grandiflorus vs *C. scortechinii*	Species	1	83.04	83.04	68.87	0.000
	Error	8	9.65	1.21		
	Total	9	92.69			
D. grandiflorus vs *H. brasiliensis*	Species	1	55.86	55.86	55.84	0.000
	Error	8	8.00	1.00		
	Total	9	63.86			
D. kunstleri vs *K. ivorensis*	Species	1	0.566	0.566	2.26	0.171
	Error	8	2.002	0.250		
	Total	9	2.567			
D. kunstleri vs *F. fragrans*	Species	1	0.27	0.27	0.22	0.650
	Error	8	9.63	1.20		
	Total	9	9.90			
D. kunstleri vs *S. curtisii*	Species	1	1.676	1.676	3.02	0.120
	Error	8	4.437	0.555		
	Total	9	6.113			
D. kunstleri vs . *A.angustifolia*	Species	1	3.219	3.219	6.56	0.034
	Error	8	3.926	0.491		
	Total	9	7.145			
D. kunstleri vs *C. scortechinii*	Species	1	64.580	64.580	93.59	0.000
	Error	8	5.520	0.690		
	Total	9	70.100			
D. kunstleri vs *H. brasiliensis*	Species	1	40.927	40.927	84.45	0.000
	Error	8	3.877	0.485		
	Total	9	44.804			

Table A3.7 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	0.05	0.05	0.05	0.828
	Error	8	8.72	1.09		
	Total	9	8.78			
K. ivorensis vs *S. curtisii*	Species	1	0.295	0.295	0.67	0.437
	Error	8	3.531	0.441		
	Total	9	3.825			
K. ivorensis vs *A. angustifolia*	Species	1	1.087	1.087	2.88	0.128
	Error	8	3.020	0.377		
	Total	9	4.106			
K. ivorensis vs *C. scortechinii*	Species	1	53.063	53.063	92.01	0.000
	Error	8	4.614	0.577		
	Total	9	57.677			
K. ivorensis vs *H. brasiliensis*	Species	1	31.874	31.874	85.84	0.000
	Error	8	2.971	0.371		
	Total	9	34.845			
F. fragrans vs *S. curtisii*	Species	1	0.60	0.60	0.43	0.529
	Error	8	11.16	1.39		
	Total	9	11.76			
F. fragrans vs *A. angustifolia*	Species	1	1.63	1.63	1.22	0.301
	Error	8	10.65	1.33		
	Total	9	12.28			
F. fragrans vs *C. scortechinii*	Species	1	56.53	56.53	36.95	0.000
	Error	8	12.24	1.53		
	Total	9	68.77			
F. fragrans vs *H. brasiliensis*	Species	1	34.57	34.57	26.10	0.001
	Error	8	10.60	1.32		
	Total	9	45.17			
S. curtisii vs *A.angustifolia*	Species	1	0.250	0.250	0.37	0.562
	Error	8	5.454	0.682		
	Total	9	5.704			
S. curtisii vs *C. scortechinii*	Species	1	45.448	45.448	51.58	0.000
	Error	8	7.049	0.881		
	Total	9	52.497			
S. curtisii vs *H. brasiliensis*	Species	1	26.039	26.039	38.54	0.000
	Error	8	5.406	0.676		
	Total	9	31.444			
A.angustifolia vs *C. scortechinii*	Species	1	38.962	38.962	47.68	0.000
	Error	8	6.538	0.817		
	Total	9	45.499			
A.angustifolia vs *H. brasiliensis*	Species	1	21.189	21.189	34.63	0.000
	Error	8	4.895	0.612		
	Total	9	26.084			
C. scortechinii vs *H. brasiliensis*	Species	1	2.685	2.685	3.31	0.106
	Error	8	6.489	0.811		
	Total	9	9.174			

Table A3.8 Average wood density of twelve Malaysian woods species (kg m^{-3})

Species	Portion	Mean density	Range
N. heimii	Basal	797 (3.89)[a]	790-813
	Middle	775 (8.34)[b]	753-795
	Top	732 (4.47)[a]	710-753
C. lanceolatum	Basal	803 (11.29)[a]	784-829
	Middle	765 (31.45)[a]	675-827
	Top	710 (14.05)[a]	676-738
M. utilis	Basal	712 (4.72)[b]	700-733
	Middle	697 (9.84)[b]	647-720
	Top	672 (8.40)[a]	628-707
P. pinnata	Basal	712 (8.46)[a]	701-733
	Middle	713 (13.21)[a]	638-815
	Top	633 (16.27)[a]	549-730
D. grandiflorus	Basal	783 (6.19)[a]	770-809
	Middle	766 (32.12)[a]	738-826
	Top	732 (19.10)[a]	683-789
D. kunstleri	Basal	730 (13.16)[b]	701-752
	Middle	714 (15.93)[b]	675-744
	Top	686 (15.29)[a]	670-719
K. ivorensis	Basal	487 (4.88)[b]	471-509
	Middle	482 (42.90)[a]	446-528
	Top	472 (46.06)[a]	441-548
F. fragrans	Basal	668 (4.92)[a]	657-687
	Middle	645 (9.90)[a]	609-673
	Top	598 (8.15)[a]	570-630
S. curtisii	Basal	543 (2.02)[a]	533-557
	Middle	527 (5.16)[a]	501-543
	Top	490 (3.09)[a]	459-510
A. angustifolia	Basal	411 (7.72)[a]	395-438
	Middle	402 (8.31)[a]	382-420
	Top	385 (8.90)[a]	371-408
C. scortechinii	Basal	490 (4.93)[b]	427-510
	Middle	483 (4.17)[b]	453-516
	Top	464 (4.18)[a]	441-484
H. brasiliensis	Basal	583 (8.23)[a]	568-627
	Middle	580 (22.89)[a]	513-624
	Top	666 (17.52)[a]	502-605

Mean (± SD) of 15 replicates for each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Table A3.9 Analysis of variance (ANOVA) table for sample within species of wood density of twelve Malaysian wood species

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	1	31717	31717	193.68	0.000
	Error	43	7042	164		
	Total	44	38758			
C. lanceolatum	Replicates	1	65179	65179	82.00	0.000
	Error	43	34179	795		
	Total	44	99359			
M. utilis	Replicates	1	12106	12106	46.65	0.000
	Error	43	11159	260		
	Total	44	23265			
P. pinnata	Replicates	1	45703	45703	26.35	0.000
	Error	43	74575	1734		
	Total	44	120278			
D. grandiflorus	Replicates	1	19685	19685	28.64	0.000
	Error	43	29557	687		
	Total	44	49243			
D. kunstleri	Replicates	1	15106	15106	67.64	0.000
	Error	43	9603	223		
	Total	44	24710			
K. ivorensis	Replicates	1	1640.7	1640.7	3.33	0.075
	Error	43	21189.5	492.8		
	Total	44	22830.2			
F. fragrans	Replicates	1	36863	36863	103.70	0.000
	Error	43	15286	355		
	Total	44	52150			
S. curtisii	Replicates	1	21750	21750	144.65	0.000
	Error	43	6466	150		
	Total	44	28216			
A. angustifolia	Replicates	1	4922.1	4922.1	36.93	0.000
	Error	43	5730.6	133.3		
	Total	44	10652.7			
C. scortechinii	Replicates	1	5075.5	5075.5	22.70	0.000
	Error	43	9613.7	223.6		
	Total	44	14689.2			
H. brasiliensis	Replicates	1	5437.8	5437.8	6.33	0.000
	Error	43	36913.0	858.4		
	Total	44	42350.8			

Table 3.10 Percentage of Tol: IMS, hot water and total extractives from twelve Malaysian woods species

Species	Durability class	Portion	Toluene: IMS	Hot water	Total
N. heimii	Very durable	Bark	23.50 (1.49)^{a}	10.87 (0.30)^{b}	34.37 (1.45)^{a}
		Heartwood	9.16 (0.26)^{a}	5.63 (0.24)^{a}	14.79 (0.25)^{a}
C. lanceolatum	Durable	Bark	8.78 (0.18)^{d}	13.29 (0.77)^{a}	22.07 (0.80)^{b}
		Heartwood	5.30 (0.13)^{c}	4.04 (0.34)^{c}	9.34 (0.30)^{b}
M. utilis	Durable	Bark	14.68 (0.19)^{b}	6.17 (0.15)^{f}	20.86 (0.30)^{c}
		Heartwood	5.62 (0.19)^{b}	3.40 (0.30)^{d}	9.02 (0.20)^{c}
P. pinnata	Moderate durable	Bark	11.24 (0.64)^{c}	6.62 (0.25)^{d}	17.85 (0.62)^{e}
		Heartwood	4.59 (0.78)^{d}	4.55 (0.30)^{c}	9.14 (0.59)^{bc}
D. grandiflorus	Moderate durable	Bark	4.20 (0.21)^{g}	2.31 (0.30)^{h}	6.51 (0.41)^{i}
		Heartwood	2.18 (0.12)^{g}	2.33 (0.16)^{e}	4.51 (0.26)^{g}
D. kunstleri	Moderate durable	Bark	2.85 (0.36)^{h}	7.77 (0.54)^{c}	10.61 (0.79)^{g}
		Heartwood	2.82 (0.45)^{f}	2.20 (0.06)^{e}	5.02 (0.47)^{f}
K. ivorensis	Moderate durable	Bark	7.97 (0.52)^{e}	5.37 (0.38)^{g}	13.34 (0.65)^{f}
		Heartwood	3.33 (0.07)^{e}	5.06 (0.08)^{b}	8.39 (0.11)^{d}
F. fragrans	Durable	Bark	3.28 (0.51)^{h}	6.32 (0.03)^{e}	9.60 (0.48)^{h}
		Heartwood	4.39 (0.57)^{d}	4.42 (0.26)^{d}	8.81 (0.55)^{cd}
S. curtisii	Moderate durable	Bark	6.09 (0.41)^{f}	13.63 (0.33)^{a}	19.71 (0.62)^{d}
		Heartwood	2.83 (0.51)^{f}	4.75 (0.22)^{c}	7.58 (0.41)^{e}
A. angustifolia	Non-durable	Bark	2.42 (0.13)^{i}	2.41 (0.10)^{h}	4.83 (0.14)^{k}
		Heartwood	2.23 (0.20)^{g}	2.33 (0.09)^{e}	4.56 (0.24)^{fg}
C. scortechinii	Non-durable	Bark	3.10 (0.24)^{h}	2.18 (0.12)^{i}	5.28 (0.29)^{j}
		Heartwood	2.24 (0.13)^{g}	2.27 (0.24)^{e}	4.51 (0.32)^{g}
H. brasiliensis	Non-durable	Bark	1.55 (0.17)^{j}	2.33 (0.15)^{h}	3.88 (0.23)^{l}
		Heartwood	1.33 (0.07)^{h}	1.48 (0.21)^{f}	2.81 (0.24)^{h}

Mean (± SD) of 5 replicates for each species. Values are in percent of oven-dry weight. Means within each column followed by the same letter are not significantly different in the same group at the 5% level of ANOVA test.

Table A3.11 Analysis of variance (ANOVA) table for Tol: IMS extractive of bark of twelve Malaysian timber species

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	541.92	541.92	481.27	0.000
	Error	8	9.01	1.13		
	Total	9	550.93			
N. heimii vs *M. utilis*	Species	1	194.44	194.44	172.32	0.000
	Error	8	9.03	1.13		
	Total	9	203.47			
N. heimii vs *P. pinnata*	Species	1	375.98	375.98	285.51	0.000
	Error	8	10.53	1.32		
	Total	9	386.52			
N. heimii vs *D. grandiflorus*	Species	1	931.11	931.11	822.36	0.000
	Error	8	9.06	1.13		
	Total	9	940.17			
N. heimii vs *D. kunstleri*	Species	1	1066.43	1066.43	908.56	0.000
	Error	8	9.39	1.17		
	Total	9	1075.82			
N. heimii vs *K. ivorensis*	Species	1	603.32	603.32	483.93	0.000
	Error	8	9.97	1.25		
	Total	9	613.29			
N. heimii vs *F. fragrans*	Species	1	1021.92	1021.92	824.97	0.000
	Error	8	9.91	1.24		
	Total	9	1031.83			
N. heimii vs *S. curtisii*	Species	1	758.17	758.17	634.61	0.000
	Error	8	9.56	1.19		
	Total	9	767.73			
N. heimii vs *A. angustifolia*	Species	1	1111.43	1111.43	992.66	0.000
	Error	8	8.96	1.12		
	Total	9	1120.38			
N. heimii vs *C. scortechinii*	Species	1	1040.61	1040.61	913.70	0.000
	Error	8	9.11	1.14		
	Total	9	1049.73			
N. heimii vs *H. brasiliensis*	Species	1	1204.63	1204.63	1070.65	0.000
	Error	8	9.00	1.13		
	Total	9	1213.64			
C. lanceolatum vs *M. utilis*	Species	1	87.1428	87.1428	2618.77	0.013
	Error	8	0.2666	0.0333		
	Total	9	87.4090			
C. lanceolatum vs *P. pinnata*	Species	1	15.124	15.124	68.20	0.000
	Error	8	1.774	0.222		
	Total	9	16.898			
C. lanceolatum vs *D. grandiflorus*	Species	1	52.3445	52.3445	1409.56	0.000
	Error	8	0.2971	0.0371		
	Total	9	52.6415			
C. lanceolatum vs *D. kunstleri*	Species	1	87.9306	87.9306	1117.94	0.000
	Error	8	0.6292	0.0787		
	Total	9	88.5598			
C. lanceolatum vs *K. ivorensis*	Species	1	1.647	1.647	10.86	0.011
	Error	8	1.213	0.152		
	Total	9	2.860			
C. lanceolatum vs *F. fragrans*	Species	1	75.487	75.487	525.55	0.000
	Error	8	1.149	0.144		
	Total	9	76.636			

Table A3.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	18.1119	18.1119	181.84	0.000
	Error	8	0.7968	0.0996		
	Total	9	18.9087			
C. lanceolatum vs *A.angustifolia*	Species	1	101.1812	101.1812	4122.4	0.000
	Error	8	0.1964	0.0245		
	Total	9	101.3776			
C. lanceolatum vs *C. scortechinii*	Species	1	80.6293	806293	1840.94	0.013
	Error	8	0.3504	0.0438		
	Total	9	80.9797			
C. lanceolatum vs *H. brasiliensis*	Species	1	130.6148	130.6148	4347.65	0.000
	Error	8	0.2403	0.0300		
	Total	9	130.8551			
M. utilis vs *P. pinnata*	Species	1	29.660	29.660	132.35	0.000
	Error	8	1.793	0.224		
	Total	9	31.453			
M. utilis vs *D. grandiflorus*	Species	1	274.5642	274.5642	6952.74	0.000
	Error	8	0.3159	0.0395		
	Total	9	274.8801			
M. utilis vs *D. kunstleri*	Species	1	350.1450	350.1450	4322.29	0.000
	Error	8	0.6481	0.0810		
	Total	9	350.7931			
M. utilis vs *K. ivorensis*	Species	1	112.749	112.749	732.35	0.000
	Error	8	1.232	0.154		
	Total	9	113.981			
M. utilis vs *F. fragrans*	Species	1	324.841	324.841	2225.13	0.000
	Error	8	1.168	0.146		
	Total	9	326.009			
M. utilis vs *S. curtisii*	Species	1	184.711	184.711	1811.62	0.006
	Error	8	0.816	0.102		
	Total	9	185.527			
M. utilis vs *A.angustifolia*	Species	1	376.1242	376.1242	13982.78	0.000
	Error	8	0.2152	0.0269		
	Total	9	376.3394			
M. utilis vs *C. scortechinii*	Species	1	335.4178	335.4178	7267.57	0.000
	Error	8	0.3692	0.0462		
	Total	9	335.7870			
M. utilis vs *H. brasiliensis*	Species	1	431.1319	431.1319	13307.58	0.000
	Error	8	0.2592	0.0324		
	Total	9	431.3911			
P. pinnata vs *D. grandiflorus*	Species	1	123.7411	123.741	542.80	0.000
	Error	8	1.824	0.228		
	Total	9	125.654			
P. pinnata vs *D. kunstleri*	Species	1	175.988	175.988	653.05	0.000
	Error	8	2.156	0.269		
	Total	9	178.144			
P. pinnata vs *K. ivorensis*	Species	1	26.752	26.752	78.12	0.000
	Error	8	2.739	0.342		
	Total	9	29.491			
P. pinnata vs *F. fragrans*	Species	1	158.187	158.187	472.95	0.001
	Error	8	2.676	0.334		
	Total	9	160.862			

Table A3.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	66.337	66.337	228.40	0.000
	Error	8	2.324	0.290		
	Total	9	68.660			
P. pinnata vs *A.angustifolia*	Species	1	194.542	194.542	903.26	0.000
	Error	8	1.723	0.215		
	Total	9	196.265			
P. pinnata vs *C. scortechinii*	Species	1	165.593	165.593	705.76	0.000
	Error	8	1.877	0.235		
	Total	9	167.470			
P. pinnata vs *H. brasiliensis*	Species	1	234.629	234.629	1062.26	0.000
	Error	8	1.767	0.221		
	Total	9	236.396			
D. grandiflorus vs *D. kunstleri*	Species	1	4.5889	4.5889	54.07	0.000
	Error	8	0.6789	0.0849		
	Total	9	5.2679			
D. grandiflorus vs *K. ivorensis*	Species	1	35.422	35.422	224.45	0.040
	Error	8	1.263	0.158		
	Total	9	36.685			
D. grandiflorus vs *F. fragrans*	Species	1	2.112	2.112	14.10	0.000
	Error	8	1.199	0.150		
	Total	9	3.311			
D. grandiflorus vs *S. curtisii*	Species	1	8.875	8.875	83.87	0.000
	Error	8	0.847	0.106		
	Total	9	9.722			
D. grandiflorus vs *A.angustifolia*	Species	1	7.9746	7.9746	259.27	0.001
	Error	8	0.2461	0.0308		
	Total	9	8.2207			
D. grandiflorus vs *C. scortechinii*	Species	1	3.0431	3.0431	60.85	0.000
	Error	8	0.4001	0.0500		
	Total	9	3.4432			
D. grandiflorus vs *H. brasiliensis*	Species	1	17.5874	17.5874	485.08	0.000
	Error	8	0.2901	0.0363		
	Total	9	17.8775			
D. kunstleri vs *K. ivorensis*	Species	1	65.510	65.510	328.64	0.000
	Error	8	1.595	0.199		
	Total	9	67.105			
D. kunstleri vs *F. fragrans*	Species	1	0.474	0.474	2.48	0.154
	Error	8	1.531	0.191		
	Total	9	2.005			
D. kunstleri vs *S. curtisii*	Species	1	26.228	26.228	178.01	0.000
	Error	8	1.179	0.147		
	Total	9	27.407			
D. kunstleri vs *A.angustifolia*	Species	1	0.4648	0.4648	6.43	0.035
	Error	8	0.5782	0.0723		
	Total	9	1.0430			
D. kunstleri vs *C. scortechinii*	Species	1	0.1582	0.1582	1.73	0.225
	Error	8	0.7322	0.0915		
	Total	9	0.8904			
D. kunstleri vs *H. brasiliensis*	Species	1	4.2089	4.2089	54.12	0.000
	Error	8	0.6222	0.0778		
	Total	9	4.8311			

Table A3.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	54.834	54.834	207.46	0.000
	Error	8	2.114	0.264		
	Total	9	56.948			
K. ivorensis vs *S. curtisii*	Species	1	8.836	8.836	40.11	0.000
	Error	8	1.762	0.220		
	Total	9	10.598			
K. ivorensis vs *A. angustifolia*	Species	1	77.011	77.011	530.29	0.000
	Error	8	1.162	0.145		
	Total	9	78.173			
K. ivorensis vs *C. scortechinii*	Species	1	59.230	59.230	360.11	0.000
	Error	8	1.316	0.164		
	Total	9	60.545			
K. ivorensis vs *H. brasiliensis*	Species	1	102.929	102.929	682.90	0.000
	Error	8	1.206	0.151		
	Total	9	104.134			
F. fragrans vs *S. curtisii*	Species	1	19.647	19.647	92.54	0.000
	Error	8	1.699	0.212		
	Total	9	21.346			
F. fragrans vs *A. angustifolia*	Species	1	1.879	1.879	13.69	0.000
	Error	8	1.098	0.137		
	Total	9	2.977			
F. fragrans vs *C. scortechinii*	Species	1	0.085	0.085	0.54	0.483
	Error	8	1.252	0.157		
	Total	9	1.337			
F. fragrans vs *H. brasiliensis*	Species	1	7.510	7.510	52.61	0.000
	Error	8	1.142	0.143		
	Total	9	8.652			
S. curtisii vs *A.angustifolia*	Species	1	33.6758	33.6758	361.22	0.000
	Error	8	0.7458	0.0932		
	Total	9	34.4216			
S. curtisii vs *C. scortechinii*	Species	1	22.312	22.312	198.36	0.000
	Error	8	0.900	0.112		
	Total	9	23.212			
S. curtisii vs *H. brasiliensis*	Species	1	51.4502	51.4502	521.14	0.001
	Error	8	0.7898	0.0987		
	Total	9	52.2400			
A.angustifolia vs *C. scortechinii*	Species	1	1.1653	1.1653	31.14	0.000
	Error	8	0.2994	0.0374		
	Total	9	1.4647			
A.angustifolia vs *H. brasiliensis*	Species	1	1.8763	1.8763	79.29	0.000
	Error	8	0.1893	0.0237		
	Total	9	2.0657			
C. scortechinii vs *H. brasiliensis*	Species	1	5.9991	5.9991	139.78	0.000
	Error	8	0.3434	0.0429		
	Total	9	6.3424			

Table A3.12 Analysis of variance (ANOVA) table for Tol: IMS extractive of heartwood of twelve Malaysian timber species

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	37.2981	37.2981	893.98	0.000
	Error	8	0.3338	0.0417		
	Total	9	37.6319			
N. heimii vs *M. utilis*	Species	1	31.3133	31.3133	599.49	0.000
	Error	8	0.4179	0.0522		
	Total	9	31.7312			
N. heimii vs *P. pinnata*	Species	1	52.397	52.397	156.08	0.000
	Error	8	2.686	0.336		
	Total	9	55.083			
N. heimii vs *D. grandiflorus*	Species	1	122.0638	122.0638	3030.53	0.000
	Error	8	0.3222	0.0403		
	Total	9	122.3860			
N. heimii vs *D. kunstleri*	Species	1	100.585	100.585	757.11	0.000
	Error	8	1.063	0.133		
	Total	9	101.648			
N. heimii vs *K. ivorensis*	Species	1	85.0949	85.0949	2379.47	0.000
	Error	8	0.2861	0.0358		
	Total	9	85.3810			
N. heimii vs *F. fragrans*	Species	1	57.009	57.009	288.39	0.000
	Error	8	1.581	0.198		
	Total	9	58.590			
N. heimii vs *S. curtisii*	Species	1	100.194	100.194	611.74	0.000
	Error	8	1.310	0.164		
	Total	9	101.504			
N. heimii vs *A. angustifolia*	Species	1	120.2801	120.2801	2281.49	0.000
	Error	8	0.4218	0.0527		
	Total	9	120.7018			
N. heimii vs *C. scortechinii*	Species	1	119.9736	119.9736	2861.91	0.000
	Error	8	0.3354	0.0419		
	Total	9	120.3090			
N. heimii vs *H. brasiliensis*	Species	1	153.5361	153.5361	4301.37	0.000
	Error	8	0.2856	0.0357		
	Total	9	153.8217			
C. lanceolatum vs *M. utilis*	Species	1	0.2615	0.2615	9.56	0.015
	Error	8	0.2188	0.0273		
	Total	9	0.4803			
C. lanceolatum vs *P. pinnata*	Species	1	1.280	1.280	4.12	0.077
	Error	8	2.487	0.311		
	Total	9	3.767			
C. lanceolatum vs *D. grandiflorus*	Species	1	24.4138	24.4138	1586.30	0.000
	Error	8	0.1231	0.0154		
	Total	9	24.5369			
C. lanceolatum vs *D. kunstleri*	Species	1	15.382	15.382	142.47	0.000
	Error	8	0.864	0.108		
	Total	9	16.246			
C. lanceolatum vs *K. ivorensis*	Species	1	9.7186	9.7186	893.71	0.000
	Error	8	0.0870	0.0109		
	Total	9	9.8056			
C. lanceolatum vs *F. fragrans*	Species	1	2.083	2.083	12.05	0.008
	Error	8	1.382	0.173		
	Total	9	3.465			

Table A3.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	15.229	15.229	109.64	0.000
	Error	8	1.111	0.139		
	Total	9	16.340			
C. lanceolatum vs *A.angustifolia*	Species	1	23.6197	23.6197	848.64	0.000
	Error	8	0.2227	0.0278		
	Total	9	23.8423			
C. lanceolatum vs *C. scortechinii*	Species	1	23.4840	23.4840	1378.71	0.000
	Error	8	0.1363	0.0170		
	Total	9	23.6202			
C. lanceolatum vs *H. brasiliensis*	Species	1	39.4855	39.4855	3653.65	0.000
	Error	8	0.0865	0.0108		
	Total	9	39.5720			
M. utilis vs *P. pinnata*	Species	1	2.699	2.699	8.40	0.020
	Error	8	2.571	0.321		
	Total	9	5.269			
M. utilis vs *D. grandiflorus*	Species	1	29.7289	29.7289	1147.72	0.000
	Error	8	0.2072	0.0259		
	Total	9	29.9361			
M. utilis vs *D. kunstleri*	Species	1	19.655	19.655	165.89	0.000
	Error	8	0.948	0.118		
	Total	9	20.603			
M. utilis vs *K. ivorensis*	Species	1	13.1686	13.1686	615.74	0.000
	Error	8	0.1711	0.0214		
	Total	9	13.3397			
M. utilis vs *F. fragrans*	Species	1	3.820	3.820	20.84	0.002
	Error	8	1.466	0.183		
	Total	9	5.287			
M. utilis vs *S. curtisii*	Species	1	19.482	19.482	130.39	0.006
	Error	8	1.195	0.149		
	Total	9	20.677			
M. utilis vs *A.angustifolia*	Species	1	28.8519	28.8519	752.44	0.000
	Error	8	0.3068	0.0383		
	Total	9	29.1587			
M. utilis vs *C. scortechinii*	Species	1	28.7019	28.7019	1041.98	0.000
	Error	8	0.2204	0.0275		
	Total	9	28.9223			
M. utilis vs *H. brasiliensis*	Species	1	46.1740	46.1740	2165.82	0.000
	Error	8	0.1706	0.0213		
	Total	9	46.3445			
P. pinnata vs *D. grandiflorus*	Species	1	14.514	14.514	46.91	0.000
	Error	8	2.475	0.309		
	Total	9	16.989			
P. pinnata vs *D. kunstleri*	Species	1	7.788	7.788	19.37	0.002
	Error	8	3.216	0.402		
	Total	9	11.003			
P. pinnata vs *K. ivorensis*	Species	1	3.945	3.945	12.94	0.000
	Error	8	2.439	0.305		
	Total	9	6.384			
P. pinnata vs *F. fragrans*	Species	1	0.097	0.097	0.21	0.660
	Error	8	3.734	0.467		
	Total	9	3.831			

Table A3.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	7.679	7.679	17.74	0.003
	Error	8	3.463	0.433		
	Total	9	11.142			
P. pinnata vs *A.angustifolia*	Species	1	13.903	13.903	43.20	0.000
	Error	8	2.575	0.322		
	Total	9	16.477			
P. pinnata vs *C. scortechinii*	Species	1	13.799	13.799	44.37	0.000
	Error	8	2.488	0.311		
	Total	9	16.287			
P. pinnata vs *H. brasiliensis*	Species	1	26.547	26.547	87.10	0.000
	Error	8	2.438	0.305		
	Total	9	28.986			
D. grandiflorus vs *D. kunstleri*	Species	1	1.038	1.038	9.75	0.014
	Error	8	0.852	0.107		
	Total	9	1.891			
D. grandiflorus vs *K. ivorensis*	Species	1	3.32536	3.32536	352.59	0.000
	Error	8	0.07545	0.00943		
	Total	9	3.40081			
D. grandiflorus vs *F. fragrans*	Species	1	12.235	12.235	71.40	0.000
	Error	8	1.371	0.171		
	Total	9	13.606			
D. grandiflorus vs *S. curtisii*	Species	1	1.079	1.079	7.85	0.023
	Error	8	1.100	0.137		
	Total	9	2.178			
D. grandiflorus vs *A.angustifolia*	Species	1	0.0066	0.0066	0.25	0.631
	Error	8	0.2111	0.0264		
	Total	9	0.2177			
D. grandiflorus vs *C. scortechinii*	Species	1	0.0090	0.0090	0.58	0.469
	Error	8	0.1247	0.0156		
	Total	9	0.1337			
D. grandiflorus vs *H. brasiliensis*	Species	1	1.80290	1.80290	192.54	0.000
	Error	8	0.07491	0.00936		
	Total	9	1.87781			
D. kunstleri vs *K. ivorensis*	Species	1	0.647	0.647	6.35	0.036
	Error	8	0.816	0.102		
	Total	9	1.463			
D. kunstleri vs *F. fragrans*	Species	1	6.144	6.144	23.28	0.001
	Error	8	2.111	0.264		
	Total	9	8.256			
D. kunstleri vs *S. curtisii*	Species	1	0.000	0.000	0.00	0.969
	Error	8	1.840	0.230		
	Total	9	1.841			
D. kunstleri vs *A.angustifolia*	Species	1	0.880	0.880	7.40	0.026
	Error	8	0.952	0.119		
	Total	9	1.832			
D. kunstleri vs *C. scortechinii*	Species	1	0.854	0.854	7.89	0.023
	Error	8	0.865	0.108		
	Total	9	1.719			
D. kunstleri vs *H. brasiliensis*	Species	1	5.578	5.578	54.72	0.000
	Error	8	0.816	0.102		
	Total	9	6.393			

Table A3.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	2.803	2.803	16.80	0.003
	Error	8	1.335	0.167		
	Total	9	4.138			
K. ivorensis vs *S. curtisii*	Species	1	0.616	0.616	4.64	0.063
	Error	8	1.064	0.133		
	Total	9	1.680			
K. ivorensis vs *A. angustifolia*	Species	1	3.0364	3.0364	138.82	0.000
	Error	8	0.1750	0.0219		
	Total	9	3.2114			
K. ivorensis vs *C. scortechinii*	Species	1	2.9879	2.9879	269.81	0.000
	Error	8	0.0886	0.0111		
	Total	9	3.0765			
K. ivorensis vs *H. brasiliensis*	Species	1	10.02533	10.02533	2067.94	0.000
	Error	8	0.03878	0.00485		
	Total	9	10.06411			
F. fragrans vs *S. curtisii*	Species	1	6.048	6.048	20.51	0.002
	Error	8	2.359	0.295		
	Total	9	8.407			
F. fragrans vs *A. angustifolia*	Species	1	11.675	11.675	63.52	0.000
	Error	8	1.470	0.184		
	Total	9	13.145			
F. fragrans vs *C. scortechinii*	Species	1	11.579	11.579	66.94	0.000
	Error	8	1.384	0.173		
	Total	9	12.963			
F. fragrans vs *H. brasiliensis*	Species	1	23.431	23.431	140.50	0.000
	Error	8	1.334	0.167		
	Total	9	24.765			
S. curtisii vs *A.angustifolia*	Species	1	0.917	0.917	6.12	0.000
	Error	8	1.199	0.150		
	Total	9	2.116			
S. curtisii vs *C. scortechinii*	Species	1	0.890	0.890	6.40	0.035
	Error	8	1.113	0.139		
	Total	9	2.003			
S. curtisii vs *H. brasiliensis*	Species	1	5.671	5.671	42.68	0.000
	Error	8	1.063	0.133		
	Total	9	6.734			
A.angustifolia vs *C. scortechinii*	Species	1	0.0002	0.0002	0.01	0.936
	Error	8	0.2243	0.0280		
	Total	9	0.2245			
A.angustifolia vs *H. brasiliensis*	Species	1	2.0270	2.0270	92.96	0.000
	Error	8	0.1744	0.0218		
	Total	9	2.2015			
C. scortechinii vs *H. brasiliensis*	Species	1	2.0670	2.0670	187.80	0.000
	Error	8	0.0881	0.0110		
	Total	9	2.1551			

Table A3.13 Analysis of variance (ANOVA) table for Hot water extractive of bark of twelve Malaysian wood species

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	14.652	14.652	43.49	0.000
	Error	8	2.701	0.338		
	Total	9	17.353			
N. heimii vs *M. utilis*	Species	1	55.0836	55.0836	998.69	0.000
	Error	8	0.4412	0.0552		
	Total	9	55.5248			
N. heimii vs *P. pinnata*	Species	1	45.1723	45.1723	609.95	0.000
	Error	8	0.5925	0.0741		
	Total	9	45.7648			
N. heimii vs *D. grandiflorus*	Species	1	183.1396	183.1396	2067.25	0.000
	Error	8	0.7087	0.0886		
	Total	9	183.8483			
N. heimii vs *D. kunstleri*	Species	1	24.035	24.035	128.73	0.000
	Error	8	1.494	0.187		
	Total	9	25.528			
N. heimii vs *K. ivorensis*	Species	1	75.415	75.415	646.59	0.000
	Error	8	0.933	0.117		
	Total	9	76.348			
N. heimii vs *F. fragrans*	Species	1	51.6714	51.6714	1172.54	0.000
	Error	8	0.3525	0.0441		
	Total	9	52.0240			
N. heimii vs *S. curtisii*	Species	1	19.0649	19.0649	195.87	0.000
	Error	8	0.7787	0.0973		
	Total	9	19.8435			
N. heimii vs *A. angustifolia*	Species	1	1787023	178.7023	3653.66	0.000
	Error	8	0.3913	0.0489		
	Total	9	179.0936			
N. heimii vs *C. scortechinii*	Species	1	188.5536	188.5536	3696.77	0.000
	Error	8	0.4080	0.0510		
	Total	9	188.9616			
N. heimii vs *H. brasiliensis*	Species	1	182.1801	182.1801	3330.35	0.000
	Error	8	0.4376	0.0547		
	Total	9	182.6177			
C. lanceolatum vs *M. utilis*	Species	1	126.553	126.553	413.94	0.013
	Error	8	2.446	0.306		
	Total	9	128.999			
C. lanceolatum vs *P. pinnata*	Species	1	111.277	111.277	342.78	0.000
	Error	8	2.597	0.325		
	Total	9	113.874			
C. lanceolatum vs *D. grandiflorus*	Species	1	301.392	301.392	888.63	0.000
	Error	8	0.339			
	Total	9	304.105			
C. lanceolatum vs *D. kunstleri*	Species	1	76.217	76.217	174.30	0.000
	Error	8	3.498	0.437		
	Total	9	79.716			
C. lanceolatum vs *K. ivorensis*	Species	1	156.548	156.548	426.32	0.000
	Error	8	2.938	0.367		
	Total	9	159.486			
C. lanceolatum vs *F. fragrans*	Species	1	121.353	121.353	411.87	0.000
	Error	8	2.357	0.295		
	Total	9	123.710			

Table A3.13 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	0.290	0.290	0.83	0.388
	Error	8	2.783	0.348		
	Total	9	3.073			
C. lanceolatum vs *A.angustifolia*	Species	1	295.692	296.692	987.34	0.000
	Error	8	2.396	0.299		
	Total	9	298.088			
C. lanceolatum vs *C. scortechinii*	Species	1	308.326	308.326	1022.37	0.000
	Error	8	2.413	0.302		
	Total	9	310.739			
C. lanceolatum vs *H. brasiliensis*	Species	1	300.161	300.161	983.24	0.000
	Error	8	2.442	0.304		
	Total	9	302.603			
M. utilis vs *P. pinnata*	Species	1	0.4911	0.4911	11.66	0.009
	Error	8	0.3369	0.0421		
	Total	9	0.8280			
M. utilis vs *D. grandiflorus*	Species	1	37.3452	37.3452	659.27	0.000
	Error	8	0.4532	0.0566		
	Total	9	37.7984			
M. utilis vs *D. kunstleri*	Species	1	6.347	6.347	41.01	0.000
	Error	8	1.238	0.155		
	Total	9	7.585			
M. utilis vs *K. ivorensis*	Species	1	1.5935	1.5935	18.82	0.002
	Error	8	0.6775	0.0847		
	Total	9	2.2711			
M. utilis vs *F. fragrans*	Species	1	0.0545	0.0545	4.50	0.067
	Error	8	0.0970	0.0121		
	Total	9	0.1515			
M. utilis vs *S. curtisii*	Species	1	138.9609	138.9609	2125.18	0.006
	Error	8	0.5231	0.0654		
	Total	9	139.4840			
M. utilis vs *A.angustifolia*	Species	1	35.3564	35.3564	2083.94	0.000
	Error	8	0.1357	0.0170		
	Total	9	35.4922			
M. utilis vs *C. scortechinii*	Species	1	39.8117	39.8117	2088.69	0.000
	Error	8	0.1525	0.0191		
	Total	9	39.9642			
M. utilis vs *H. brasiliensis*	Species	1	36.9127	36.9127	1621.91	0.000
	Error	8	0.1821	0.0228		
	Total	9	37.0947			
P. pinnata vs *D. grandiflorus*	Species	1	46.4016	46.4016	614.19	0.000
	Error	8	0.6044	0.0755		
	Total	9	47.0060			
P. pinnata vs *D. kunstleri*	Species	1	3.307	3.307	19.04	0.002
	Error	8	1.389	0.174		
	Total	9	4.696			
P. pinnata vs *K. ivorensis*	Species	1	3.854	3.854	37.20	0.000
	Error	8	0.829	0.104		
	Total	9	4.683			
P. pinnata vs *F. fragrans*	Species	1	0.2183	0.2183	7.04	0.029
	Error	8	0.2482	0.0310		
	Total	9	0.4665			

Table A3.13 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	122.9297	122.9297	1458.39	0.001
	Error	8	0.6743	0.0843		
	Total	9	123.6041			
P. pinnata vs *A.angustifolia*	Species	1	44.1816	44.1816	1231.73	0.000
	Error	8	0.2870	0.0359		
	Total	9	44.4686			
P. pinnata vs *C. scortechinii*	Species	1	49.1464	49.1464	1294.55	0.000
	Error	8	0.3037	0.0380		
	Total	9	49.401			
P. pinnata vs *H. brasiliensis*	Species	1	45.9193	45.9193	1102.19	0.000
	Error	8	0.3333	0.0417		
	Total	9	46.2526			
D. grandiflorus vs *D. kunstleri*	Species	1	74.483	74.483	395.78	0.000
	Error	8	1.506	0.188		
	Total	9	75.989			
D. grandiflorus vs *K. ivorensis*	Species	1	23.510	23.510	199.03	0.000
	Error	8	0.945	0.118		
	Total	9	24.455			
D. grandiflorus vs *F. fragrans*	Species	1	40.2542	40.2542	883.57	0.000
	Error	8	0.3645	0.0456		
	Total	9	40.6187			
D. grandiflorus vs *S. curtisii*	Species	1	320.3829	320.3829	3241.99	0.000
	Error	8	0.7906	0.0988		
	Total	9	321.1734			
D. grandiflorus vs *A.angustifolia*	Species	1	0.0272	0.0272	0.54	0.483
	Error	8	0.4032	0.0504		
	Total	9	0.4304			
D. grandiflorus vs *C. scortechinii*	Species	1	0.0394	0.0394	0.75	0.411
	Error	8	0.4200	0.0525		
	Total	9	0.4594			
D. grandiflorus vs *H. brasiliensis*	Species	1	0.0013	0.0013	0.02	0.885
	Error	8	0.4495	0.0562		
	Total	9	0.4508			
D. kunstleri vs *K. ivorensis*	Species	1	14.301	14.301	66.14	0.000
	Error	8	1.730	0.216		
	Total	9	16.031			
D. kunstleri vs *F. fragrans*	Species	1	5.225	5.225	36.37	0.040
	Error	8	1.149	0.144		
	Total	9	6.374			
D. kunstleri vs *S. curtisii*	Species	1	85.912	85.912	436.24	0.000
	Error	8	1.575	0.197		
	Total	9	87.487			
D. kunstleri vs *A.angustifolia*	Species	1	71.664	71.664	482.54	0.000
	Error	8	1.188	0.149		
	Total	9	72.852			
D. kunstleri vs *C. scortechinii*	Species	1	77.950	77.950	517.57	0.000
	Error	8	1.205	0.151		
	Total	9	79.155			
D. kunstleri vs *H. brasiliensis*	Species	1	73.872	73.872	478.74	0.000
	Error	8	1.234	0.154		
	Total	9	75.106			

Table A3.13 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	2.2377	2.2377	30.40	0.001
	Error	8	0.5888	0.0736		
	Total	9	2.8265			
K. ivorensis vs *S. curtisii*	Species	1	170.316	170.316	1342.48	0.000
	Error	8	1.015	0.127		
	Total	9	171.331			
K. ivorensis vs *A. angustifolia*	Species	1	21.9378	21.9378	279.66	0.000
	Error	8	0.6276	0.0784		
	Total	9	22.5653			
K. ivorensis vs *C. scortechinii*	Species	1	25.4752	25.4752	316.31	0.000
	Error	8	0.6443	0.0805		
	Total	9	26.1195			
K. ivorensis vs *H. brasiliensis*	Species	1	23.1672	23.1672	275.02	0.000
	Error	8	0.6739	0.0842		
	Total	9	23.8411			
F. fragrans vs *S. curtisii*	Species	1	133.5093	133.5093	2458.74	0.000
	Error	8	0.4344	0.0543		
	Total	9	133.9437			
F. fragrans vs *A. angustifolia*	Species	1	38.18836	38.18836	6496.56	0.000
	Error	8	0.4703	0.00588		
	Total	9	38.235.39			
F. fragrans vs *C. scortechinii*	Species	1	42.81340	42.81340	5370.02	0.000
	Error	8	0.06378	0.00797		
	Total	9	42.87718			
F. fragrans vs *H. brasiliensis*	Species	1	39.8050	39.8050	3410.67	0.000
	Error	8	0.0934	0.0117		
	Total	9	39.8984			
S. curtisii vs *A.angustifolia*	Species	1	314.5052	314.5052	5317.74	0.000
	Error	8	0.4731	0.0591		
	Total	9	314.9783			
S. curtisii vs *C. scortechinii*	Species	1	327.5310	327.5310	5348.58	0.000
	Error	8	0.4899	0.0612		
	Total	9	328.0209			
S. curtisii vs *H. brasiliensis*	Species	1	319.1134	319.1134	4914.34	0.000
	Error	8	0.5195	0.0649		
	Total	9	319.6329			
A.angustifolia vs *C. scortechinii*	Species	1	0.1321	0.1321	10.31	0.012
	Error	8	0.1025	0.0128		
	Total	9	0.2347			
A.angustifolia vs *H. brasiliensis*	Species	1	0.0168	0.0168	1.01	0.343
	Error	8	0.1321	0.0165		
	Total	9	0.1489			
C. scortechinii vs *H. brasiliensis*	Species	1	0.0548	0.0548	2.94	0.125
	Error	8	0.1489	0.0186		
	Total	9	0.2037			

Table A3.14 Analysis of variance (ANOVA) table for Hot water extractive of heartwood of twelve Malaysian wood species

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	6.3221	6.3221	72.74	0.000
	Error	8	0.6953	0.0869		
	Total	9	7.0174			
N. heimii vs *M. utilis*	Species	1	12.4503	12.4503	168.31	0.000
	Error	8	0.5918	0.0740		
	Total	9	13.0421			
N. heimii vs *P. pinnata*	Species	1	2.8847	2.8847	39.83	0.000
	Error	8	0.5794	0.0724		
	Total	9	3.4641			
N. heimii vs *D. grandiflorus*	Species	1	27.1277	27.1277	662.90	0.000
	Error	8	0.3274	0.0409		
	Total	9	27.4551			
N. heimii vs *D. kunstleri*	Species	1	29.3907	29.3907	975.98	0.000
	Error	8	0.2409	0.0301		
	Total	9	29.6316			
N. heimii vs *K. ivorensis*	Species	1	0.7953	0.7953	25.59	0.001
	Error	8	0.2487	0.0311		
	Total	9	1.0440			
N. heimii vs *F. fragrans*	Species	1	3.6497	3.6497	57.79	0.000
	Error	8	0.5052	0.0631		
	Total	9	4.1549			
N. heimii vs *S. curtisii*	Species	1	1.9375	1.9375	37.28	0.000
	Error	8	0.4157	0.0520		
	Total	9	2.3532			
N. heimii vs *A. angustifolia*	Species	1	24.8116	24.8116	757.65	0.000
	Error	8	0.2620	0.0327		
	Total	9	25.0736			
N. heimii vs *C. scortechinii*	Species	1	28.2540	28.2540	493.24	0.000
	Error	8	0.4583	0.0573		
	Total	9	28.7123			
N. heimii vs *H. brasiliensis*	Species	1	42.9720	42.9720	844.40	0.000
	Error	8	0.4071	0.0509		
	Total	9	43.3791			
C. lanceolatum vs *M. utilis*	Species	1	1.028	1.028	9.92	0.014
	Error	8	0.829	0.104		
	Total	9	1.858			
C. lanceolatum vs *P. pinnata*	Species	1	0.666	0.666	6.52	0.034
	Error	8	0.817	0.102		
	Total	9	1.483			
C. lanceolatum vs *D. grandiflorus*	Species	1	7.2579	7.2579	102.75	0.000
	Error	8	0.5651	0.0706		
	Total	9	7.8230			
C. lanceolatum vs *D. kunstleri*	Species	1	8.4503	8.4503	141.24	0.000
	Error	8	0.4786	0.0598		
	Total	9	8.9290			
C. lanceolatum vs *K. ivorensis*	Species	1	2.6327	2.6327	43.30	0.000
	Error	8	0.4864	0.0608		
	Total	9	3.1191			
C. lanceolatum vs *F. fragrans*	Species	1	0.3648	0.3648	3.93	0.083
	Error	8	0.7429	0.0929		
	Total	9	1.1077			

Table A3.14 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	1.2599	1.2599	15.42	0.004
	Error	8	0.6535	0.0817		
	Total	9	1.9133			
C. lanceolatum vs *A.angustifolia*	Species	1	6.0849	6.0849	97.42	0.000
	Error	8	0.4997	0.0625		
	Total	9	6.5846			
C. lanceolatum vs *C. scortechinii*	Species	1	7.8460	7.8460	90.19	0.000
	Error	8	0.6960	0.0870		
	Total	9	8.5420			
C. lanceolatum vs *H. brasiliensis*	Species	1	16.3291	16.3291	202.58	0.000
	Error	8	0.6448	0.0806		
	Total	9	16.9736			
M. utilis vs *P. pinnata*	Species	1	3.3491	3.3491	37.55	0.000
	Error	8	0.7036	0.0892		
	Total	9	4.0627			
M. utilis vs *D. grandiflorus*	Species	1	2.8222	2.8222	48.91	0.000
	Error	8	0.4616	0.0577		
	Total	9	3.2838			
M. utilis vs *D. kunstleri*	Species	1	3.5828	3.5828	76.41	0.000
	Error	8	0.3751	0.0469		
	Total	9	3.9579			
M. utilis vs *K. ivorensis*	Species	1	6.9522	6.9522	145.26	0.000
	Error	8	0.3829	0.0479		
	Total	9	7.3351			
M. utilis vs *F. fragrans*	Species	1	2.6182	2.6182	32.76	0.000
	Error	8	0.6394	0.0799		
	Total	9	3.2576			
M. utilis vs *S. curtisii*	Species	1	4.5649	4.5649	66.40	0.006
	Error	8	0.5500	0.0687		
	Total	9	5.1149			
M. utilis vs *A.angustifolia*	Species	1	2.1101	2.1101	42.61	0.000
	Error	8	0.3962	0.0495		
	Total	9	2.5063			
M. utilis vs *C. scortechinii*	Species	1	3.1932	3.1932	43.12	0.000
	Error	8	0.5925	0.0741		
	Total	9	3.7857			
M. utilis vs *H. brasiliensis*	Species	1	9.1615	9.1615	135.39	0.000
	Error	8	0.5413	0.0677		
	Total	9	9.7029			
P. pinnata vs *D. grandiflorus*	Species	1	12.3200	12.3200	219.41	0.000
	Error	8	0.4492	0.0562		
	Total	9	12.7692			
P. pinnata vs *D. kunstleri*	Species	1	13.8598	13.8598	305.67	0.000
	Error	8	0.3627	0.0453		
	Total	9	14.2226			
P. pinnata vs *K. ivorensis*	Species	1	0.6507	0.6507	14.05	0.006
	Error	8	0.3705	0.0463		
	Total	9	1.0212			
P. pinnata vs *F. fragrans*	Species	1	0.0449	0.0449	0.57	0.471
	Error	8	0.6270	0.0784		
	Total	9	0.6720			

Table A3.14 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	0.0939	0.0939	1.40	0.271
	Error	8	0.5376	0.0672		
	Total	9	0.6315			
P. pinnata vs *A.angustifolia*	Species	1	10.7761	10.7761	224.61	0.000
	Error	8	0.3838	0.0480		
	Total	9	11.1599			
P. pinnata vs *C. scortechinii*	Species	1	13.0828	13.0828	180.42	0.000
	Error	8	0.5801	0.0725		
	Total	9	13.6628			
P. pinnata vs *H. brasiliensis*	Species	1	23.5891	23.5891	356.77	0.000
	Error	8	0.5290	0.0661		
	Total	9	24.1180			
D. grandiflorus vs *D. kunstleri*	Species	1	0.0453	0.0453	3.27	0.108
	Error	8	0.1107	0.0138		
	Total	9	0.1560			
D. grandiflorus vs *K. ivorensis*	Species	1	18.6333	18.6333	1258.14	0.000
	Error	8	0.1185	0.0148		
	Total	9	18.7518			
D. grandiflorus vs *F. fragrans*	Species	1	10.8769	10.8769	232.04	0.000
	Error	8	0.3750	0.0469		
	Total	9	11.2519			
D. grandiflorus vs *S. curtisii*	Species	1	14.5656	14.5656	408.07	0.000
	Error	8	0.2856	0.0357		
	Total	9	14.8512			
D. grandiflorus vs *A.angustifolia*	Species	1	0.0517	0.0517	3.14	0.115
	Error	8	0.1318	0.0165		
	Total	9	0.1835			
D. grandiflorus vs *C. scortechinii*	Species	1	0.0115	0.0115	0.28	0.612
	Error	8	0.3281	0.0410		
	Total	9	0.3395			
D. grandiflorus vs *H. brasiliensis*	Species	1	1.8141	1.8141	52.41	0.000
	Error	8	0.2769	0.0346		
	Total	9	2.0910			
D. kunstleri vs *K. ivorensis*	Species	1	20.51654	21.51654	5126.90	0.000
	Error	8	0.03201	0.00400		
	Total	9	20.54856			
D. kunstleri vs *F. fragrans*	Species	1	12.3265	12.3265	341.78	0.040
	Error	8	0.2885	0.0361		
	Total	9	12.6150			
D. kunstleri vs *S. curtisii*	Species	1	16.2360	16.2360	652.42	0.000
	Error	8	0.1991	0.0249		
	Total	9	16.4350			
D. kunstleri vs *A.angustifolia*	Species	1	0.19377	0.19377	34.20	0.000
	Error	8	0.04532	0.00567		
	Total	9	0.23909			
D. kunstleri vs *C. scortechinii*	Species	1	0.0112	0.112	0.37	0.559
	Error	8	0.2416	0.0302		
	Total	9	0.2528			
D. kunstleri vs *H. brasiliensis*	Species	1	1.2859	1.2859	54.01	0.000
	Error	8	0.1905	0.0238		
	Total	9	1.4764			

Table A3.14 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	1.0376	1.0376	28.01	0.001
	Error	8	0.2963	0.0370		
	Total	9	1.3339			
K. ivorensis vs *S. curtisii*	Species	1	0.2501	0.2501	9.67	0.014
	Error	8	0.2069	0.0259		
	Total	9	0.4570			
K. ivorensis vs *A. angustifolia*	Species	1	16.72262	16.72262	2520.03	0.000
	Error	8	0.05309	0.00664		
	Total	9	16.77571			
K. ivorensis vs *C. scortechinii*	Species	1	19.5687	19.5687	627.80	0.000
	Error	8	0.2494	0.0312		
	Total	9	19.8180			
K. ivorensis vs *H. brasiliensis*	Species	1	32.0752	32.0752	1294.50	0.000
	Error	8	0.1982	0.0248		
	Total	9	32.2735			
F. fragrans vs *S. curtisii*	Species	1	0.2688	0.2688	4.64	0.063
	Error	8	0.4634	0.0579		
	Total	9	0.7322			
F. fragrans vs *A. angustifolia*	Species	1	9.4293	9.4293	243.65	0.000
	Error	8	0.3096	0.0387		
	Total	9	9.7389			
F. fragrans vs *C. scortechinii*	Species	1	11.5943	11.5943	183.35	0.000
	Error	8	0.5059	0.0632		
	Total	9	12.1001			
F. fragrans vs *H. brasiliensis*	Species	1	21.5750	21.5750	379.56	0.000
	Error	8	0.4547	0.0568		
	Total	9	22.0297			
S. curtisii vs *A.angustifolia*	Species	1	12.8823	12.8823	468.11	0.000
	Error	8	0.2202	0.0275		
	Total	9	13.1025			
S. curtisii vs *C. scortechinii*	Species	1	15.3940	15.3940	295.73	0.000
	Error	8	0.4164	0.0521		
	Total	9	15.8104			
S. curtisii vs *H. brasiliensis*	Species	1	26.6604	26.6604	583.86	0.000
	Error	8	0.3653	0.0457		
	Total	9	27.0257			
A.angustifolia vs *C. scortechinii*	Species	1	0.1118	0.1118	3.40	0.102
	Error	8	0.2627	0.0328		
	Total	9	0.3744			
A.angustifolia vs *H. brasiliensis*	Species	1	2.4780	2.4780	93.72	0.000
	Error	8	0.2115	0.0264		
	Total	9	2.6895			
C. scortechinii vs *H. brasiliensis*	Species	1	1.5372	1.5372	30.16	0.001
	Error	8	0.4078	0.0510		
	Total	9	1.9450			

Table A3.15 Analysis of variance (ANOVA) table for Total extractive of bark of twelve Malaysian wood species

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	378.36	378.36	275.31	0.000
	Error	8	10.99	1.37		
	Total	9	389.35			
N. heimii vs *M. utilis*	Species	1	456.50	456.50	417.00	0.000
	Error	8	8.76	1.09		
	Total	9	465.26			
N. heimii vs *P. pinnata*	Species	1	681.80	681.80	549.16	0.000
	Error	8	9.93	1.24		
	Total	9	691.73			
N. heimii vs *D. grandiflorus*	Species	1	1940.14	1940.14	1709.54	0.000
	Error	8	9.08	1.13		
	Total	9	1949.22			
N. heimii vs *D. kunstleri*	Species	1	1410.67	1410.67	1037.53	0.000
	Error	8	10.88	1.36		
	Total	9	1421.54			
N. heimii vs *K. ivorensis*	Species	1	1105.34	1105.34	877.83	0.000
	Error	8	10.07	1.26		
	Total	9	1115.41			
N. heimii vs *F. fragrans*	Species	1	1533.17	1533.17	1315.49	0.000
	Error	8	9.32	1.17		
	Total	9	1542.50			
N. heimii vs *S. curtisii*	Species	1	536.79	536.79	431.15	0.000
	Error	8	9.96	1.25		
	Total	9	546.75			
N. heimii vs *A. angustifolia*	Species	1	2181.45	2181.45	2058.48	0.000
	Error	8	8.48	1.06		
	Total	9	2189.93			
N. heimii vs *C. scortechinii*	Species	1	2115.08	2115.08	1937.71	0.000
	Error	8	8.73	1.09		
	Total	9	2123.82			
N. heimii vs *H. brasiliensis*	Species	1	2323.75	2323.75	2155.70	0.000
	Error	8	8.62	1.08		
	Total	9	2332.37			
C. lanceolatum vs *M. utilis*	Species	1	3.665	3.665	9.96	0.013
	Error	8	2.944	0.368		
	Total	9	6.609			
C. lanceolatum vs *P. pinnata*	Species	1	44.354	44.354	86.16	0.000
	Error	8	4.118	0.515		
	Total	9	48.472			
C. lanceolatum vs *D. grandiflorus*	Species	1	604.943	604.943	1482.15	0.000
	Error	8	3.265	0.408		
	Total	9	608.208			
C. lanceolatum vs *D. kunstleri*	Species	1	327.878	327.878	518.05	0.000
	Error	8	5.063	0.633		
	Total	9	332.941			
C. lanceolatum vs *K. ivorensis*	Species	1	190.308	190.308	357.43	0.000
	Error	8	4.259	0.532		
	Total	9	194.568			
C. lanceolatum vs *F. fragrans*	Species	1	388.260	388.260	884.95	0.000
	Error	8	3.510	0.439		
	Total	9	391.770			

Table A3.15 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	13.818	13.818	26.66	0.001
	Error	8	4.146	0.518		
	Total	9	17.964			
C. lanceolatum vs *A.angustifolia*	Species	1	742.812	742.812	2230.64	0.000
	Error	8	2.664	0.333		
	Total	9	745.476			
C. lanceolatum vs *C. scortechinii*	Species	1	704.297	704.297	1930.63	0.000
	Error	8	2.918	0.365		
	Total	9	707.216			
C. lanceolatum vs *H. brasiliensis*	Species	1	826.783	826.783	2354.03	0.000
	Error	8	2.810	0.351		
	Total	9	829.593			
M. utilis vs *P. pinnata*	Species	1	22.518	22.518	95.72	0.000
	Error	8	1.882	0.235		
	Total	9	24.400			
M. utilis vs *D. grandiflorus*	Species	1	514.430	514.30	4000.02	0.000
	Error	8	1.029	0.129		
	Total	9	515.459			
M. utilis vs *D. kunstleri*	Species	1	262.209	262.209	742.05	0.000
	Error	8	2.827	0.353		
	Total	9	265.035			
M. utilis vs *K. ivorensis*	Species	1	141.151	141.151	558.15	0.000
	Error	8	2.023	0.253		
	Total	9	143.174			
M. utilis vs *F. fragrans*	Species	1	316.477	316.477	1988.01	0.000
	Error	8	1.274	0.159		
	Total	9	317.750			
M. utilis vs *S. curtisii*	Species	1	3.250	3.250	13.61	0.006
	Error	8	1.910	0.239		
	Total	9	5.160			
M. utilis vs *A.angustifolia*	Species	1	642.1181	642.1181	12011.44	0.000
	Error	8	0.4277	0.0535		
	Total	9	642.5458			
M. utilis vs *C. scortechinii*	Species	1	606.3446	606.3446	7112.09	0.000
	Error	8	0.6820	0.0853		
	Total	9	607.0266			
M. utilis vs *H. brasiliensis*	Species	1	720.3477	720.3477	10050.28	0.000
	Error	8	0.5734	0.0717		
	Total	9	720.9211			
P. pinnata vs *D. grandiflorus*	Species	1	321.691	321.691	1168.05	0.000
	Error	8	2.203	0.275		
	Total	9	323.894			
P. pinnata vs *D. kunstleri*	Species	1	131.046	131.046	262.01	0.000
	Error	8	4.001	0.500		
	Total	9	135.048			
P. pinnata vs *K. ivorensis*	Species	1	50.914	50.914	127.38	0.000
	Error	8	3.198	0.400		
	Total	9	54.111			
P. pinnata vs *F. fragrans*	Species	1	170.159	170.159	556.08	0.000
	Error	8	2.448	0.306		
	Total	9	172.606			

Table A3.15 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	8.659	8.659	22.46	0.001
	Error	8	3.084	0.386		
	Total	9	11.743			
P. pinnata vs *A.angustifolia*	Species	1	424.143	424.143	2117.95	0.000
	Error	8	1.602	0.200		
	Total	9	425.745			
P. pinnata vs *C. scortechinii*	Species	1	395.165	395.165	1702.88	0.000
	Error	8	1.856	0.232		
	Total	9	397.021			
P. pinnata vs *H. brasiliensis*	Species	1	488.144	488.144	2234.31	0.000
	Error	8	1.748	0.218		
	Total	9	489.892			
D. grandiflorus vs *D. kunstleri*	Species	1	42.097	42.097	106.98	0.000
	Error	8	3.148	0.394		
	Total	9	45.245			
D. grandiflorus vs *K. ivorensis*	Species	1	17.291	17.291	154.62	0.000
	Error	8	0.895	0.112		
	Total	9	18.186			
D. grandiflorus vs *F. fragrans*	Species	1	23.924	23.924	120.01	0.000
	Error	8	1.595	0.199		
	Total	9	25.519			
D. grandiflorus vs *S. curtisii*	Species	1	435.907	435.907	1562.99	0.000
	Error	8	2.231	0.279		
	Total	9	438.138			
D. grandiflorus vs *A.angustifolia*	Species	1	7.0703	7.0703	75.52	0.000
	Error	8	0.7489	0.0936		
	Total	9	7.8192			
D. grandiflorus vs *C. scortechinii*	Species	1	3.775	3.775	30.10	0.001
	Error	8	1.003	0.125		
	Total	9	4.779			
D. grandiflorus vs *H. brasiliensis*	Species	1	116.648	116.648	398.05	0.000
	Error	8	2.344	0.293		
	Total	9	118.992			
D. kunstleri vs *K. ivorensis*	Species	1	18.595	18.595	35.91	0.000
	Error	8	4.142	0.518		
	Total	9	22.737			
D. kunstleri vs *F. fragrans*	Species	1	2.550	2.550	6.01	0.040
	Error	8	3.393	0.424		
	Total	9	5.943			
D. kunstleri vs *S. curtisii*	Species	1	207.077	207.077	411.16	0.000
	Error	8	4.029	0.504		
	Total	9	211.107			
D. kunstleri vs *A.angustifolia*	Species	1	83.671	83.671	262.81	0.000
	Error	8	2.547	0.318		
	Total	9	86.218			
D. kunstleri vs *C. scortechinii*	Species	1	71.085	71.085	203.01	0.000
	Error	8	2.801	0.350		
	Total	9	73.887			
D. kunstleri vs *H. brasiliensis*	Species	1	113.347	113.347	336.76	0.000
	Error	8	2.693	0.337		
	Total	9	116.039			

Table A3.15 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	34.917	34.917	107.89	0.000
	Error	8	2.589	0.324		
	Total	9	37.507			
K. ivorensis vs *S. curtisii*	Species	1	101.566	101.566	251.92	0.000
	Error	8	3.225	0.403		
	Total	9	104.792			
K. ivorensis vs *A. angustifolia*	Species	1	181.154	181.154	831.37	0.000
	Error	8	1.743	0.218		
	Total	9	182.898			
K. ivorensis vs *C. scortechinii*	Species	1	162.394	162.394	650.37	0.000
	Error	8	1.998	0.250		
	Total	9	164.391			
K. ivorensis vs *H. brasiliensis*	Species	1	223.760	223.760	947.68	0.000
	Error	8	1.889	0.236		
	Total	9	225.649			
F. fragrans vs *S. curtisii*	Species	1	255.588	255.588	825.87	0.000
	Error	8	2.476	0.309		
	Total	9	258.064			
F. fragrans vs *A. angustifolia*	Species	1	57.006	57.006	458.98	0.000
	Error	8	0.994	0.124		
	Total	9	58.000			
F. fragrans vs *C. scortechinii*	Species	1	46.707	46.707	299.41	0.000
	Error	8	1.248	0.156		
	Total	9	47.955			
F. fragrans vs *H. brasiliensis*	Species	1	81.894	81.894	575.03	0.000
	Error	8	1.139	0.142		
	Total	9	83.033			
S. curtisii vs *A.angustifolia*	Species	1	554.008	554.008	2719.14	0.000
	Error	8	1.630	0.204		
	Total	9	555.638			
S. curtisii vs *C. scortechinii*	Species	1	520.816	520.816	2211.15	0.000
	Error	8	1.884	0.236		
	Total	9	522.700			
S. curtisii vs *H. brasiliensis*	Species	1	626.833	626.833	2824.08	0.000
	Error	8	1.776	0.222		
	Total	9	628.608			
A.angustifolia vs *C. scortechinii*	Species	1	0.5126	0.5126	10.20	0.013
	Error	8	0.4021	0.0503		
	Total	9	0.9148			
A.angustifolia vs *H. brasiliensis*	Species	1	2.2477	2.2477	61.27	0.000
	Error	8	0.2935	0.0367		
	Total	9	2.5412			
C. scortechinii vs *H. brasiliensis*	Species	1	4.9072	4.9072	71.66	0.000
	Error	8	0.5478	0.0685		
	Total	9	5.4551			

Table A3.16 Analysis of variance (ANOVA) table for Total extractive of heartwood of twelve Malaysian wood species

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	74.3318	74.3318	980.49	0.000
	Error	8	0.6065	0.0758		
	Total	9	74.9383			
N. heimii vs *M. utilis*	Species	1	83.2533	83.2533	1596.72	0.000
	Error	8	0.4171	0.0521		
	Total	9	83.6704			
N. heimii vs *P. pinnata*	Species	1	79.870	79.870	389.31	0.000
	Error	8	1.641	0.205		
	Total	9	81.511			
N. heimii vs *D. grandiflorus*	Species	1	264.2795	264.2795	4112.57	0.000
	Error	8	0.5141	0.0643		
	Total	9	264.7936			
N. heimii vs *D. kunstleri*	Species	1	238.719	238.719	1707.65	0.000
	Error	8	1.118	0.140		
	Total	9	239.838			
N. heimii vs *K. ivorensis*	Species	1	102.3433	102.3433	2707.78	0.000
	Error	8	0.3024	0.0378		
	Total	9	102.6457			
N. heimii vs *F. fragrans*	Species	1	89.507	89.507	493.88	0.000
	Error	8	1.450	0.181		
	Total	9	90.957			
N. heimii vs *S. curtisii*	Species	1	129.997	129.997	1108.52	0.000
	Error	8	0.938	0.117		
	Total	9	130.935			
N. heimii vs *A. angustifolia*	Species	1	254.3501	254.3501	4164.48	0.000
	Error	8	0.4886	0.0611		
	Total	9	254.8387			
N. heimii vs *C. scortechinii*	Species	1	264.6704	264.6704	3160.31	0.000
	Error	8	0.6700	0.0837		
	Total	9	265.3404			
N. heimii vs *H. brasiliensis*	Species	1	358.9611	358.9611	5943.36	0.000
	Error	8	0.4832	0.0604		
	Total	9	359.4443			
C. lanceolatum vs *M. utilis*	Species	1	0.2527	0.2527	3.88	0.085
	Error	8	0.5217	0.0652		
	Total	9	0.7744			
C. lanceolatum vs *P. pinnata*	Species	1	0.099	0.099	0.46	0.519
	Error	8	1.746	0.218		
	Total	9	1.845			
C. lanceolatum vs *D. grandiflorus*	Species	1	58.2945	58.2945	753.86	0.000
	Error	8	0.6186	0.0773		
	Total	9	58.9131			
C. lanceolatum vs *D. kunstleri*	Species	1	46.635	46.635	305.08	0.000
	Error	8	1.223	0.153		
	Total	9	47.857			
C. lanceolatum vs *K. ivorensis*	Species	1	2.2347	2.2347	43.94	0.000
	Error	8	0.4069	0.0509		
	Total	9	2.6416			
C. lanceolatum vs *F. fragrans*	Species	1	0.704	0.704	3.63	0.093
	Error	8	1.554	0.194		
	Total	9	2.259			

Table A3.16 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	7.729	7.729	59.30	0.001
	Error	8	1.043	0.130		
	Total	9	8.771			
C. lanceolatum vs *A.angustifolia*	Species	1	53.6815	53.6815	724.03	0.000
	Error	8	0.5931	0.0741		
	Total	9	54.2746			
C. lanceolatum vs *C. scortechinii*	Species	1	58.4782	58.4782	604.02	0.000
	Error	8	0.7745	0.0968		
	Total	9	59.2527			
C. lanceolatum vs *H. brasiliensis*	Species	1	106.5990	106.5990	1451.04	0.000
	Error	8	0.5877	0.0735		
	Total	9	107.1867			
M. utilis vs *P. pinnata*	Species	1	0.035	0.035	0.18	0.682
	Error	8	1.556	0.195		
	Total	9	1.592			
M. utilis vs *D. grandiflorus*	Species	1	50.8704	50.8704	948.06	0.000
	Error	8	0.4293	0.0537		
	Total	9	51.2997			
M. utilis vs *D. kunstleri*	Species	1	40.021	40.021	309.78	0.000
	Error	8	1.034	0.129		
	Total	9	41.055			
M. utilis vs *K. ivorensis*	Species	1	0.9844	0.9844	36.20	0.000
	Error	8	0.2175	0.0272		
	Total	9	1.2019			
M. utilis vs *F. fragrans*	Species	1	0.113	0.113	0.66	0.439
	Error	8	1.365	0.171		
	Total	9	1.478			
M. utilis vs *S. curtisii*	Species	1	5.186	5.186	48.62	0.006
	Error	8	0.853	0.107		
	Total	9	6.039			
M. utilis vs *A.angustifolia*	Species	1	46.5674	46.5674	922.64	0.000
	Error	8	0.4038	0.0505		
	Total	9	46.9712			
M. utilis vs *C. scortechinii*	Species	1	51.0421	51.0421	697.83	0.000
	Error	8	0.5852	0.0731		
	Total	9	51.6272			
M. utilis vs *H. brasiliensis*	Species	1	96.4706	96.4706	1937.44	0.000
	Error	8	0.3983	0.0498		
	Total	9	96.8690			
P. pinnata vs *D. grandiflorus*	Species	1	53.577	53.577	259.23	0.000
	Error	8	1.653	0.207		
	Total	9	55.231			
P. pinnata vs *D. kunstleri*	Species	1	42.426	42.426	150.34	0.000
	Error	8	2.258	0.282		
	Total	9	44.684			
P. pinnata vs *K. ivorensis*	Species	1	1.391	1.391	7.72	0.024
	Error	8	1.442	0.180		
	Total	9	2.833			
P. pinnata vs *F. fragrans*	Species	1	0.274	0.274	0.85	0.384
	Error	8	2.589	0.324		
	Total	9	2.864			

Table A3.16 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	6.074	6.074	23.29	0.001
	Error	8	2.077	0.260		
	Total	9	8.152			
P. pinnata vs *A.angustifolia*	Species	1	49.159	49.159	241.58	0.000
	Error	8	1.628	0.203		
	Total	9	50.787			
P. pinnata vs *C. scortechinii*	Species	1	53.754	53.754	237.68	0.000
	Error	8	1.809	0.226		
	Total	9	55.563			
P. pinnata vs *H. brasiliensis*	Species	1	100.185	100.185	493.98	0.000
	Error	8	1.623	0.203		
	Total	9	101.808			
D. grandiflorus vs *D. kunstleri*	Species	1	0.650	0.650	4.60	0.064
	Error	8	1.130	0.141		
	Total	9	1.780			
D. grandiflorus vs *K. ivorensis*	Species	1	37.7019	37.7019	959.01	0.000
	Error	8	0.3145	0.0393		
	Total	9	38.0164			
D. grandiflorus vs *F. fragrans*	Species	1	46.183	46.183	252.71	0.000
	Error	8	1.462	0.183		
	Total	9	47.645			
D. grandiflorus vs *S. curtisii*	Species	1	23.572	23.572	198.43	0.000
	Error	8	0.950	0.119		
	Total	9	24.522			
D. grandiflorus vs *A.angustifolia*	Species	1	0.0951	0.0951	1.52	0.253
	Error	8	0.5007	0.0626		
	Total	9	0.5958			
D. grandiflorus vs *C. scortechinii*	Species	1	0.0001	0.0001	0.00	0.968
	Error	8	0.6821	0.0853		
	Total	9	0.6823			
D. grandiflorus vs *H. brasiliensis*	Species	1	7.2339	7.2339	116.84	0.000
	Error	8	0.4953	0.0619		
	Total	9	7.7292			
D. kunstleri vs *K. ivorensis*	Species	1	28.452	28.452	247.74	0.000
	Error	8	0.919	0.115		
	Total	9	29.371			
D. kunstleri vs *F. fragrans*	Species	1	35.877	35.877	138.90	0.000
	Error	8	2.066	0.258		
	Total	9	37.943			
D. kunstleri vs *S. curtisii*	Species	1	16.394	16.394	84.36	0.000
	Error	8	1.555	0.194		
	Total	9	17.948			
D. kunstleri vs *A.angustifolia*	Species	1	0.248	0.248	1.79	0.217
	Error	8	1.105	0.138		
	Total	9	1.353			
D. kunstleri vs *C. scortechinii*	Species	1	0.669	0.669	4.16	0.076
	Error	8	1.286	0.161		
	Total	9	1.956			
D. kunstleri vs *H. brasiliensis*	Species	1	12.220	12.220	88.91	0.000
	Error	8	1.100	0.137		
	Total	9	13.320			

Table A3.16 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	0.430	0.430	2.75	0.136
	Error	8	1.250	0.156		
	Total	9	1.680			
K. ivorensis vs *S. curtisii*	Species	1	1.6515	1.6515	17.89	0.003
	Error	8	0.7386	0.0923		
	Total	9	2.3901			
K. ivorensis vs *A. angustifolia*	Species	1	34.0107	34.0107	941.40	0.000
	Error	8	0.2890	0.0361		
	Total	9	34.2997			
K. ivorensis vs *C. scortechinii*	Species	1	37.8497	37.8497	643.7	0.000
	Error	8	0.4704	0.0588		
	Total	9	38.3201			
K. ivorensis vs *H. brasiliensis*	Species	1	77.9650	77.9650	2199.37	0.000
	Error	8	0.2836	0.0354		
	Total	9	78.2486			
F. fragrans vs *S. curtisii*	Species	1	3.767	3.767	15.98	0.004
	Error	8	1.886	0.236		
	Total	9	5.653			
F. fragrans vs *A. angustifolia*	Species	1	42.088	42.088	234.39	0.000
	Error	8	1.437	0.180		
	Total	9	43.524			
F. fragrans vs *C. scortechinii*	Species	1	46.347	46.347	229.17	0.000
	Error	8	1.618	0.202		
	Total	9	47.965			
F. fragrans vs *H. brasiliensis*	Species	1	89.973	89.973	502.97	0.000
	Error	8	1.431	0.179		
	Total	9	91.405			
S. curtisii vs *A.angustifolia*	Species	1	20.673	20673	178.83	0.000
	Error	8	0.925	0.116		
	Total	9	21.598			
S. curtisii vs *C. scortechinii*	Species	1	23.688	23.688	171.31	0.000
	Error	8	1.106	0.138		
	Total	9	24.795			
S. curtisii vs *H. brasiliensis*	Species	1	56.922	56.922	495.30	0.000
	Error	8	0.919	0.115		
	Total	9	57.841			
A.angustifolia vs *C. scortechinii*	Species	1	0.1026	0.1026	1.25	0.296
	Error	8	0.6566	0.0821		
	Total	9	0.7593			
A.angustifolia vs *H. brasiliensis*	Species	1	8.9875	8.9875	153.03	0.000
	Error	8	0.4698	0.0587		
	Total	9	9.4573			
C. scortechinii vs *H. brasiliensis*	Species	1	7.1694	7.1694	88.08	0.000
	Error	8	0.6512	0.0814		
	Total	9	7.8206			

Table A3.17 Analysis of variance (ANOVA) table for species between samples tested for Tol: IMS wood extractive

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	1	513.99	513.99	449.35	0.000
	Error	8	9.15	1.14		
	Total	9	523.14			
C. lanceolatum	Replicates	1	30.2441	30.2441	1266.63	0.000
	Error	8	0.1910	0.0239		
	Total	9	30.4351			
M. utilis	Replicates	1	205.1513	205.1513	5583.17	0.000
	Error	8	0.2940	0.0367		
	Total	9	205.4452			
P. pinnata	Replicates	1	110.665	110.665	217.55	0.000
	Error	8	4.070	0.509		
	Total	9	114.735			
D. grandiflorus	Replicates	1	10.2755	10.2755	358.68	0.000
	Error	8	0.2292	0.0286		
	Total	9	10.5047			
D. kunstleri	Replicates	1	0.002	0.002	0.01	0.915
	Error	8	1.302	0.163		
	Total	9	1.304			
K. ivorensis	Replicates	1	53.782	53.782	388.04	0.000
	Error	8	1.109	0.139		
	Total	9	54.891			
F. fragrans	Replicates	1	3.047	3.047	10.42	0.012
	Error	8	2.340	0.293		
	Total	9	5.388			
S. curtisii	Replicates	1	26.483	26.483	123.39	0.000
	Error	8	1.717	0.215		
	Total	9	28.200			
A. angustifolia	Replicates	1	0.0903	0.0903	3.17	0.113
	Error	8	0.2280	0.0285		
	Total	9	0.3183			
C. scortechinii	Replicates	1	1.8662	1.8662	50.50	0.000
	Error	8	0.2956	0.0370		
	Total	9	2.1619			
H. brasiliensis	Replicates	1	0.1257	0.1257	7.41	0.026
	Error	8	0.1358	0.0170		
	Total	9	0.2615			

Table A3.18 Analysis of variance (ANOVA) table for species between samples tested for hot water wood extractive

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	1	68.5759	68.5759	950.48	0.000
	Error	8	0.5772	0.0721		
	Total	9	69.1531			
C. lanceolatum	Replicates	1	213.837	213.837	606.74	0.000
	Error	8	2.819	0.352		
	Total	9	216.656			
M. utilis	Replicates	1	19.2521	19.2521	337.88	0.000
	Error	8	0.4558	0.0570		
	Total	9	19.7079			
P. pinnata	Replicates	1	10.6176	10.6176	142.83	0.000
	Error	8	0.5947	0.0743		
	Total	9	11.2123			
D. grandiflorus	Replicates	1	0.0019	0.0019	0.03	0.861
	Error	8	0.4589	0.0574		
	Total	9	0.4608			
D. kunstleri	Replicates	1	77.437	77.437	535.28	0.000
	Error	8	1.157	0.145		
	Total	9	78.595			
K. ivorensis	Replicates	1	0.2388	0.2388	3.16	0.113
	Error	8	0.6046	0.0756		
	Total	9	0.8434			
F. fragrans	Replicates	1	9.0191	9.0191	257.19	0.000
	Error	8	0.2805	0.0351		
	Total	9	9.2997			
S. curtisii	Replicates	1	197.1027	197.1027	2554.73	0.000
	Error	8	0.6172	0.0772		
	Total	9	197.7199			
A. angustifolia	Replicates	1	0.01119	0.01119	1.18	0.310
	Error	8	0.07608	0.00951		
	Total	9	0.08727			
C. scortechinii	Replicates	1	0.0182	0.0182	0.50	0.498
	Error	8	0.2891	0.0361		
	Total	9	0.3073			
H. brasiliensis	Replicates	1	1.7928	1.7928	53.60	0.000
	Error	8	0.2676	0.0334		
	Total	9	2.0603			

Table A3.19 Analysis of variance (ANOVA) table for species between samples tested for Total extractives

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	1	958.06	958.06	885.55	0.000
	Error	8	8.66	1.08		
	Total	9	966.71			
C. lanceolatum	Replicates	1	404.920	404.920	1099.70	0.000
	Error	8	2.946	0.368		
	Total	9	407.866			
M. utilis	Replicates	1	350.0950	350.0950	5386.67	0.000
	Error	8	0.5199	0.0650		
	Total	9	350.6149			
P. pinnata	Replicates	1	189.839	189.839	520.37	0.000
	Error	8	2.919	0.365		
	Total	9	192.757			
D. grandiflorus	Replicates	1	9.999	9.999	85.26	0.000
	Error	8	0.938	0.117		
	Total	9	10.937			
D. kunstleri	Replicates	1	78.220	78.220	187.33	0.000
	Error	8	3.340	0.418		
	Total	9	81.560			
K. ivorensis	Replicates	1	61.188	61.188	284.48	0.000
	Error	8	1.721	0.215		
	Total	9	62.909			
F. fragrans	Replicates	1	1.581	1.581	5.97	0.040
	Error	8	2.119	0.265		
	Total	9	3.700			
S. curtisii	Replicates	1	368.081	368.081	1312.66	0.000
	Error	8	2.243	0.280		
	Total	9	370.325			
A. angustifolia	Replicates	1	0.0380	0.0380	0.97	0.352
	Error	8	0.3115	0.0389		
	Total	9	0.3495			
C. scortechinii	Replicates	1	1.5157	1.5157	16.23	0.004
	Error	8	0.7473	0.0934		
	Total	9	2.2629			
H. brasiliensis	Replicates	1	2.8679	2.8679	50.78	0.000
	Error	8	0.4518	0.0565		
	Total	9	3.3197			

Table A3.20 Antioxidant activity (EC_{50}) and total phenols (%) of Tol: IMS extracts from bark and heartwood of twelve Malaysian woods species

Species	Portion	EC_{50} (μg/ml)	Total phenols (%)
N. heimii	Bark	93.60 (0.16)[a]	29.11 (0.23)[a]
	Heartwood	83.78 (1.20)[a]	24.11 (1.24)[a]
C. lanceolatum	Bark	86.28 (0.53)[b]	23.15 (0.68)[b]
	Heartwood	81.38 (0.27)[b]	20.05 (0.78)[b]
M. utilis	Bark	83.61 (0.58)[d]	22.14 (0.30)[c]
	Heartwood	75.28 (0.63)[c]	18.84 (0.99)[c]
P. pinnata	Bark	72.94 (2.19)[e]	13.92 (0.43)[f]
	Heartwood	63.07 (1.64)[e]	8.83 (0.13)[e]
D. grandiflorus	Bark	51.93 (1.99)[i]	8.88 (0.92)[h]
	Heartwood	18.66 (1.24)[i]	7.67 (0.09)[f]
D. kunstleri	Bark	66.83 (0.65)[g]	10.37 (0.30)[g]
	Heartwood	34.68 (1.06)[g]	7.62 (0.73)[f]
K. ivorensis	Bark	56.14 (1.41)[h]	18.13 (0.10)[e]
	Heartwood	27.56 (2.11)[h]	9.47 (1.22)[e]
F. fragrans	Bark	71.83 (0.91)[e]	8.70 (0.65)[h]
	Heartwood	66.18 (0.78)[d]	6.79 (0.12)[g]
S. curtisii	Bark	84.11 (0.53)[c]	18.77 (0.59)[d]
	Heartwood	76.80 (1.37)[c]	15.97 (0.91)[d]
A. angustifolia	Bark	22.59 (1.91)[k]	4.91 (0.15)[k]
	Heartwood	7.45 (1.60)[j]	4.28 (0.12)[i]
C. scortechinii	Bark	46.08 (5.69)[j]	7.54 (0.29)[j]
	Heartwood	28.53 (2.34)[h]	6.82 (0.34)[g]
H. brasiliensis	Bark	70.07 (0.95)[f]	8.16 (0.22)[i]
	Heartwood	54.39 (2.02)[f]	5.46 (0.06)[h]

Mean (± SD) of 6 replicates for each species. Means within each column followed by the same letter are not significantly different in the same group at the 5% level of ANOVA test.

Appendix 4 Laboratory testing of natural durability against termite

Table A4.1 Wood consumption (WC, %), visual rating (VR), termite mortality (TM, %) and wood moisture content (MC, %) of twelve Malaysian woods species against *C. curvignathus* in laboratory test

Timber species	WC	Range of WC	VR	Range of VR	TM	Range of TM	MC	Range of MC
N. heimii	0.86 (0.44)^{g}	0.51-1.75	9.80 (0.41)^{a}	9-10	100.00 (0)^{a}	100.00	33.29 (2.32)^{d}	30.21-37.06
C. lanceolatum	1.00 (0.40)^{g}	0.37-1.59	9.60 (0.51)^{b}	9-10	100.00 (0)^{a}	100.00	42.77 (3.51)^{c}	35.85-47.85
M. utilis	1.36 (0.31)^{f}	0.74-1.84	9.67 (0.49)^{b}	9-10	100.00 (0)^{a}	100.00	34.99 (2.52)^{d}	31.72-42.08
P. pinnata	3.80 (0.68)^{d}	2.54-4.95	9.13 (0.35)^{d}	9	98.20 (0.71)^{c}	96.50-99.25	27.83 (5.43)^{e}	20.30-37.60
D. grandiflorus	3.55 (1.61)^{de}	1.18-5.46	9.33 (0.82)^{c}	7-10	99.17 (0.98)^{b}	96.75-100.00	43.69 (7.09)^{c}	29.84-55.74
D. kunstleri	5.54 (1.10)^{c}	4.01-7.28	9.00 (0.65)^{d}	7-10	97.98 (0.92)^{c}	96.00-99.25	39.65 (8.55)^{c}	27.43-54.16
K. ivorensis	4.88 (1.92)^{c}	3.13-8.38	8.93 (0.88)^{e}	7-10	97.98 (0.94)^{c}	96.50-99.50	79.82 (19.77)^{a}	51.57-18.51
F. fragrans	2.97 (0.55)^{e}	2.28-4.46	9.40 (0.51)^{c}	9-10	99.53 (0.40)^{b}	99.00-100.00	56.70 (7.76)^{b}	40.94-75.86
S. curtisii	1.51 (0.48)^{f}	0.80-2.86	9.47 (0.52)^{c}	9-10	100.00 (0)^{a}	100.00	64.85 (14.92)^{b}	32.69-85.60
A. angustifolia	8.22 (1.70)^{b}	6.21-12.54	7.53 (0.92)^{f}	7-9	87.27 (2.76)^{e}	81.75-91.25	61.09 (9.34)^{b}	45.87-73.59
C. scortechinii	6.02 (1.06)^{c}	4.32-7.74	8.60 (0.80)^{e}	7-9	89.20 (1.68)^{d}	85.75-91.75	79.96 (8.18)^{a}	61.63-91.79
H. brasiliensis	12.36 (1.75)^{a}	9.99-15.76	5.87 (1.92)^{g}	4-9	67.70 (2.84)^{f}	62.25-72.50	80.50 (15.79)^{a}	60.68-99.38

Mean (± SD) of 15 replicates for each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Table A4.2 Wood consumption (WC, %), visual rating (VR), termite mortality (TM, %) and wood moisture content (MC, %) of twelve Malaysian woods species against *C. gestroi* in laboratory test

Timber species	WC	Range of WC	VR	Range of VR	TM	Range of TM	MC	Range of MC
N. heimii	0.72 (0.30)^{h}	0.09-1.23	9.93 (0.32)^{a}	9-10	100.00 (0)^{ab}	100.00	31.41 (2.96)^{f}	21.36-38.41
C. lanceolatum	0.82 (1.33)^{h}	0.07-4.06	9.67 (0.49)^{b}	9-10	100.00 (0)^{ab}	100.00	39.76 (6.34)^{e}	29.80-51.94
M. utilis	1.54 (0.70)^{f}	0.90-3.42	9.53 (0.50)^{b}	9-10	99.97 (0.09)^{b}	99.75-100	44.99 (7.55)^{d}	32.99-54.04
P. pinnata	1.64 (0.41)^{ef}	1.03-2.31	9.47 (0.52)^{b}	9-10	99.43 (0.46)^{c}	98.00-100	64.68 (13.03)^{c}	41.50-90.66
D. grandiflorus	2.48 (2.07)^{d}	0.52-7.70	9.40 (0.83)^{b}	7-10	98.37 (0.97)^{d}	96.00-100	41.62 (7.90)^{de}	30.70-56.20
D. kunstleri	3.66 (1.84)^{c}	0.68-7.43	9.07 (0.96)^{c}	7-10	96.25 (1.56)^{e}	93.00-99.00	45.82 (8.41)^{d}	30.61-61.00
K. ivorensis	2.67 (2.57)^{cd}	0.44-9.87	9.13 (0.99)^{c}	7-10	98.53 (0.51)^{d}	97.75-99.25	76.65 (15.23)^{b}	58.51-99.53
F. fragrans	1.90 (0.61)^{e}	1.14-3.00	9.40 (0.51)^{b}	9-10	98.53 (0.51)^{d}	97.25-99.25	39.95 (8.35)^{e}	17.78-51.73
S. curtisii	1.36 (0.35)^{g}	0.38-2.38	9.47 (0.52)^{b}	9-10	100.00 (0)^{ab}	100.00	44.44 (4.55)^{d}	35.17-51.69
A. angustifolia	7.37 (4.23)^{b}	2.52-17.18	7.80 (2.21)^{e}	4-10	95.20 (2.66)^{e}	89.25-98.50	68.31 (7.18)^{c}	57.33-79.84
C. scortechinii	2.74 (1.59)^{c}	1.12-5.37	8.87 (0.83)^{d}	7-10	98.22 (0.77)^{d}	96.50-99.50	40.22 (2.98)^{de}	31.59-50.43
H. brasiliensis	11.08 (3.27)^{a}	5.61-17.62	6.60 (1.80)^{f}	4-9	77.13 (6.85)^{f}	65.00-89.00	91.05 (19.56)^{a}	54.98-119.53

Mean (± SD) of 15 replicates for each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test

Table A4.3 Analysis of variance (ANOVA) table for sample between species of wood consumption with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	0.133	0.133	0.76	0.000
	Error	8	4.905	0.175		
	Total	9	5.037			
N. heimii vs *M. utilis*	Species	1	1.789	1.789	12.46	0.001
	Error	8	4.019	0.144		
	Total	9	5.808			
N. heimii vs *P. pinnata*	Species	1	64.381	64.381	198.41	0.000
	Error	8	9.086	0.324		
	Total	9	73.467			
N. heimii vs *D. grandiflorus*	Species	1	53.98	53.98	38.64	0.000
	Error	8	39.11	1.40		
	Total	9	93.09			
N. heimii vs *D. kunstleri*	Species	1	163.939	163.939	234.94	0.000
	Error	8	19.538	0.698		
	Total	9	183.477			
N. heimii vs *K. ivorensis*	Species	1	160.23	160.23	71.41	0.000
	Error	8	62.82	2.24		
	Total	9	223.05			
N. heimii vs *F. fragrans*	Species	1	33.102	33.102	134.29	0.000
	Error	8	6.902	0.246		
	Total	9	40.004			
N. heimii vs *S. curtisii*	Species	1	3.034	3.034	14.48	0.000
	Error	8	5.865	0.209		
	Total	9	8.898			
N. heimii vs *A. angustifolia*	Species	1	405.63	405.63	262.82	0.000
	Error	8	43.22	1.54		
	Total	9	448.85			
N. heimii vs *C. scortechinii*	Species	1	199.106	199.106	284.23	0.000
	Error	8	19.614	0.700		
	Total	9	218.720			
N. heimii vs *H. brasiliensis*	Species	1	990.28	990.28	607.53	0.000
	Error	8	45.64	1.63		
	Total	9	1035.92			
C. lanceolatum vs *M. utilis*	Species	1	0.946	0.946	7.37	0.000
	Error	8	3.597	0.128		
	Total	9	4.543			
C. lanceolatum vs *P. pinnata*	Species	1	58.663	58.663	189.60	0.000
	Error	8	8.663	0.309		
	Total	9	67.326			
C. lanceolatum vs *D. grandiflorus*	Species	1	48.75	48.75	35.28	0.000
	Error	8	38.69	1.38		
	Total	9	87.44			
C. lanceolatum vs *D. kunstleri*	Species	1	154.735	154.735	226.65	0.000
	Error	8	19.115	0.683		
	Total	9	173.851			
C. lanceolatum vs *K. ivorensis*	Species	1	151.13	151.13	67.81	0.000
	Error	8	62.40	2.23		
	Total	9	213.53			
C. lanceolatum vs *F. fragrans*	Species	1	29.040	29.040	125.49	0.000
	Error	8	6.480	0.231		
	Total	9	35.519			

Table A4.3 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	1.896	1.896	9.76	0.004
	Error	8	5.443	0.194		
	Total	9	7.339			
C. lanceolatum vs *A.angustifolia*	Species	1	391.08	391.08	255.89	0.000
	Error	8	42.79	1.53		
	Total	9	433.87			
C. lanceolatum vs *C. scortechinii*	Species	1	188.949	188.949	275.67	0.000
	Error	8	19.192	0.685		
	Total	9	208.141			
C. lanceolatum vs *H. brasiliensis*	Species	1	967.46	967.46	599.08	0.000
	Error	8	45.22	1.61		
	Total	9	1012.68			
M. utilis vs *P. pinnata*	Species	1	44.707	44.707	160.94	0.000
	Error	8	7.778	0.278		
	Total	9	52.485			
M. utilis vs *D. grandiflorus*	Species	1	36.11	36.11	26.75	0.000
	Error	8	37.80	1.35		
	Total	9	73.91			
M. utilis vs *D. kunstleri*	Species	1	131.478	131.478	201.94	0.000
	Error	8	18.230	0.651		
	Total	9	149.708			
M. utilis vs *K. ivorensis*	Species	1	128.15	128.15	58.33	0.000
	Error	8	61.52	2.20		
	Total	9	189.67			
M. utilis vs *F. fragrans*	Species	1	19.501	19.501	97.60	0.000
	Error	8	5.594	0.200		
	Total	9	25.095			
M. utilis vs *S. curtisii*	Species	1	0.163	0.163	1.00	0.325
	Error	8	4.557	0.163		
	Total	9	4.721			
M. utilis vs *A.angustifolia*	Species	1	353.55	353.55	236.22	0.000
	Error	8	41.91	1.50		
	Total	9	395.45			
M. utilis vs *C. scortechinii*	Species	1	163.150	163.150	249.54	0.000
	Error	8	18.306	0.654		
	Total	9	181.456			
M. utilis vs *H. brasiliensis*	Species	1	907.89	907.89	573.42	0.000
	Error	8	44.33	1.58		
	Total	9	952.22			
P. pinnata vs *D. grandiflorus*	Species	1	0.46	0.46	0.30	0.589
	Error	8	42.87	1.53		
	Total	9	43.33			
P. pinnata vs *D. kunstleri*	Species	1	22.849	22.849	27.46	0.000
	Error	8	23.297	0.832		
	Total	9	46.146			
P. pinnata vs *K. ivorensis*	Species	1	21.48	21.48	9.03	0.006
	Error	8	66.58	2.38		
	Total	9	88.06			
P. pinnata vs *F. fragrans*	Species	1	5.154	5.154	13.54	0.001
	Error	8	10.661	0.381		
	Total	9	15.815			

Table A4.3 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	39.465	39.465	114.82	0.000
	Error	8	9.624	0.344		
	Total	9	49.088			
P. pinnata vs *A.angustifolia*	Species	1	146.81	146.81	87.51	0.000
	Error	8	46.97	1.68		
	Total	9	193.78			
P. pinnata vs *C. scortechinii*	Species	1	37.048	37.048	44.38	0.000
	Error	8	23.373	0.835		
	Total	9	60.421			
P. pinnata vs *H. brasiliensis*	Species	1	549.66	549.66	311.56	0.000
	Error	8	49.40	1.76		
	Total	9	599.06			
D. grandiflorus vs *D. kunstleri*	Species	1	29.78	29.78	15.64	0.000
	Error	8	53.32	1.90		
	Total	9	83.10			
D. grandiflorus vs *K. ivorensis*	Species	1	28.21	28.21	8.18	0.008
	Error	8	96.61	3.45		
	Total	9	124.82			
D. grandiflorus vs *F. fragrans*	Species	1	2.54	2.54	1.75	0.197
	Error	8	40.68	1.45		
	Total	9	43.22			
D. grandiflorus vs *S. curtisii*	Species	1	31.42	31.42	22.19	0.000
	Error	8	39.65	1.42		
	Total	9	71.06			
D. grandiflorus vs *A.angustifolia*	Species	1	163.67	163.67	59.52	0.000
	Error	8	77.00	2.75		
	Total	9	240.67			
D. grandiflorus vs *C. scortechinii*	Species	1	45.75	45.75	23.99	0.000
	Error	8	53.40	1.91		
	Total	9	99.14			
D. grandiflorus vs *H. brasiliensis*	Species	1	581.87	581.87	205.13	0.000
	Error	8	79.42	2.84		
	Total	9	661.29			
D. kunstleri vs *K. ivorensis*	Species	1	0.02	0.02	0.01	0.931
	Error	8	77.04	2.75		
	Total	9	77.06			
D. kunstleri vs *F. fragrans*	Species	1	49.708	49.708	65.92	0.000
	Error	8	21.113	0.754		
	Total	9	70.821			
D. kunstleri vs *S. curtisii*	Species	1	122.372	122.372	170.67	0.000
	Error	8	20.076	0.717		
	Total	9	142.448			
D. kunstleri vs *A.angustifolia*	Species	1	53.82	53.82	26.24	0.000
	Error	8	57.43	2.05		
	Total	9	111.25			
D. kunstleri vs *C. scortechinii*	Species	1	1.71	1.71	1.41	0.245
	Error	8	33.82	1.21		
	Total	9	35.53			
D. kunstleri vs *H. brasiliensis*	Species	1	348.38	348.38	162.98	0.000
	Error	8	59.85	2.14		
	Total	9	408.23			

Table A4.3 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	47.67	47.67	20.73	0.000
	Error	8	64.40	2.30		
	Total	9	112.07			
K. ivorensis vs *S. curtisii*	Species	1	119.17	119.17	52.66	0.000
	Error	8	63.36	2.26		
	Total	9	182.53			
K. ivorensis vs *A. angustifolia*	Species	1	55.98	55.98	15.56	0.000
	Error	8	100.71	3.60		
	Total	9	156.70			
K. ivorensis vs *C. scortechinii*	Species	1	2.11	2.11	0.77	0.389
	Error	8	77.11	2.75		
	Total	9	79.22			
K. ivorensis vs *H. brasiliensis*	Species	1	353.84	3.53.84	96.06	0.000
	Error	8	103.14	3.68		
	Total	9	456.98			
F. fragrans vs *S. curtisii*	Species	1	16.094	16.094	60.57	0.000
	Error	8	7.440	0.266		
	Total	9	23.534			
F. fragrans vs *A. angustifolia*	Species	1	206.98	206.98	129.39	0.000
	Error	8	44.79	1.60		
	Total	9	251.77			
F. fragrans vs *C. scortechinii*	Species	1	69.840	69.840	92.29	0.000
	Error	8	21.189	0.757		
	Total	9	91.029			
F. fragrans vs *H. brasiliensis*	Species	1	661.27	661.27	392.16	0.000
	Error	8	47.22	1.69		
	Total	9	708.49			
S. curtisii vs *A.angustifolia*	Species	1	338.51	338.51	216.51	0.000
	Error	8	43.75	1.56		
	Total	9	382.26			
S. curtisii vs *C. scortechinii*	Species	1	152.987	152.987	212.57	0.000
	Error	8	20.152	0.720		
	Total	9	173.139			
S. curtisii vs *H. brasiliensis*	Species	1	883.70	883.70	535.83	0.000
	Error	8	46.18	1.65		
	Total	9	929.87			
A.angustifolia vs *C. scortechinii*	Species	1	36.36	36.36	17.70	0.000
	Error	8	57.50	2.05		
	Total	9	93.86			
A.angustifolia vs *H. brasiliensis*	Species	1	128.33	128.33	43.02	0.000
	Error	8	83.53	2.98		
	Total	9	211.86			
C. scortechinii vs *H. brasiliensis*	Species	1	301.31	301.31	140.78	0.000
	Error	8	59.93	2.14		
	Total	9	361.23			

Table A4.4 Analysis of variance (ANOVA) table for sample between species of wood consumption with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	0.434	0.434	0.46	0.502
	Error	8	26.215	0.936		
	Total	9	26.649			
N. heimii vs *M. utilis*	Species	1	6.988	6.988	22.15	0.000
	Error	8	8.832	0.315		
	Total	9	15.819			
N. heimii vs *P. pinnata*	Species	1	8.371	8.371	59.74	0.000
	Error	8	3.924	0.140		
	Total	9	12.295			
N. heimii vs *D. grandiflorus*	Species	1	27.10	27.10	12.35	0.002
	Error	8	61.46	2.20		
	Total	9	88.57			
N. heimii vs *D. kunstleri*	Species	1	71.21	71.21	40.67	0.000
	Error	8	49.03	1.75		
	Total	9	120.24			
N. heimii vs *K. ivorensis*	Species	1	32.86	32.86	9.77	0.004
	Error	8	94.17	3.36		
	Total	9	127.03			
N. heimii vs *F. fragrans*	Species	1	13.033	13.033	53.63	0.000
	Error	8	6.804	0.243		
	Total	9	19.837			
N. heimii vs *S. curtisii*	Species	1	4.603	4.603	17.41	0.000
	Error	8	7.402	0.264		
	Total	9	12.005			
N. heimii vs *A. angustifolia*	Species	1	346.25	346.25	38.47	0.000
	Error	8	252.01	9.00		
	Total	9	598.27			
N. heimii vs *C. scortechinii*	Species	1	48.97	48.97	42.15	0.000
	Error	8	32.54	1.16		
	Total	9	81.51			
N. heimii vs *H. brasiliensis*	Species	1	826.34	826.34	153.25	0.000
	Error	8	150.98	5.39		
	Total	9	977.33			
C. lanceolatum vs *M. utilis*	Species	1	3.94	3.94	3.45	0.074
	Error	8	31.96	1.14		
	Total	9	35.90			
C. lanceolatum vs *P. pinnata*	Species	1	4.994	4.994	5.17	0.031
	Error	8	27.052	0.966		
	Total	9	32.046			
C. lanceolatum vs *D. grandiflorus*	Species	1	20.68	20.68	6.85	0.014
	Error	8	84.59	3.02		
	Total	9	105.27			
C. lanceolatum vs *D. kunstleri*	Species	1	6053	60.53	23.49	0.000
	Error	8	72.16	2.58		
	Total	9	132.69			
C. lanceolatum vs *K. ivorensis*	Species	1	25.74	25.74	6.14	0.019
	Error	8	117.30	4.19		
	Total	9	143.04			
C. lanceolatum vs *F. fragrans*	Species	1	8.71	8.71	8.15	0.008
	Error	8	29.93	1.07		
	Total	9	38.64			

Table A4.4 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	2.21	2.21	2.03	0.166
	Error	8	30.53	1.09		
	Total	9	32.74			
C. lanceolatum vs *A.angustifolia*	Species	1	322.18	322.18	32.79	0.000
	Error	8	275.14	9.83		
	Total	9	597.32			
C. lanceolatum vs *C. scortechinii*	Species	1	40.19	40.19	20.22	0.000
	Error	8	55.66	1.99		
	Total	9	95.85			
C. lanceolatum vs *H. brasiliensis*	Species	1	788.92	788.92	126.87	0.000
	Error	8	174.11	6.22		
	Total	9	963.03			
M. utilis vs *P. pinnata*	Species	1	0.062	0.062	0.18	0.674
	Error	8	9.668	0.345		
	Total	9	9.731			
M. utilis vs *D. grandiflorus*	Species	1	6.57	6.57	2.74	0.109
	Error	8	67.21	2.40		
	Total	9	73.78			
M. utilis vs *D. kunstleri*	Species	1	33.58	33.58	17.17	0.000
	Error	8	54.77	1.96		
	Total	9	88.36			
M. utilis vs *K. ivorensis*	Species	1	9.54	9.54	2.67	0.113
	Error	8	99.91	3.57		
	Total	9	109.45			
M. utilis vs *F. fragrans*	Species	1	0.935	0.935	2.09	0.000
	Error	8	12.549	0.448		
	Total	9	13.483			
M. utilis vs *S. curtisii*	Species	1	0.248	0.248	0.53	0.473
	Error	8	13.147	0.470		
	Total	9	13.395			
M. utilis vs *A.angustifolia*	Species	1	254.87	254.87	27.69	0.000
	Error	8	257.76	9.21		
	Total	9	512.62			
M. utilis vs *C. scortechinii*	Species	1	18.96	18.96	13.87	0.001
	Error	8	38.28	1.37		
	Total	9	57.24			
M. utilis vs *H. brasiliensis*	Species	1	681.36	681.36	121.73	0.000
	Error	8	156.73	5.60		
	Total	9	838.09			
P. pinnata vs *D. grandiflorus*	Species	1	5.35	5.35	2.40	0.132
	Error	8	62.30	2.22		
	Total	9	67.65			
P. pinnata vs *D. kunstleri*	Species	1	30.75	30.75	17.27	0.000
	Error	8	49.87	1.78		
	Total	9	80.62			
P. pinnata vs *K. ivorensis*	Species	1	8.06	8.06	2.38	0.135
	Error	8	95.01	3.39		
	Total	9	103.07			
P. pinnata vs *F. fragrans*	Species	1	0.514	0.514	1.88	0.181
	Error	8	7.640	0.273		
	Total	9	8.154			

Table A4.4 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	0.559	0.559	1.90	0.179
	Error	8	8.239	0.294		
	Total	9	8.798			
P. pinnata vs *A.angustifolia*	Species	1	246.95	246.95	27.35	0.000
	Error	8	252.85	9.03		
	Total	9	499.80			
P. pinnata vs *C. scortechinii*	Species	1	16.85	16.85	14.14	0.001
	Error	8	33.37	1.19		
	Total	9	50.22			
P. pinnata vs *H. brasiliensis*	Species	1	668.38	668.38	123.27	0.000
	Error	8	151.82	5.42		
	Total	9	820.20			
D. grandiflorus vs *D. kunstleri*	Species	1	10.45	10.45	2.72	0.110
	Error	8	107.40	3.84		
	Total	9	117.85			
D. grandiflorus vs *K. ivorensis*	Species	1	0.28	0.28	0.05	0.823
	Error	8	152.55	5.45		
	Total	9	152.82			
D. grandiflorus vs *F. fragrans*	Species	1	2.55	2.55	1.09	0.304
	Error	8	65.18	2.33		
	Total	9	67.73			
D. grandiflorus vs *S. curtisii*	Species	1	9.37	9.37	3.99	0.056
	Error	8	65.78	2.35		
	Total	9	75.15			
D. grandiflorus vs *A.angustifolia*	Species	1	179.6	179.6	16.20	0.000
	Error	8	310.4	11.1		
	Total	9	490.0			
D. grandiflorus vs *C. scortechinii*	Species	1	3.21	3.21	0.99	0.328
	Error	8	90.91	3.25		
	Total	9	94.12			
D. grandiflorus vs *H. brasiliensis*	Species	1	554.13	554.13	74.11	0.000
	Error	8	209.36	7.48		
	Total	9	763.49			
D. kunstleri vs *K. ivorensis*	Species	1	7.32	7.32	1.46	0.236
	Error	8	140.11	5.00		
	Total	9	147.44			
D. kunstleri vs *F. fragrans*	Species	1	23.31	23.31	12.38	0.002
	Error	8	52.75	1.88		
	Total	9	76.06			
D. kunstleri vs *S. curtisii*	Species	1	39.60	39.60	20.79	0.000
	Error	8	53.34	1.91		
	Total	9	92.95			
D. kunstleri vs *A.angustifolia*	Species	1	103.4	103.4	9.72	0.004
	Error	8	298.0	10.6		
	Total	9	401.4			
D. kunstleri vs *C. scortechinii*	Species	1	2.07	2.07	0.74	0.397
	Error	8	78.48	2.80		
	Total	9	80.55			
D. kunstleri vs *H. brasiliensis*	Species	1	412.40	412.40	58.64	0.000
	Error	8	196.93	7.03		
	Total	9	609.33			

Table A4.4 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	4.50	4.50	1.29	0.266
	Error	8	97.89	3.50		
	Total	9	102.39			
K. ivorensis vs *S. curtisii*	Species	1	12.86	12.86	3.66	0.066
	Error	8	98.49	3.52		
	Total	9	111.35			
K. ivorensis vs *A. angustifolia*	Species	1	165.8	165.8	13.53	0.001
	Error	8	343.1	12.3		
	Total	9	508.9			
K. ivorensis vs *C. scortechinii*	Species	1	1.60	1.60	0.36	0.552
	Error	8	123.62	4.41		
	Total	9	125.22			
K. ivorensis vs *H. brasiliensis*	Species	1	529.65	529.65	61.26	0.000
	Error	8	242.07	8.65		
	Total	9	771.72			
F. fragrans vs *S. curtisii*	Species	1	2.146	2.146	5.40	0.028
	Error	8	11.119	0.397		
	Total	9	13.264			
F. fragrans vs *A. angustifolia*	Species	1	224.93	224.93	24.63	0.000
	Error	8	255.73	9.13		
	Total	9	480.66			
F. fragrans vs *C. scortechinii*	Species	1	11.48	11.48	8.87	0.006
	Error	8	36.25	1.29		
	Total	9	47.73			
F. fragrans vs *H. brasiliensis*	Species	1	631.82	631.82	114.36	0.000
	Error	8	154.70	5.53		
	Total	9	786.52			
S. curtisii vs *A.angustifolia*	Species	1	271.01	271.01	29.60	0.000
	Error	8	256.33	9.15		
	Total	9	527.34			
S. curtisii vs *C. scortechinii*	Species	1	23.55	23.55	17.89	0.000
	Error	8	36.85	1.32		
	Total	9	60.40			
S. curtisii vs *H. brasiliensis*	Species	1	707.60	707.60	127.58	0.000
	Error	8	155.30	5.55		
	Total	9	862.90			
A.angustifolia vs *C. scortechinii*	Species	1	134.8	134.8	13.41	0.001
	Error	8	281.5	10.1		
	Total	9	416.2			
A.angustifolia vs *H. brasiliensis*	Species	1	102.8	102.8	7.20	0.012
	Error	8	399.9	14.3		
	Total	9	502.7			
C. scortechinii vs *H. brasiliensis*	Species	1	472.98	472.98	73.40	0.000
	Error	8	180.43	6.44		
	Total	9	653.41			

Table A4.5 Analysis of variance (ANOVA) table for sample between species of average visual rating with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	0.300	0.300	1.40	0.247
	Error	8	6.000	0.214		
	Total	9	6.300			
N. heimii vs *M. utilis*	Species	1	0.133	0.133	0.65	0.426
	Error	8	5.733	0.205		
	Total	9	5.867			
N. heimii vs *P. pinnata*	Species	1	3.333	3.333	22.58	0.000
	Error	8	4.133	0.148		
	Total	9	7.467			
N. heimii vs *D. grandiflorus*	Species	1	1.633	1.633	3.90	0.058
	Error	8	11.733	0.419		
	Total	9	13.367			
N. heimii vs *D. kunstleri*	Species	1	4.800	4.800	16.00	0.000
	Error	8	8.400	0.300		
	Total	9	13.200			
N. heimii vs *K. ivorensis*	Species	1	5.633	5.633	11.83	0.002
	Error	8	13.333	0.476		
	Total	9	18.967			
N. heimii vs *F. fragrans*	Species	1	1.200	1.200	5.60	0.025
	Error	8	6.000	0.214		
	Total	9	7.200			
N. heimii vs *S. curtisii*	Species	1	0.833	0.833	3.80	0.061
	Error	8	6.133	0.219		
	Total	9	6.967			
N. heimii vs *A. angustifolia*	Species	1	38.533	38.533	76.34	0.000
	Error	8	14.133	0.505		
	Total	9	52.667			
N. heimii vs *C. scortechinii*	Species	1	10.800	10.800	25.20	0.000
	Error	8	12.000	0.429		
	Total	9	22.800			
N. heimii vs *H. brasiliensis*	Species	1	116.03	116.03	60.02	0.000
	Error	8	54.13	1.93		
	Total	9	170.17			
C. lanceolatum vs *M. utilis*	Species	1	0.033	0.033	0.13	0.716
	Error	8	6.933	0.248		
	Total	9	6.967			
C. lanceolatum vs *P. pinnata*	Species	1	1.633	1.633	8.58	0.007
	Error	8	5.333	0.190		
	Total	9	6.967			
C. lanceolatum vs *D. grandiflorus*	Species	1	0.533	0.533	1.15	0.292
	Error	8	12.933	0.462		
	Total	9	13.467			
C. lanceolatum vs *D. kunstleri*	Species	1	2.700	2.700	7.87	0.009
	Error	8	9.600	0.343		
	Total	9	12.300			
C. lanceolatum vs *K. ivorensis*	Species	1	3.333	3.333	6.42	0.017
	Error	8	14.533	0.519		
	Total	9	17.867			
C. lanceolatum vs *F. fragrans*	Species	1	0.300	0.300	1.17	0.289
	Error	8	7.200	0.257		
	Total	9	7.500			

Table A4.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	0.133	0.133	0.51	0.481
	Error	8	7.333	0.262		
	Total	9	7.467			
C. lanceolatum vs *A.angustifolia*	Species	1	32.033	32.033	58.50	0.000
	Error	8	15.333	0.548		
	Total	9	47.367			
C. lanceolatum vs *C. scortechinii*	Species	1	7.500	7.500	15.91	0.000
	Error	8	13.200	0.471		
	Total	9	20.700			
C. lanceolatum vs *H. brasiliensis*	Species	1	104.53	104.53	52.90	0.000
	Error	8	55.33	1.98		
	Total	9	159.87			
M. utilis vs *P. pinnata*	Species	1	2.133	2.133	11.79	0.002
	Error	8	5.067	0.181		
	Total	9	7.200			
M. utilis vs *D. grandiflorus*	Species	1	0.833	0.833	1.84	0.186
	Error	8	12.667	0.452		
	Total	9	13.500			
M. utilis vs *D. kunstleri*	Species	1	3.333	3.333	10.00	0.004
	Error	8	9.333	0.333		
	Total	9	12.667			
M. utilis vs *K. ivorensis*	Species	1	4.033	4.033	7.92	0.009
	Error	8	14.267	0.510		
	Total	9	18.300			
M. utilis vs *F. fragrans*	Species	1	0.533	0.533	2.15	0.153
	Error	8	6.933	0.248		
	Total	9	7.467			
M. utilis vs *S. curtisii*	Species	1	0.300	0.300	1.19	0.285
	Error	8	7.067	0.252		
	Total	9	7.367			
M. utilis vs *A.angustifolia*	Species	1	34.133	34.133	63.43	0.000
	Error	8	15.067	0.538		
	Total	9	49.200			
M. utilis vs *C. scortechinii*	Species	1	8.533	8.533	18.47	0.000
	Error	8	12.933	0.462		
	Total	9	21.467			
M. utilis vs *H. brasiliensis*	Species	1	108.30	108.30	55.07	0.000
	Error	8	55.07	1.97		
	Total	9	163.37			
P. pinnata vs *D. grandiflorus*	Species	1	0.300	0.300	0.76	0.391
	Error	8	11.067	0.395		
	Total	9	11.367			
P. pinnata vs *D. kunstleri*	Species	1	0.133	0.133	0.48	0.493
	Error	8	7.733	0.276		
	Total	9	7.867			
P. pinnata vs *K. ivorensis*	Species	1	0.300	0.300	0.66	0.422
	Error	8	12.667	0.452		
	Total	9	12.967			
P. pinnata vs *F. fragrans*	Species	1	0.533	0.533	2.80	0.105
	Error	8	5.333	0.190		
	Total	9	5.867			

Table A4.55*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	0.833	0.833	4.27	0.048
	Error	8	5.467	0.195		
	Total	9	6.300			
P. pinnata vs *A.angustifolia*	Species	1	19.200	19.200	39.93	0.000
	Error	8	13.467	0.481		
	Total	9	32.667			
P. pinnata vs *C. scortechinii*	Species	1	2.133	2.133	5.27	0.029
	Error	8	11.333	0.405		
	Total	9	13.467			
P. pinnata vs *H. brasiliensis*	Species	1	80.03	80.03	41.91	0.000
	Error	8	53.47	1.91		
	Total	9	133.50			
D. grandiflorus vs *D. kunstleri*	Species	1	0.833	0.833	1.52	0.228
	Error	8	15.333	0.548		
	Total	9	16.167			
D. grandiflorus vs *K. ivorensis*	Species	1	1.200	1.200	1.66	0.208
	Error	8	20.267	0.724		
	Total	9	21.467			
D. grandiflorus vs *F. fragrans*	Species	1	0.033	0.033	0.07	0.790
	Error	8	12.933	0.462		
	Total	9	12.967			
D. grandiflorus vs *S. curtisii*	Species	1	0.133	0.133	0.29	0.597
	Error	8	13.067	0.467		
	Total	9	13.200			
D. grandiflorus vs *A.angustifolia*	Species	1	24.300	24.300	32.30	0.000
	Error	8	21.067	0.752		
	Total	9	45.367			
D. grandiflorus vs *C. scortechinii*	Species	1	4.033	4.033	5.96	0.021
	Error	8	18.933	0.676		
	Total	9	22.967			
D. grandiflorus vs *H. brasiliensis*	Species	1	90.13	90.13	41.33	0.000
	Error	8	61.07	2.18		
	Total	9	151.20			
D. kunstleri vs *K. ivorensis*	Species	1	0.033	0.033	0.06	0.816
	Error	8	16.933	0.605		
	Total	9	16.967			
D. kunstleri vs *F. fragrans*	Species	1	1.200	1.200	3.50	0.072
	Error	8	9.600	0.343		
	Total	9	10.800			
D. kunstleri vs *S. curtisii*	Species	1	1.633	1.633	4.70	0.039
	Error	8	9.733	0.348		
	Total	9	11.367			
D. kunstleri vs *A.angustifolia*	Species	1	16.133	16.133	25.47	0.000
	Error	8	17.733	0.633		
	Total	9	33.867			
D. kunstleri vs *C. scortechinii*	Species	1	1.200	1.200	2.15	0.153
	Error	8	15.600	0.557		
	Total	9	16.800			
D. kunstleri vs *H. brasiliensis*	Species	1	73.63	73.63	35.71	0.000
	Error	8	57.73	2.06		
	Total	9	131.37			

Table A4.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	1.633	1.633	3.15	0.087
	Error	8	14.533	0.519		
	Total	9	16.167			
K. ivorensis vs *S. curtisii*	Species	1	2.133	2.133	4.07	0.053
	Error	8	14.667	0.524		
	Total	9	16.800			
K. ivorensis vs *A. angustifolia*	Species	1	14.700	14.700	18.16	0.000
	Error	8	22.667	0.810		
	Total	9	37.367			
K. ivorensis vs *C. scortechinii*	Species	1	0.833	0.833	1.14	0.296
	Error	8	20.533	0.733		
	Total	9	21.367			
K. ivorensis vs *H. brasiliensis*	Species	1	70.53	70.53	31.51	0.000
	Error	8	62.67	2.24		
	Total	9	133.20			
F. fragrans vs *S. curtisii*	Species	1	0.033	0.033	0.13	0.724
	Error	8	7.333	0.262		
	Total	9	7.367			
F. fragrans vs *A. angustifolia*	Species	1	26.133	26.133	47.72	0.000
	Error	8	15.333	0.548		
	Total	9	41.467			
F. fragrans vs *C. scortechinii*	Species	1	4.800	4.800	10.18	0.003
	Error	8	13.200	0.471		
	Total	9	18.000			
F. fragrans vs *H. brasiliensis*	Species	1	93.63	93.63	47.38	0.000
	Error	8	55.33	1.98		
	Total	9	148.97			
S. curtisii vs *A.angustifolia*	Species	1	28.033	28.033	50.75	0.000
	Error	8	15.467	0.552		
	Total	9	43.500			
S. curtisii vs *C. scortechinii*	Species	1	5.633	5.633	11.83	0.002
	Error	8	13.333	0.476		
	Total	9	18.967			
S. curtisii vs *H. brasiliensis*	Species	1	97.20	97.20	49.07	0.000
	Error	8	55.47	1.98		
	Total	9	152.67			
A.angustifolia vs *C. scortechinii*	Species	1	8.533	8.533	11.20	0.002
	Error	8	21.333	0.762		
	Total	9	29.866			
A.angustifolia vs *H. brasiliensis*	Species	1	63.47	20.83	9.19	0.005
	Error	8	84.30			
	Total	9	147.77			
C. scortechinii vs *H. brasiliensis*	Species	1	56.03	56.03	25.58	0.000
	Error	8	61.33	2.19		
	Total	9	117.37			

Appendix

Table A4.6 Analysis of variance (ANOVA) table for sample between species of average visual rating with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	440.833	440.833	3703.00	0.000
	Error	8	3.333	0.119		
	Total	9	444.167			
N. heimii vs *M. utilis*	Species	1	1.200	1.200	7.20	0.012
	Error	8	4.667	0.167		
	Total	9	5.867			
N. heimii vs *P. pinnata*	Species	1	418.133	418.133	3136.00	0.000
	Error	8	3.733	0.133		
	Total	9	421.867			
N. heimii vs *D. grandiflorus*	Species	1	410.700	410.700	1197.88	0.000
	Error	8	9.600	0.343		
	Total	9	420.300			
N. heimii vs *D. kunstleri*	Species	1	374.533	374.533	810.85	0.000
	Error	8	12.933	0.462		
	Total	9	387.467			
N. heimii vs *K. ivorensis*	Species	1	381.633	381.633	778.09	0.000
	Error	8	13.733	0.490		
	Total	9	395.367			
N. heimii vs *F. fragrans*	Species	1	410.700	410.700	3194.33	0.000
	Error	8	3.600	0.129		
	Total	9	414.300			
N. heimii vs *S. curtisii*	Species	1	418.133	418.133	3136.00	0.000
	Error	8	3.733	0.133		
	Total	9	421.867			
N. heimii vs *A. angustifolia*	Species	1	252.30	252.30	103.28	0.000
	Error	8	68.40	2.44		
	Total	9	320.70			
N. heimii vs *C. scortechinii*	Species	1	353.633	353.633	1017.30	0.000
	Error	8	9.733	0.348		
	Total	9	363.367			
N. heimii vs *H. brasiliensis*	Species	1	158.70	158.70	97.45	0.000
	Error	8	45.60	1.63		
	Total	9	204.30			
C. lanceolatum vs *M. utilis*	Species	1	0.133	0.133	0.53	0.473
	Error	8	7.067	0.252		
	Total	9	7.200			
C. lanceolatum vs *P. pinnata*	Species	1	0.300	0.300	1.19	0.285
	Error	8	7.067	0.252		
	Total	9	7.367			
C. lanceolatum vs *D. grandiflorus*	Species	1	0.533	0.533	1.15	0.292
	Error	8	12.933	0.462		
	Total	9	13.467			
C. lanceolatum vs *D. kunstleri*	Species	1	2.700	2.700	4.65	0.040
	Error	8	16.267	0.581		
	Total	9	18.967			
C. lanceolatum vs *K. ivorensis*	Species	1	2.133	2.133	3.50	0.072
	Error	8	17.067	0.610		
	Total	9	19.200			
C. lanceolatum vs *F. fragrans*	Species	1	0.533	0.533	2.15	0.153
	Error	8	6.933	0.248		
	Total	9	7.467			

Table A4.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	0.300	0.300	1.19	0.285
	Error	8	7.067	0.252		
	Total	9	7.367			
C. lanceolatum vs *A.angustifolia*	Species	1	26.13	26.13	10.20	0.003
	Error	8	71.73	2.56		
	Total	9	97.87			
C. lanceolatum vs *C. scortechinii*	Species	1	4.800	4.800	10.29	0.003
	Error	8	13.067	0.467		
	Total	9	17.867			
C. lanceolatum vs *H. brasiliensis*	Species	1	70.53	70.53	40.36	0.000
	Error	8	48.93	1.75		
	Total	9	119.47			
M. utilis vs *P. pinnata*	Species	1	0.033	0.033	0.12	0.726
	Error	8	7.467	0.267		
	Total	9	7.500			
M. utilis vs *D. grandiflorus*	Species	1	0.133	0.133	0.28	0.601
	Error	8	13.333	0.476		
	Total	9	13.467			
M. utilis vs *D. kunstleri*	Species	1	1.633	1.633	2.74	0.109
	Error	8	16.667	0.595		
	Total	9	18.300			
M. utilis vs *K. ivorensis*	Species	1	1.200	1.200	1.92	0.176
	Error	8	17.467	0.624		
	Total	9	18.667			
M. utilis vs *F. fragrans*	Species	1	0.133	0.133	0.51	0.481
	Error	8	7.333	0.262		
	Total	9	7.467			
M. utilis vs *S. curtisii*	Species	1	0.033	0.033	0.12	0.726
	Error	8	7.467	0.267		
	Total	9	7.500			
M. utilis vs *A.angustifolia*	Species	1	22.53	22.53	8.75	0.006
	Error	8	72.13	2.58		
	Total	9	94.67			
M. utilis vs *C. scortechinii*	Species	1	3.333	3.333	6.93	0.014
	Error	8	13.467	0.481		
	Total	9	16.800			
M. utilis vs *H. brasiliensis*	Species	1	64.53	64.53	36.63	0.000
	Error	8	49.33	1.76		
	Total	9	113.87			
P. pinnata vs *D. grandiflorus*	Species	1	0.033	0.033	0.07	0.793
	Error	8	13.333	0.476		
	Total	9	13.367			
P. pinnata vs *D. kunstleri*	Species	1	1.200	1.200	2.02	0.167
	Error	8	16.667	0.595		
	Total	9	17.867			
P. pinnata vs *K. ivorensis*	Species	1	0.833	0.833	1.34	0.258
	Error	8	17.467	0.624		
	Total	9	18.300			
P. pinnata vs *F. fragrans*	Species	1	0.033	0.033	0.13	0.724
	Error	8	7.333	0.262		
	Total	9	7.367			

Table A4.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	0.000	0.000	0.00	1.000
	Error	8	7.467	0.267		
	Total	9	7.467			
P. pinnata vs *A.angustifolia*	Species	1	20.18	20.83	8.09	0.008
	Error	8	72.13	2.58		
	Total	9	92.97			
P. pinnata vs *C. scortechinii*	Species	1	2.700	2.700	5.61	0.025
	Error	8	13.467	0.481		
	Total	9	16.167			
P. pinnata vs *H. brasiliensis*	Species	1	61.63	61.63	34.98	0.000
	Error	8	49.33	1.76		
	Total	9	110.97			
D. grandiflorus vs *D. kunstleri*	Species	1	0.833	0.833	1.04	0.318
	Error	8	22.533	0.805		
	Total	9	23.367			
D. grandiflorus vs *K. ivorensis*	Species	1	0.533	0.533	0.64	0.430
	Error	8	23.333	0.833		
	Total	9	23.867			
D. grandiflorus vs *F. fragrans*	Species	1	0.000	0.000	0.00	1.000
	Error	8	13.200	0.471		
	Total	9	13.200			
D. grandiflorus vs *S. curtisii*	Species	1	0.033	0.033	0.07	0.793
	Error	8	13.333	0.476		
	Total	9	13.367			
D. grandiflorus vs *A.angustifolia*	Species	1	19.20	19.20	6.89	0.014
	Error	8	78.00	2.79		
	Total	9	97.20			
D. grandiflorus vs *C. scortechinii*	Species	1	2.133	2.133	3.09	0.090
	Error	8	19.333	0.690		
	Total	9	21.467			
D. grandiflorus vs *H. brasiliensis*	Species	1	58.80	58.80	29.83	0.000
	Error	8	55.20	1.97		
	Total	9	114.00			
D. kunstleri vs *K. ivorensis*	Species	1	0.033	0.033	0.03	0.853
	Error	8	26.667	0.952		
	Total	9	26.700			
D. kunstleri vs *F. fragrans*	Species	1	0.833	0.833	1.41	0.245
	Error	8	16.533	0.590		
	Total	9	17.367			
D. kunstleri vs *S. curtisii*	Species	1	1.200	1.200	2.02	0.167
	Error	8	16.667	0.595		
	Total	9	17.867			
D. kunstleri vs *A.angustifolia*	Species	1	12.03	12.03	4.14	0.051
	Error	8	81.33	2.90		
	Total	9	93.37			
D. kunstleri vs *C. scortechinii*	Species	1	0.300	0.300	0.37	0.548
	Error	8	22.667	0.810		
	Total	9	22.967			
D. kunstleri vs *H. brasiliensis*	Species	1	45.63	45.63	21.83	0.000
	Error	8	58.53	2.09		
	Total	9	104.17			

Table A4.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	0.533	0.533	0.86	0.361
	Error	8	17.333	0.619		
	Total	9	17.867			
K. ivorensis vs *S. curtisii*	Species	1	0.833	0.833	1.34	0.258
	Error	8	17.467	0.624		
	Total	9	18.300			
K. ivorensis vs *A. angustifolia*	Species	1	13.33	13.33	4.55	0.042
	Error	8	82.13	2.93		
	Total	9	95.47			
K. ivorensis vs *C. scortechinii*	Species	1	0.533	0.533	0.64	0.432
	Error	8	23.467	0.838		
	Total	9	24.000			
K. ivorensis vs *H. brasiliensis*	Species	1	48.13	48.13	22.71	0.000
	Error	8	59.33	2.12		
	Total	9	107.47			
F. fragrans vs *S. curtisii*	Species	1	0.033	0.033	0.13	0.724
	Error	8	7.333	0.262		
	Total	9	7.367			
F. fragrans vs *A. angustifolia*	Species	1	19.20	19.20	7.47	0.011
	Error	8	72.00	2.57		
	Total	9	91.20			
F. fragrans vs *C. scortechinii*	Species	1	2.133	2.133	4.48	0.043
	Error	8	13.333	0.476		
	Total	9	15.467			
F. fragrans vs *H. brasiliensis*	Species	1	58.80	58.80	33.46	0.000
	Error	8	49.20	1.76		
	Total	9	108.00			
S. curtisii vs *A.angustifolia*	Species	1	20.83	20.83	8.09	0.008
	Error	8	72.13	2.58		
	Total	9	92.97			
S. curtisii vs *C. scortechinii*	Species	1	2.700	2.700	5.61	0.025
	Error	8	13.467	0.481		
	Total	9	16.167			
S. curtisii vs *H. brasiliensis*	Species	1	61.63	61.63	34.98	0.000
	Error	8	49.33	1.76		
	Total	9	110.97			
A.angustifolia vs *C. scortechinii*	Species	1	8.53	8.53	3.06	0.091
	Error	8	78.13	2.79		
	Total	9	86.67			
A.angustifolia vs *H. brasiliensis*	Species	1	10.80	10.80	2.65	0.115
	Error	8	114.00	4.07		
	Total	9	124.80			
C. scortechinii vs *H. brasiliensis*	Species	1	38.53	38.53	19.50	0.000
	Error	8	55.33	1.98		
	Total	9	93.87			

Table A4.7 Analysis of variance (ANOVA) table for sample within species of wood consumption with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	0.332	0.083	0.36	0.835
	Error	10	2.332	0.233		
	Total	14	2.663			
C. lanceolatum	Replicates	4	0.577	0.144	0.87	0.517
	Error	10	1.665	0.166		
	Total	14	2.241			
M. utilis	Replicates	4	0.097	0.024	0.19	0.937
	Error	10	1.259	0.126		
	Total	14	1.356			
P. pinnata	Replicates	4	3.239	0.810	2.54	0.105
	Error	10	3.184	0.318		
	Total	14	6.422			
D. grandiflorus	Replicates	4	4.40	1.10	0.34	0.843
	Error	10	32.05	3.20		
	Total	14	36.45			
D. kunstleri	Replicates	4	4.38	1.10	0.88	0.511
	Error	10	12.49	1.25		
	Total	14	16.87			
K. ivorensis	Replicates	4	17.07	4.27	0.99	0.456
	Error	10	43.09	4.31		
	Total	14	60.16			
F. fragrans	Replicates	4	2.176	0.544	2.64	0.097
	Error	10	2.062	0.206		
	Total	14	4.239			
S. curtisii	Replicates	4	1.064	0.266	1.24	0.353
	Error	10	2.138	0.214		
	Total	14	3.201			
A. angustifolia	Replicates	4	19.03	4.76	2.21	0.141
	Error	10	21.52	2.15		
	Total	14	40.55			
C. scortechinii	Replicates	4	1.47	0.37	0.24	0.910
	Error	10	15.48	1.55		
	Total	14	16.95			
H. brasiliensis	Replicates	4	6.89	1.72	0.48	0.752
	Error	10	36.08	3.61		
	Total	14	42.98			

Table A4.8 Analysis of variance (ANOVA) table for sample within species of wood consumption with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	0.408	0.102	0.90	0.500
	Error	10	1.135	0.114		
	Total	14	1.544			
C. lanceolatum	Replicates	4	13.40	3.35	2.97	0.074
	Error	10	11.27	1.13		
	Total	14	24.67			
M. utilis	Replicates	4	3.419	0.855	2.21	0.141
	Error	10	3.869	0.387		
	Total	14	7.288			
P. pinnata	Replicates	4	0.194	0.048	0.22	0.920
	Error	10	2.186	0.219		
	Total	14	2.380			
D. grandiflorus	Replicates	4	11.83	2.96	0.61	0.662
	Error	10	48.09	4.81		
	Total	14	59.92			
D. kunstleri	Replicates	4	8.38	2.10	0.54	0.713
	Error	10	39.10	3.91		
	Total	14	47.49			
K. ivorensis	Replicates	4	18.66	4.66	0.63	0.652
	Error	10	73.97	7.40		
	Total	14	92.63			
F. fragrans	Replicates	4	1.757	0.439	1.25	0.350
	Error	10	3.503	0.350		
	Total	14	5.260			
S. curtisii	Replicates	4	3.533	0.883	3.80	0.040
	Error	10	2.325	0.233		
	Total	14	5.859			
A. angustifolia	Replicates	4	142.5	35.6	3.30	0.057
	Error	10	107.9	10.8		
	Total	14	250.5			
C. scortechinii	Replicates	4	11.20	2.80	1.42	0.298
	Error	10	19.79	1.98		
	Total	14	30.00			
H. brasiliensis	Replicates	4	50.66	12.66	1.28	0.340
	Error	10	98.78	9.88		
	Total	14	149.44			

Table A4.9 Analysis of variance (ANOVA) table for sample within species of visual rating with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	0.400	0.100	0.50	0.737
	Error	10	2.000	0.200		
	Total	14	2.400			
C. lanceolatum	Replicates	4	0.267	0.067	0.20	0.933
	Error	10	3.333	0.333		
	Total	14	3.600			
M. utilis	Replicates	4	0.667	0.167	0.62	0.655
	Error	10	2.667	0.267		
	Total	14	3.333			
P. pinnata	Replicates	4	0.400	0.100	0.75	0.580
	Error	10	1.333	0.133		
	Total	14	1.733			
D. grandiflorus	Replicates	4	1.333	0.333	0.42	0.793
	Error	10	8.000	0.800		
	Total	14	9.333			
D. kunstleri	Replicates	4	2.000	0.500	1.25	0.351
	Error	10	4.000	0.400		
	Total	14	6.000			
K. ivorensis	Replicates	4	2.933	0.733	0.92	0.491
	Error	10	8.000	0.800		
	Total	14	10.933			
F. fragrans	Replicates	4	0.933	0.233	0.87	0.512
	Error	10	2.667	0.267		
	Total	14	3.600			
S. curtisii	Replicates	4	0.400	0.100	0.30	0.871
	Error	10	3.333	0.333		
	Total	14	3.733			
A. angustifolia	Replicates	4	3.733	0.933	1.17	0.382
	Error	10	8.000	0.800		
	Total	14	11.733			
C. scortechinii	Replicates	4	1.600	0.400	0.50	0.737
	Error	10	8.000	0.800		
	Total	14	9.600			
H. brasiliensis	Replicates	4	4.40	1.10	0.23	0.914
	Error	10	47.33	4.73		
	Total	14	51.73			

Table A4.10 Analysis of variance (ANOVA) table for sample within species of visual rating with *C.gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	0.2667	0.0667	1.00	0.452
	Error	10	0.6667	0.0667		
	Total	14	0.9333			
C. lanceolatum	Replicates	4	0.667	0.167	0.62	0.655
	Error	10	2.667	0.267		
	Total	14	3.333			
M. utilis	Replicates	4	1.067	0.267	1.00	0.452
	Error	10	2.667	0.267		
	Total	14	3.733			
P. pinnata	Replicates	4	1.733	0.433	2.17	0.147
	Error	10	2.000	0.200		
	Total	14	3.733			
D. grandiflorus	Replicates	4	2.267	0.567	0.77	0.567
	Error	10	7.333	0.733		
	Total	14	9.600			
D. kunstleri	Replicates	4	0.27	0.07	0.05	0.994
	Error	10	12.67	1.27		
	Total	14	12.93			
K. ivorensis	Replicates	4	2.40	0.60	0.53	0.717
	Error	10	11.33	1.13		
	Total	14	13.73			
F. fragrans	Replicates	4	2.267	0.567	4.25	0.029
	Error	10	1.333	0.133		
	Total	14	3.600			
S. curtisii	Replicates	4	1.733	0.433	2.17	0.147
	Error	10	2.000	0.200		
	Total	14	3.733			
A. angustifolia	Replicates	4	34.40	8.60	2.53	0.107
	Error	10	34.00	3.40		
	Total	14	68.40			
C. scortechinii	Replicates	4	3.733	0.933	1.56	0.260
	Error	10	6.000	0.600		
	Total	14	9.733			
H. brasiliensis	Replicates	4	15.60	3.90	1.30	0.334
	Error	10	30.00	3.00		
	Total	14	45.60			

Table A4.11 Analysis of variance (ANOVA) table for sample between species of termite mortality with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	na	na	na	na
	Error	8	na			
	Total	9	na			
N. heimii vs *M. utilis*	Species	1	na	na	na	na
	Error	8	na			
	Total	9	na			
N. heimii vs *P. pinnata*	Species	1	24.300	24.300	96.85	0.000
	Error	8	7.025	0.251		
	Total	9	31.325			
N. heimii vs *D. grandiflorus*	Species	1	5.208	5.208	10.84	0.003
	Error	8	13.458	0.481		
	Total	9	18.667			
N. heimii vs *D. kunstleri*	Species	1	30.502	30.502	72.33	0.000
	Error	8	11.808	0.422		
	Total	9	42.310			
N. heimii vs *K. ivorensis*	Species	1	30.502	30.502	85.98	0.000
	Error	8	9.933	0.355		
	Total	9	40.435			
N. heimii vs *F. fragrans*	Species	1	1.6333	1.6333	20.48	0.000
	Error	8	2.2333	0.0798		
	Total	9	3.8667			
N. heimii vs *S. curtisii*	Species	1	na	na	na	na
	Error	8	na			
	Total	9	na			
N. heimii vs *A. angustifolia*	Species	1	1216.03	1216.03	319.53	0.000
	Error	8	106.56	3.81		
	Total	9	1322.59			
N. heimii vs *C. scortechinii*	Species	1	874.80	874.80	617.77	0.000
	Error	8	39.65	1.42		
	Total	9	914.45			
N. heimii vs *H. brasiliensis*	Species	1	7824.67	7824.67	1944.88	0.000
	Error	8	112.65	4.02		
	Total	9	7937.32			
C. lanceolatum vs *M. utilis*	Species	1	na	na	na	na
	Error	8	na			
	Total	9	na			
C. lanceolatum vs *P. pinnata*	Species	1	24.300	24.300	96.85	0.000
	Error	8	7.025	0.251		
	Total	9	31.325			
C. lanceolatum vs *D. grandiflorus*	Species	1	5.208	5.208	10.84	0.003
	Error	8	13.458	0.481		
	Total	9	18.667			
C. lanceolatum vs *D. kunstleri*	Species	1	30.502	30.502	72.33	0.000
	Error	8	11.808	0.422		
	Total	9	42.310			
C. lanceolatum vs *K. ivorensis*	Species	1	30.502	30.502	85.98	0.000
	Error	8	9.933	0.355		
	Total	9	40.435			
C. lanceolatum vs *F. fragrans*	Species	1	1.6333	1.6333	20.48	0.000
	Error	8	2.2333	0.0798		
	Total	9	3.8667			

Table A4.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	na	na	na	na
	Error	8	na			
	Total	9	na			
C. lanceolatum vs *A.angustifolia*	Species	1	1216.03	1216.03	319.53	0.000
	Error	8	106.56	3.81		
	Total	9	1322.59			
C. lanceolatum vs *C. scortechinii*	Species	1	874.80	874.80	617.77	0.000
	Error	8	39.65	1.42		
	Total	9	914.45			
C. lanceolatum vs *H. brasiliensis*	Species	1	7824.67	7824.67	1944.88	0.000
	Error	8	112.65	4.02		
	Total	9	7937.32			
M. utilis vs *P. pinnata*	Species	1	24.300	24.300	96.85	0.000
	Error	8	7.025	0.251		
	Total	9	31.325			
M. utilis vs *D. grandiflorus*	Species	1	5.208	5.208	10.84	0.003
	Error	8	13.458	0.481		
	Total	9	18.667			
M. utilis vs *D. kunstleri*	Species	1	30.502	30.502	72.33	0.000
	Error	8	11.808	0.422		
	Total	9	42.310			
M. utilis vs *K. ivorensis*	Species	1	30.502	30.502	85.97	0.000
	Error	8	9.933	0.355		
	Total	9	40.435			
M. utilis vs *F. fragrans*	Species	1	1.6333	1.6333	20.48	0.000
	Error	8	2.2333	0.0798		
	Total	9	3.8667			
M. utilis vs *S. curtisii*	Species	1	na	na	na	na
	Error	8	na			
	Total	9	na			
M. utilis vs *A.angustifolia*	Species	1	1216.03	1216.03	319.53	0.000
	Error	8	106.56	3.81		
	Total	9	1322.59			
M. utilis vs *C. scortechinii*	Species	1	874.80	874.80	617.77	0.000
	Error	8	39.65	1.42		
	Total	9	914.45			
M. utilis vs *H. brasiliensis*	Species	1	1128.53	1128.53	290.45	0.000
	Error	8	108.79	3.89		
	Total	9	1237.32			
P. pinnata vs *D. grandiflorus*	Species	1	7.008	7.008	9.58	0.004
	Error	8	20.483	0.732		
	Total	9	27.492			
P. pinnata vs *D. kunstleri*	Species	1	0.352	0.352	0.52	0.475
	Error	8	18.833	0.673		
	Total	9	19.185			
P. pinnata vs *K. ivorensis*	Species	1	0.352	0.352	0.58	0.452
	Error	8	16.958	0.606		
	Total	9	17.310			
P. pinnata vs *F. fragrans*	Species	1	13.333	13.333	40.32	0.000
	Error	8	9.258	0.331		
	Total	9	22.592			

Table A4.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	24.300	24.300	96.85	0.000
	Error	8	7.025	0.251		
	Total	9	31.325			
P. pinnata vs *A.angustifolia*	Species	1	896.53	896.53	221.01	0.000
	Error	8	113.58	4.06		
	Total	9	1010.12			
P. pinnata vs *C. scortechinii*	Species	1	607.50	607.50	364.43	0.000
	Error	8	46.68	1.67		
	Total	9	654.18			
P. pinnata vs *H. brasiliensis*	Species	1	6976.88	6976.88	1632.36	0.000
	Error	8	119.68	4.27		
	Total	9	7096.55			
D. grandiflorus vs *D. kunstleri*	Species	1	10.502	10.502	11.64	0.002
	Error	8	25.267	0.902		
	Total	9	35.769			
D. grandiflorus vs *K. ivorensis*	Species	1	10.502	10.502	12.57	0.001
	Error	8	23.392	0.835		
	Total	9	33.894			
D. grandiflorus vs *F. fragrans*	Species	1	5.208	5.208	10.84	0.003
	Error	8	13.458	0.481		
	Total	9	18.667			
D. grandiflorus vs *S. curtisii*	Species	1	1.008	1.008	1.80	0.191
	Error	8	15.692	0.560		
	Total	9	16.700			
D. grandiflorus vs *A.angustifolia*	Species	1	1062.07	1062.07	247.78	0.000
	Error	8	120.02	4.29		
	Total	9	1182.09			
D. grandiflorus vs *C. scortechinii*	Species	1	745.01	745.01	392.79	0.000
	Error	8	53.11	1.90		
	Total	9	798.12			
D. grandiflorus vs *H. brasiliensis*	Species	1	7426.13	7426.13	1648.83	0.000
	Error	8	126.11	4.50		
	Total	9	7552.24			
D. kunstleri vs *K. ivorensis*	Species	1	0.000	0.000	0.00	1.000
	Error	8	21.742	0.776		
	Total	9	21.742			
D. kunstleri vs *F. fragrans*	Species	1	18.019	18.019	35.93	0.000
	Error	8	14.042	0.501		
	Total	9	32.060			
D. kunstleri vs *S. curtisii*	Species	1	30.502	30.502	72.33	0.000
	Error	8	11.808	0.422		
	Total	9	42.310			
D. kunstleri vs *A.angustifolia*	Species	1	861.35	861.35	203.76	0.000
	Error	8	118.37	4.23		
	Total	9	979.72			
D. kunstleri vs *C. scortechinii*	Species	1	578.60	578.60	314.83	0.000
	Error	8	51.46	1.84		
	Total	9	630.06			
D. kunstleri vs *H. brasiliensis*	Species	1	6878.10	6878.10	1547.40	0.000
	Error	8	124.46	4.44		
	Total	9	7002.56			

Table A4.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	18.019	18.019	41.47	0.000
	Error	8	12.167	0.435		
	Total	9	30.185			
K. ivorensis vs *S. curtisii*	Species	1	30.502	30.502	85.98	0.000
	Error	8	9.933	0.355		
	Total	9	40.435			
K. ivorensis vs *A. angustifolia*	Species	1	861.35	861.35	207.04	0.000
	Error	8	116.49	4.16		
	Total	9	977.84			
K. ivorensis vs *C. scortechinii*	Species	1	578.60	578.60	326.74	0.000
	Error	8	49.58	1.77		
	Total	9	628.19			
K. ivorensis vs *H. brasiliensis*	Species	1	1062.07	1062.07	247.78	0.000
	Error	8	120.02	4.29		
	Total	9	1182.09			
F. fragrans vs *S. curtisii*	Species	1	1.6333	1.6333	20.48	0.000
	Error	8	2.2333	0.0798		
	Total	9	3.8667			
F. fragrans vs *A. angustifolia*	Species	1	1128.53	1128.53	290.45	0.000
	Error	8	108.79	3.89		
	Total	9	1237.32			
F. fragrans vs *C. scortechinii*	Species	1	800.83	800.83	535.38	0.000
	Error	8	41.88	1.50		
	Total	9	842.72			
F. fragrans vs *H. brasiliensis*	Species	1	7600.21	7600.21	1852.36	0.000
	Error	8	114.88	4.10		
	Total	9	7715.09			
S. curtisii vs *A.angustifolia*	Species	1	1216.03	1216.03	319.53	0.000
	Error	8	106.56	3.81		
	Total	9	1322.59			
S. curtisii vs *C. scortechinii*	Species	1	874.80	874.80	617.77	0.000
	Error	8	39.65	1.42		
	Total	9	914.45			
S. curtisii vs *H. brasiliensis*	Species	1	7824.67	7824.67	1944.88	0.000
	Error	8	112.65	4.02		
	Total	9	7937.32			
A.angustifolia vs *C. scortechinii*	Species	1	28.03	28.03	5.37	0.028
	Error	8	146.21	5.22		
	Total	9	174.24			
A.angustifolia vs *H. brasiliensis*	Species	1	2871.41	2871.41	366.77	0.000
	Error	8	219.21	7.83		
	Total	9	3090.62			
C. scortechinii vs *H. brasiliensis*	Species	1	3466.87	3466.87	637.38	0.000
	Error	8	152.30	5.44		
	Total	9	3619.17			

na – not available

Appendix

Table A4.12 Analysis of variance (ANOVA) table for sample between species of termite mortality with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	0.0000000	0.0000000	*	*
	Error	8	0.0000000	0.0000000		
	Total	9	0.0000000			
N. heimii vs *M. utilis*	Species	1	0.00833	0.00833	3.25	0.153
	Error	8	0.10833	0.00387		
	Total	9	0.11667			
N. heimii vs *P. pinnata*	Species	1	3.333	3.333	17.50	0.000
	Error	8	5.333	0.190		
	Total	9	8.667			
N. heimii vs *D. grandiflorus*	Species	1	20.008	20.008	42.34	0.000
	Error	8	13.233	0.473		
	Total	9	33.242			
N. heimii vs *D. kunstleri*	Species	1	105.47	105.47	87.18	0.000
	Error	8	33.88	1.21		
	Total	9	139.34			
N. heimii vs *K. ivorensis*	Species	1	16.133	16.133	125.19	0.000
	Error	8	3.608	0.129		
	Total	9	19.742			
N. heimii vs *F. fragrans*	Species	1	16.133	16.133	125.19	0.000
	Error	8	3.608	0.129		
	Total	9	19.742			
N. heimii vs *S. curtisii*	Species	1	0.00000	0.00000	*	*
	Error	8	0.00000	0.00000		
	Total	9	0.00000			
N. heimii vs *A. angustifolia*	Species	1	3910.2	3910.2	166.72	0.000
	Error	8	656.7	23.5		
	Total	9	4566.9			
N. heimii vs *C. scortechinii*	Species	1	23.852	23.852	75.39	0.000
	Error	8	8.858	0.316		
	Total	9	32.710			
N. heimii vs *H. brasiliensis*	Species	1	3921.6	3921.6	167.23	0.000
	Error	8	656.6	23.5		
	Total	9	4578.2			
C. lanceolatum vs *M. utilis*	Species	1	0.00833	0.00833	3.25	0.153
	Error	8	0.10833	0.00387		
	Total	9	0.11667			
C. lanceolatum vs *P. pinnata*	Species	1	3.333	3.333	17.50	0.000
	Error	8	5.333	0.190		
	Total	9	8.667			
C. lanceolatum vs *D. grandiflorus*	Species	1	20.008	20.008	42.34	0.000
	Error	8	13.233	0.473		
	Total	9	33.242			
C. lanceolatum vs *D. kunstleri*	Species	1	105.47	105.47	87.18	0.000
	Error	8	33.88	1.21		
	Total	9	139.34			
C. lanceolatum vs *K. ivorensis*	Species	1	16.133	16.133	126.19	0.000
	Error	8	3.608	0.129		
	Total	9	19.742			
C. lanceolatum vs *F. fragrans*	Species	1	16.133	16.133	125.19	0.000
	Error	8	3.608	0.129		
	Total	9	19.742			

Table A4.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	0.00000	0.00000	*	*
	Error	8	0.00000	0.00000		
	Total	9	0.00000			
C. lanceolatum vs *A.angustifolia*	Species	1	172.80	172.80	48.86	0.000
	Error	8	99.02	3.54		
	Total	9	271.82			
C. lanceolatum vs *C. scortechinii*	Species	1	23.852	23.852	75.39	0.000
	Error	8	8.858	0.316		
	Total	9	32.710			
C. lanceolatum vs *H. brasiliensis*	Species	1	3921.6	3921.6	167.23	0.000
	Error	8	656.6	23.5		
	Total	9	4578.2			
M. utilis vs *P. pinnata*	Species	1	3.008	3.008	15.48	0.001
	Error	8	5.442	0.194		
	Total	9	8.450			
M. utilis vs *D. grandiflorus*	Species	1	19.200	19.200	40.29	0.000
	Error	8	13.342	0.476		
	Total	9	32.542			
M. utilis vs *D. kunstleri*	Species	1	103.60	103.60	85.36	0.000
	Error	8	33.98	1.21		
	Total	9	137.59			
M. utilis vs *K. ivorensis*	Species	1	15.408	15.408	116.08	0.000
	Error	8	3.717	0.133		
	Total	9	19.125			
M. utilis vs *F. fragrans*	Species	1	15.408	15.408	116.08	0.000
	Error	8	3.717	0.133		
	Total	9	19.125			
M. utilis vs *S. curtisii*	Species	1	0.00833	0.00833	3.25	0.153
	Error	8	0.10833	0.00387		
	Total	9	0.11667			
M. utilis vs *A.angustifolia*	Species	1	170.41	170.41	48.13	0.000
	Error	8	99.13	3.54		
	Total	9	269.54			
M. utilis vs *C. scortechinii*	Species	1	22.969	22.969	71.72	0.000
	Error	8	8.967	0.320		
	Total	9	31.935			
M. utilis vs *H. brasiliensis*	Species	1	3910.2	3910.2	166.72	0.000
	Error	8	656.7	23.5		
	Total	9	4566.9			
P. pinnata vs *D. grandiflorus*	Species	1	7.008	7.008	10.57	0.003
	Error	8	18.567	0.663		
	Total	9	25.575			
P. pinnata vs *D. kunstleri*	Species	1	71.30	71.30	50.92	0.000
	Error	8	39.21	1.40		
	Total	9	110.51			
P. pinnata vs *K. ivorensis*	Species	1	4.800	4.800	15.03	0.001
	Error	8	8.942	0.319		
	Total	9	13.742			
P. pinnata vs *F. fragrans*	Species	1	4.800	4.800	15.03	0.001
	Error	8	8.942	0.319		
	Total	9	13.742			

Table A4.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	3.333	3.333	17.50	0.000
	Error	8	5.333	0.190		
	Total	9	8.667			
P. pinnata vs *A.angustifolia*	Species	1	128.13	128.13	34.38	0.000
	Error	8	104.36	3.73		
	Total	9	232.49			
P. pinnata vs *C. scortechinii*	Species	1	9.352	9.352	18.45	0.000
	Error	8	14.192	0.507		
	Total	9	23.544			
P. pinnata vs *H. brasiliensis*	Species	1	3696.3	3696.3	156.35	0.000
	Error	8	661.9	23.6		
	Total	9	4358.2			
D. grandiflorus vs *D. kunstleri*	Species	1	33.60	33.60	19.97	0.000
	Error	8	47.11	1.68		
	Total	9	80.71			
D. grandiflorus vs *K. ivorensis*	Species	1	0.208	0.208	0.35	0.561
	Error	8	16.842	0.601		
	Total	9	17.050			
D. grandiflorus vs *F. fragrans*	Species	1	0.208	0.208	0.35	0.561
	Error	8	16.842	0.601		
	Total	9	17.050			
D. grandiflorus vs *S. curtisii*	Species	1	20.008	20.008	42.34	0.000
	Error	8	13.233	0.473		
	Total	9	33.242			
D. grandiflorus vs *A.angustifolia*	Species	1	75.21	75.21	18.76	0.000
	Error	8	112.26	4.01		
	Total	9	187.47			
D. grandiflorus vs *C. scortechinii*	Species	1	0.169	0.169	0.21	0.647
	Error	8	22.092	0.789		
	Total	9	22.260			
D. grandiflorus vs *H. brasiliensis*	Species	1	3381.4	3381.4	141.35	0.000
	Error	8	669.8	23.9		
	Total	9	4051.3			
D. kunstleri vs *K. ivorensis*	Species	1	39.10	39.10	29.21	0.000
	Error	8	37.48	1.34		
	Total	9	76.59			
D. kunstleri vs *F. fragrans*	Species	1	39.10	39.10	29.21	0.000
	Error	8	37.48	1.34		
	Total	9	76.59			
D. kunstleri vs *S. curtisii*	Species	1	105.47	105.47	87.18	0.000
	Error	8	33.88	1.21		
	Total	9	139.34			
D. kunstleri vs *A.angustifolia*	Species	1	8.27	8.27	1.74	0.198
	Error	8	132.90	4.75		
	Total	9	141.17			
D. kunstleri vs *C. scortechinii*	Species	1	29.01	29.01	19.01	0.000
	Error	8	42.73	1.53		
	Total	9	71.74			
D. kunstleri vs *H. brasiliensis*	Species	1	2740.9	2740.9	111.15	0.000
	Error	8	690.5	24.7		
	Total	9	3431.3			

Table A4.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	0.000	0.000	0.00	1.000
	Error	8	7.217	0.258		
	Total	9	7.217			
K. ivorensis vs *S. curtisii*	Species	1	16.133	16.133	126.19	0.000
	Error	8	3.608	0.129		
	Total	9	19.742			
K. ivorensis vs *A. angustifolia*	Species	1	83.33	83.33	22.73	0.000
	Error	8	102.63	3.67		
	Total	9	185.97			
K. ivorensis vs *C. scortechinii*	Species	1	0.752	0.752	1.69	0.204
	Error	8	12.467	0.445		
	Total	9	13.219			
K. ivorensis vs *H. brasiliensis*	Species	1	3434.7	3434.7	145.67	0.000
	Error	8	660.2	23.6		
	Total	9	4094.9			
F. fragrans vs *S. curtisii*	Species	1	16.133	16.133	125.19	0.000
	Error	8	3.608	0.129		
	Total	9	19.742			
F. fragrans vs *A. angustifolia*	Species	1	83.33	83.33	22.73	0.000
	Error	8	102.63	3.67		
	Total	9	185.97			
F. fragrans vs *C. scortechinii*	Species	1	0.752	0.752	1.69	0.204
	Error	8	12.467	0.445		
	Total	9	13.219			
F. fragrans vs *H. brasiliensis*	Species	1	3434.7	3434.7	145.67	0.000
	Error	8	660.2	23.6		
	Total	9	4094.9			
S. curtisii vs *A.angustifolia*	Species	1	172.80	172.80	48.86	0.000
	Error	8	99.02	3.54		
	Total	9	271.82			
S. curtisii vs *C. scortechinii*	Species	1	23.852	23.852	75.39	0.000
	Error	8	8.858	0.316		
	Total	9	32.710			
S. curtisii vs *H. brasiliensis*	Species	1	3921.6	3921.6	167.23	0.000
	Error	8	656.6	23.5		
	Total	9	4578.2			
A.angustifolia vs *C. scortechinii*	Species	1	68.25	68.25	17.71	0.000
	Error	8	107.88	3.85		
	Total	9	176.14			
A.angustifolia vs *H. brasiliensis*	Species	1	2448.0	2448.0	90.71	0.000
	Error	8	755.6	27.0		
	Total	9	3202.7			
C. scortechinii vs *H. brasiliensis*	Species	1	3333.8	3333.8	140.27	0.000
	Error	8	665.5	23.8		
	Total	9	3999.3			

na – not available.

Table A4.13 Analysis of variance (ANOVA) table for sample within species of termite mortality with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	na	na	na	na
	Error	10	na			
	Total	14	na			
C. lanceolatum	Replicates	4	na	na	na	na
	Error	10	na			
	Total	14	na			
M. utilis	Replicates	4	na	na	na	na
	Error	10	na			
	Total	14	na			
P. pinnata	Replicates	4	3.733	0.933	2.80	0.083
	Error	10	3.292	0.329		
	Total	14	7.025			
D. grandiflorus	Replicates	4	2.13	0.53	0.47	0.758
	Error	10	11.33	1.13		
	Total	14	13.46			
D. kunstleri	Replicates	4	4.183	1.046	1.37	0.311
	Error	10	7.625	0.762		
	Total	14	11.808			
K. ivorensis	Replicates	4	3.058	0.765	1.11	0.503
	Error	10	6.875	0.688		
	Total	14	9.933			
F. fragrans	Replicates	4	0.483	0.121	0.69	0.615
	Error	10	1.750	0.175		
	Total	14	2.233			
S. curtisii	Replicates	4	na	na	na	na
	Error	10	na			
	Total	14	na			
A. angustifolia	Replicates	4	50.73	12.68	2.27	0.133
	Error	10	55.83	5.58		
	Total	14	106.56			
C. scortechinii	Replicates	4	12.61	3.15	1.17	0.382
	Error	10	27.04	2.70		
	Total	14	39.65			
H. brasiliensis	Replicates	4	74.11	18.53	4.81	0.020
	Error	10	38.54	3.85		
	Total	14	112.65			

na – not available.

Table A4.14 Analysis of variance (ANOVA) table for sample within species of termite mortality with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	0.00000	0.00000	*	*
	Error	10	0.00000	0.00000		
	Total	14	0.00000			
C. lanceolatum	Replicates	4	0.00000	0.00000	*	*
	Error	10	0.00000	0.00000		
	Total	14	0.00000			
M. utilis	Replicates	4	0.02500	0.00625	0.75	0.580
	Error	10	0.08333	0.00833		
	Total	14	0.10833			
P. pinnata	Replicates	4	0.292	0.073	0.14	0.961
	Error	10	5.042	0.504		
	Total	14	5.333			
D. kunstleri	Replicates	4	5.67	1.42	0.50	0.735
	Error	10	28.21	2.82		
	Total	14	33.87			
D. grandiflorus	Replicates	4	4.775	1.194	1.41	0.299
	Error	10	8.458	0.846		
	Total	14	13.233			
K. ivorensis	Replicates	4	0.900	0.225	0.83	0.535
	Error	10	2.708	0.271		
	Total	14	3.608			
F. fragrans	Replicates	4	0.900	0.225	0.83	0.535
	Error	10	2.708	0.271		
	Total	14	3.608			
S. curtisii	Replicates	4	0.00000	0.00000	*	*
	Error	10	0.00000	0.00000		
	Total	14	0.00000			
A. angustifolia	Replicates	4	39.82	9.95	1.68	0.230
	Error	10	59.21	5.92		
	Total	14	99.03			
C. scortechinii	Replicates	4	2.608	0.652	1.04	0.432
	Error	10	6.250	0.625		
	Total	14	8.858			
H. brasiliensis	Replicates	4	293.4	73.4	2.02	0.167
	Error	10	363.2	36.3		
	Total	14	656.6			

na – not available.

Table A4.15 Analysis of variance (ANOVA) table for sample between species of moisture content with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	597.20	597.20	67.95	0.000
	Error	8	246.07	8.79		
	Total	9	843.27			
N. heimii vs *M. utilis*	Species	1	9.74	9.74	1.68	0.205
	Error	8	162.15	5.79		
	Total	9	171.89			
N. heimii vs *P. pinnata*	Species	1	271.9	271.9	15.65	0.002
	Error	8	486.6	17.4		
	Total	9	758.5			
N. heimii vs *D. grandiflorus*	Species	1	725.9	725.9	26.17	0.000
	Error	8	776.6	27.7		
	Total	9	1502.6			
N. heimii vs *D. kunstleri*	Species	1	252.4	252.4	6.45	0.017
	Error	8	1095.5	39.1		
	Total	9	1347.8			
N. heimii vs *K. ivorensis*	Species	1	18491	18491	126.02	0.000
	Error	8	4109	147		
	Total	9	22600			
N. heimii vs *F. fragrans*	Species	1	3916.9	3916.9	119.70	0.000
	Error	8	916.3	32.7		
	Total	9	4833.2			
N. heimii vs *S. curtisii*	Species	1	7206	7206	63.28	0.000
	Error	8	3188	114		
	Total	9	10394			
N. heimii vs *A. angustifolia*	Species	1	5566.3	5566.3	120.38	0.000
	Error	8	1294.7	46.2		
	Total	9	6861.0			
N. heimii vs *C. scortechinii*	Species	1	15946.1	15946.1	414.49	0.000
	Error	8	1077.2	38.5		
	Total	9	17023.3			
N. heimii vs *H. brasiliensis*	Species	1	16324	16324	128.30	0.000
	Error	8	3563	127		
	Total	9	19887			
C. lanceolatum vs *M. utilis*	Species	1	454.41	454.41	48.63	0.000
	Error	8	261.63	9.34		
	Total	9	716.04			
C. lanceolatum vs *P. pinnata*	Species	1	1675.0	1675.0	80.03	0.000
	Error	8	586.0	20.9		
	Total	9	2261.0			
C. lanceolatum vs *D. grandiflorus*	Species	1	6.3	6.3	0.20	0.658
	Error	8	876.1	31.3		
	Total	9	882.4			
C. lanceolatum vs *D. kunstleri*	Species	1	73.1	73.1	1.71	0.201
	Error	8	1194.9	42.7		
	Total	9	1268.1			
C. lanceolatum vs *K. ivorensis*	Species	1	12442	12442	82.79	0.000
	Error	8	4208	150		
	Total	9	16650			
C. lanceolatum vs *F. fragrans*	Species	1	1839	1839	7.80	0.009
	Error	8	6604	236		
	Total	9	8443			

Table A4.15 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	3654	3654	31.12	0.000
	Error	8	3288	117		
	Total	9	6942			
C. lanceolatum vs *A.angustifolia*	Species	1	2517.0	2517.0	50.55	0.000
	Error	8	1394.2	49.8		
	Total	9	3911.2			
C. lanceolatum vs *C. scortechinii*	Species	1	10371.4	10371.4	246.79	0.000
	Error	8	1176.7	42.0		
	Total	9	11548.1			
C. lanceolatum vs *H. brasiliensis*	Species	1	10677	10677	81.63	0.000
	Error	8	3662	131		
	Total	9	14339			
M. utilis vs *P. pinnata*	Species	1	384.5	384.5	21.44	0.000
	Error	8	502.1	17.9		
	Total	9	886.7			
M. utilis vs *D. grandiflorus*	Species	1	567.5	567.5	20.06	0.000
	Error	8	792.2	28.3		
	Total	9	1359.7			
M. utilis vs *D. kunstleri*	Species	1	162.9	162.9	4.11	0.052
	Error	8	1111.0	39.7		
	Total	9	1273.9			
M. utilis vs *K. ivorensis*	Species	1	17652	17652	119.84	0.000
	Error	8	4124	147		
	Total	9	21776			
M. utilis vs *F. fragrans*	Species	1	3536.0	3536.0	106.26	0.000
	Error	8	931.8	33.3		
	Total	9	4467.8			
M. utilis vs *S. curtisii*	Species	1	6686	6686	58.43	0.000
	Error	8	3204	114		
	Total	9	9889			
M. utilis vs *A.angustifolia*	Species	1	5110.4	5110.4	109.21	0.000
	Error	8	1310.3	46.8		
	Total	9	6420.6			
M. utilis vs *C. scortechinii*	Species	1	15167.7	15167.7	388.64	0.000
	Error	8	1092.8	39.0		
	Total	9	16260.5			
M. utilis vs *H. brasiliensis*	Species	1	15536	15536	121.57	0.000
	Error	8	3578	128		
	Total	9	19115			
P. pinnata vs *D. grandiflorus*	Species	1	1886.3	1886.3	47.30	0.000
	Error	8	1116.6	39.9		
	Total	9	3003.0			
P. pinnata vs *D. kunstleri*	Species	1	1048.1	1048.1	20.45	0.000
	Error	8	1435.4	51.3		
	Total	9	2483.5			
P. pinnata vs *K. ivorensis*	Species	1	23247	23247	146.32	0.000
	Error	8	4449	159		
	Total	9	27696			
P. pinnata vs *F. fragrans*	Species	1	6252.8	6252.8	139.37	0.000
	Error	8	1256.2	44.9		
	Total	9	7509.0			

Table A4.15 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	10277	10277	81.56	0.000
	Error	8	3528	126		
	Total	9	13805			
P. pinnata vs *A.angustifolia*	Species	1	8298.6	8298.6	142.15	0.000
	Error	8	1634.7	58.4		
	Total	9	9933.3			
P. pinnata vs *C. scortechinii*	Species	1	20382.4	20382.4	402.70	0.000
	Error	8	1417.2	50.6		
	Total	9	21799.6			
P. pinnata vs *H. brasiliensis*	Species	1	20809	20809	149.30	0.000
	Error	8	3903	139		
	Total	9	24712			
D. grandiflorus vs *D. kunstleri*	Species	1	122.3	122.3	1.98	0.170
	Error	8	1725.5	61.6		
	Total	9	1847.8			
D. grandiflorus vs *K. ivorensis*	Species	1	11889	11889	70.25	0.000
	Error	8	4739	169		
	Total	9	16628			
D. grandiflorus vs *F. fragrans*	Species	1	1270.4	1270.4	23.00	0.000
	Error	8	1546.3	55.2		
	Total	9	2816.7			
D. grandiflorus vs *S. curtisii*	Species	1	3357	3357	24.62	0.000
	Error	8	3818	136		
	Total	9	7176			
D. grandiflorus vs *A.angustifolia*	Species	1	2271.9	2271.9	33.05	0.000
	Error	8	1924.7	68.7		
	Total	9	4196.7			
D. grandiflorus vs *C. scortechinii*	Species	1	9867.4	9867.4	161.83	0.000
	Error	8	1707.3	61.0		
	Total	9	11574.7			
D. grandiflorus vs *H. brasiliensis*	Species	1	10165	10165	67.89	0.000
	Error	8	4193	150		
	Total	9	14358			
D. kunstleri vs *K. ivorensis*	Species	1	14423	14423	79.85	0.000
	Error	8	5057	181		
	Total	9	19480			
D. kunstleri vs *F. fragrans*	Species	1	2180.9	2180.9	32.74	0.000
	Error	8	1865.1	66.6		
	Total	9	4046.0			
D. kunstleri vs *S. curtisii*	Species	1	4761	4761	32.22	0.000
	Error	8	4137	148		
	Total	9	8898			
D. kunstleri vs *A.angustifolia*	Species	1	3448.3	3448.3	43.04	0.000
	Error	8	2243.6	80.1		
	Total	9	5691.8			
D. kunstleri vs *C. scortechinii*	Species	1	12186.5	12186.5	168.42	0.000
	Error	8	2026.1	72.4		
	Total	9	14212.5			
D. kunstleri vs *H. brasiliensis*	Species	1	12517	12517	77.69	0.000
	Error	8	4511	161		
	Total	9	17029			

Table A4.15 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	5387	5387	30.92	0.000
	Error	8	4878	174		
	Total	9	10265			
K. ivorensis vs *S. curtisii*	Species	1	2611	2611	10.22	0.003
	Error	8	7150	255		
	Total	9	9761			
K. ivorensis vs *A. angustifolia*	Species	1	3767	3767	20.06	0.000
	Error	8	5257	188		
	Total	9	9023			
K. ivorensis vs *C. scortechinii*	Species	1	94	94	0.52	0.475
	Error	8	5039	180		
	Total	9	5133			
K. ivorensis vs *H. brasiliensis*	Species	1	68	68	0.25	0.620
	Error	8	7525	269		
	Total	9	7592			
F. fragrans vs *S. curtisii*	Species	1	497	497	3.52	0.071
	Error	8	3958	141		
	Total	9	4455			
F. fragrans vs *A. angustifolia*	Species	1	144.5	144.5	1.96	0.172
	Error	8	2064.4	73.7		
	Total	9	2208.9			
F. fragrans vs *C. scortechinii*	Species	1	4056.7	4056.7	61.50	0.000
	Error	8	1846.9	66.0		
	Total	9	5903.6			
F. fragrans vs *H. brasiliensis*	Species	1	4248	4248	27.46	0.000
	Error	8	4332	155		
	Total	9	8581			
S. curtisii vs *A.angustifolia*	Species	1	106	106	0.68	0.416
	Error	8	4336	155		
	Total	9	4442			
S. curtisii vs *C. scortechinii*	Species	1	1713	1713	11.65	0.002
	Error	8	4119	147		
	Total	9	5832			
S. curtisii vs *H. brasiliensis*	Species	1	1839	1839	7.80	0.009
	Error	8	6604	236		
	Total	9	8443			
A.angustifolia vs *C. scortechinii*	Species	1	2669.8	2669.8	33.59	0.000
	Error	8	2225.3	79.5		
	Total	9	4895.1			
A.angustifolia vs *H. brasiliensis*	Species	1	2826	2826	16.80	0.000
	Error	8	4711	168		
	Total	9	7536			
C. scortechinii vs *H. brasiliensis*	Species	1	2	2	0.01	0.907
	Error	8	4493	160		
	Total	9	4495			

na – not available.

Table A4.16 Analysis of variance (ANOVA) table for sample between species of moisture content with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	613.26	613.26	68.83	0.000
	Error	8	249.46	8.91		
	Total	9	862.72			
N. heimii vs *M. utilis*	Species	1	29.34	29.34	5.19	0.031
	Error	8	158.20	5.65		
	Total	9	187.54			
N. heimii vs *P. pinnata*	Species	1	201.4	201.4	11.69	0.002
	Error	8	482.6	17.2		
	Total	9	684.1			
N. heimii vs *D. grandiflorus*	Species	1	854.9	854.9	30.98	0.000
	Error	8	772.7	27.6		
	Total	9	1627.6			
N. heimii vs *D. kunstleri*	Species	1	330.6	330.6	8.48	0.007
	Error	8	1091.5	39.0		
	Total	9	1422.1			
N. heimii vs *K. ivorensis*	Species	1	19121	19121	130.43	0.000
	Error	8	4105	16.5		
	Total	9	23225			
N. heimii vs *F. fragrans*	Species	1	4209.6	4209.6	129.20	0.000
	Error	8	912.3	32.6		
	Total	9	5121.9			
N. heimii vs *S. curtisii*	Species	1	7439	7439	67.71	0.000
	Error	8	3076	110		
	Total	9	10516			
N. heimii vs *A. angustifolia*	Species	1	5914.2	5914.2	128.30	0.000
	Error	8	1290.7	46.1		
	Total	9	7204.9			
N. heimii vs *C. scortechinii*	Species	1	16531.2	16531.2	431.28	0.000
	Error	8	107.3	38.3		
	Total	9	17604.5			
N. heimii vs *H. brasiliensis*	Species	1	2271.9	2271.9	33.05	0.000
	Error	8	1924.7	68.7		
	Total	9	4196.7			
C. lanceolatum vs *M. utilis*	Species	1	374.33	374.33	38.97	0.000
	Error	8	268.96	9.61		
	Total	9	643.29			
C. lanceolatum vs *P. pinnata*	Species	1	1517.7	1517.7	71.61	0.000
	Error	8	593.4	21.2		
	Total	9	2111.1			
C. lanceolatum vs *D. grandiflorus*	Species	1	20.0	20.0	0.63	0.432
	Error	8	883.5	31.6		
	Total	9	903.5			
C. lanceolatum vs *D. kunstleri*	Species	1	43.3	43.3	4.01	0.324
	Error	8	1202.3	42.9		
	Total	9	1245.6			
C. lanceolatum vs *K. ivorensis*	Species	1	12885	12885	85.59	0.000
	Error	8	4215	151		
	Total	9	17101			
C. lanceolatum vs *F. fragrans*	Species	1	1609.4	1609.4	44.05	0.000
	Error	8	1023.1	36.5		
	Total	9	2632.4			

Table A4.16 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	3781	3781	33.21	0.000
	Error	8	3187	114		
	Total	9	6968			
C. lanceolatum vs *A.angustifolia*	Species	1	2718.5	2718.5	54.31	0.000
	Error	8	1401.5	50.1		
	Total	9	4120.0			
C. lanceolatum vs *C. scortechinii*	Species	1	10776.5	10776.5	254.84	0.000
	Error	8	1184.0	42.3		
	Total	9	11960.5			
C. lanceolatum vs *H. brasiliensis*	Species	1	11088	11088	84.60	0.000
	Error	8	3669	131		
	Total	9	14757			
M. utilis vs *P. pinnata*	Species	1	384.5	384.5	21.44	0.000
	Error	8	502.1	17.9		
	Total	9	886.7			
M. utilis vs *D. grandiflorus*	Species	1	567.5	567.5	20.06	0.000
	Error	8	792.2	28.3		
	Total	9	1359.7			
M. utilis vs *D. kunstleri*	Species	1	162.9	162.9	4.11	0.052
	Error	8	1111.0	39.7		
	Total	9	1273.9			
M. utilis vs *K. ivorensis*	Species	1	17652	17652	119.84	0.000
	Error	8	4124	147		
	Total	9	21776			
M. utilis vs *F. fragrans*	Species	1	3536.0	3536.0	106.26	0.000
	Error	8	931.8	33.3		
	Total	9	4467.8			
M. utilis vs *S. curtisii*	Species	1	6534	6534	59.10	0.000
	Error	8	3096	111		
	Total	9	9630			
M. utilis vs *A.angustifolia*	Species	1	5110.4	5110.4	109.21	0.000
	Error	8	1310.3	46.8		
	Total	9	6420.6			
M. utilis vs *C. scortechinii*	Species	1	15167.7	15167.7	388.64	0.000
	Error	8	1092.8	39.0		
	Total	9	16260.5			
M. utilis vs *H. brasiliensis*	Species	1	15536	15536	121.57	0.000
	Error	8	3578	128		
	Total	9	19115			
P. pinnata vs *D. grandiflorus*	Species	1	1886.3	1886.3	47.30	0.000
	Error	8	1116.6	39.9		
	Total	9	3003.0			
P. pinnata vs *D. kunstleri*	Species	1	1048.1	1048.1	20.45	0.000
	Error	8	1435.4	51.3		
	Total	9	2483.5			
P. pinnata vs *K. ivorensis*	Species	1	23247	23247	146.32	0.000
	Error	8	4449	159		
	Total	9	27696			
P. pinnata vs *F. fragrans*	Species	1	6252.8	6252.8	139.37	0.000
	Error	8	1256.2	44.9		
	Total	9	7509.0			

Table A4.16 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	10089	10089	82.59	0.000
	Error	8	3420	122		
	Total	9	13509			
P. pinnata vs *A.angustifolia*	Species	1	8298.6	8298.6	142.15	0.000
	Error	8	1634.7	58.4		
	Total	9	9933.3			
P. pinnata vs *C. scortechinii*	Species	1	20382.4	20382.4	402.70	0.000
	Error	8	1417.2	50.6		
	Total	9	21799.6			
P. pinnata vs *H. brasiliensis*	Species	1	20809	20809	149.30	0.000
	Error	8	3903	139		
	Total	9	24712			
D. grandiflorus vs *D. kunstleri*	Species	1	122.3	122.3	1.98	0.170
	Error	8	1725.5	61.6		
	Total	9	1847.8			
D. grandiflorus vs *K. ivorensis*	Species	1	11889	11889	70.25	0.000
	Error	8	4739	169		
	Total	9	16628			
D. grandiflorus vs *F. fragrans*	Species	1	1270.4	1270.4	23.00	0.000
	Error	8	1546.3	55.2		
	Total	9	2816.7			
D. grandiflorus vs *S. curtisii*	Species	1	3250	3250	24.53	0.000
	Error	8	3710	133		
	Total	9	6961			
D. grandiflorus vs *A.angustifolia*	Species	1	2271.9	2271.9	33.05	0.000
	Error	8	1924.7	68.7		
	Total	9	4196.7			
D. grandiflorus vs *C. scortechinii*	Species	1	9867.4	9867.4	161.83	0.000
	Error	8	1707.3	61.0		
	Total	9	11574.7			
D. grandiflorus vs *H. brasiliensis*	Species	1	10165	10165	67.89	0.000
	Error	8	4193	150		
	Total	9	14358			
D. kunstleri vs *K. ivorensis*	Species	1	14423	14423	79.85	0.000
	Error	8	5057	181		
	Total	9	19480			
D. kunstleri vs *F. fragrans*	Species	1	2180.9	2180.9	32.74	0.000
	Error	8	1865.1	66.6		
	Total	9	4046.0			
D. kunstleri vs *S. curtisii*	Species	1	4633	4633	32.20	0.000
	Error	8	4029	144		
	Total	9	8663			
D. kunstleri vs *A.angustifolia*	Species	1	3448.3	3448.3	43.04	0.000
	Error	8	2243.6	80.1		
	Total	9	5691.8			
D. kunstleri vs *C. scortechinii*	Species	1	12186.5	12186.5	168.42	0.000
	Error	8	2026.1	72.4		
	Total	9	14212.5			
D. kunstleri vs *H. brasiliensis*	Species	1	12517	12517	77.69	0.000
	Error	8	4511	161		
	Total	9	17029			

Table A4.16 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	5387	5387	30.92	0.000
	Error	8	4878	174		
	Total	9	10265			
K. ivorensis vs *S. curtisii*	Species	1	2707	2707	10.76	0.003
	Error	8	7042	252		
	Total	9	9749			
K. ivorensis vs *A. angustifolia*	Species	1	3767	3767	20.06	0.000
	Error	8	5257	188		
	Total	9	9023			
K. ivorensis vs *C. scortechinii*	Species	1	94	94	0.52	0.475
	Error	8	5039	180		
	Total	9	5133			
K. ivorensis vs *H. brasiliensis*	Species	1	68	68	0.25	0.620
	Error	8	7525	269		
	Total	9	7592			
F. fragrans vs *S. curtisii*	Species	1	457	457	3.32	0.079
	Error	8	3820	138		
	Total	9	4307			
F. fragrans vs *A. angustifolia*	Species	1	144.5	144.5	1.96	0.172
	Error	8	2064.4	73.7		
	Total	9	2208.9			
F. fragrans vs *C. scortechinii*	Species	1	4056.7	4056.7	61.50	0.000
	Error	8	1846.9	66.0		
	Total	9	5903.6			
F. fragrans vs *H. brasiliensis*	Species	1	4248	4248	27.46	0.000
	Error	8	4332	155		
	Total	9	8581			
S. curtisii vs *A.angustifolia*	Species	1	87	87	0.58	0.453
	Error	8	4229	151		
	Total	9	4316			
S. curtisii vs *C. scortechinii*	Species	1	1791	1791	12.50	0.001
	Error	8	4011	143		
	Total	9	5802			
S. curtisii vs *H. brasiliensis*	Species	1	1919	1919	8.27	0.008
	Error	8	6496	232		
	Total	9	8416			
A.angustifolia vs *C. scortechinii*	Species	1	2669.8	2669.8	33.59	0.000
	Error	8	2225.3	79.5		
	Total	9	4895.1			
A.angustifolia vs *H. brasiliensis*	Species	1	2826	2826	16.80	0.000
	Error	8	4711	168		
	Total	9	7536			
C. scortechinii vs *H. brasiliensis*	Species	1	2	2	0.01	0.907
	Error	8	4493	160		
	Total	9	4495			

na – not available.

Table A4.17 Analysis of variance (ANOVA) table for sample within species of moisture content with *C. curvignathus*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	17.69	4.42	0.86	0.522
	Error	10	51.66	5.17		
	Total	14	69.35			
C. lanceolatum	Replicates	4	85.70	21.43	2.27	0.134
	Error	10	94.41	9.44		
	Total	14	180.11			
M. utilis	Replicates	4	19.55	4.89	0.71	0.606
	Error	10	69.30	6.93		
	Total	14	88.82			
P. pinnata	Replicates	4	62.2	15.6	0.44	0.775
	Error	10	351.0	35.1		
	Total	14	413.3			
D. grandiflorus	Replicates	4	292.7	73.2	1.78	0.209
	Error	10	410.7	41.1		
	Total	14	703.3			
D. kunstleri	Replicates	4	413.5	103.4	1.70	0.226
	Error	10	608.6	60.9		
	Total	14	1022.2			
K. ivorensis	Replicates	4	2159	540	2.88	0.080
	Error	10	1876	188		
	Total	14	4035			
F. fragrans	Replicates	4	320.1	80.0	1.53	0.266
	Error	10	522.9	52.3		
	Total	14	843.0			
S. curtisii	Replicates	4	908	227	1.08	0.416
	Error	10	2099	210		
	Total	14	3007			
A. angustifolia	Replicates	4	966.3	241.6	9.47	0.002
	Error	10	255.1	25.5		
	Total	14	1221.4			
C. scortechinii	Replicates	4	547.3	136.8	3.00	0.073
	Error	10	456.6	45.7		
	Total	14	1003.9			
H. brasiliensis	Replicates	4	1540	385	1.97	0.175
	Error	10	1950	195		
	Total	14	3489			

Table A4.18 Analysis of variance (ANOVA) table for sample within species of moisture content with *C. gestroi*

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	4	17.69	4.42	0.86	0.522
	Error	10	51.66	5.17		
	Total	14	69.35			
C. lanceolatum	Replicates	4	85.70	21.43	2.27	0.134
	Error	10	94.41	9.44		
	Total	14	180.11			
M. utilis	Replicates	4	19.55	4.89	0.71	0.606
	Error	10	69.30	6.93		
	Total	14	88.82			
P. pinnata	Replicates	4	62.2	15.6	0.44	0.775
	Error	10	351.0	35.1		
	Total	14	413.3			
D. grandiflorus	Replicates	4	292.7	73.2	1.78	0.209
	Error	10	410.7	41.1		
	Total	14	703.3			
D. kunstleri	Replicates	4	413.5	103.4	1.70	0.226
	Error	10	608.6	60.9		
	Total	14	1022.2			
K. ivorensis	Replicates	4	2159	540	2.88	0.080
	Error	10	1876	188		
	Total	14	4035			
F. fragrans	Replicates	4	320.1	80.0	1.53	0.266
	Error	10	522.9	52.3		
	Total	14	843.0			
S. curtisii	Replicates	4	908	227	1.08	0.416
	Error	10	2099	210		
	Total	14	3007			
A. angustifolia	Replicates	4	966.3	241.6	9.47	0.002
	Error	10	255.1	25.5		
	Total	14	1221.4			
C. scortechinii	Replicates	4	547.3	136.8	3.00	0.073
	Error	10	456.6	45.7		
	Total	14	1003.9			
H. brasiliensis	Replicates	4	1540	385	1.97	0.175
	Error	10	1950	195		
	Total	14	3489			

Appendix 5 Laboratory testing of natural durability against basidiomycete fungi

Table A5.1 Average weight loss (AWL, %) and average moisture content (MC, %) of time check test with tree fungi species

Wood species	Time (weeks)	Fungi	AWL (%)	Average MC (%)
Beech	2	*P. sanguineus*	0.06 (0.02)	30.74 (0.84)
		T. versicolor	0.36 (0.07)	34.52 (1.29)
		L. sajor-caju	0.69 (0.19)	40.62 (1.23)
	4	*P. sanguineus*	1.39 (0.97)	40.33 (7.42)
		T. versicolor	5.52 (3.69)	41.22 (5.57)
		L. sajor-caju	2.12 (0.61)	39.48 (2.03)
	6	*P. sanguineus*	2.63 (1.68)	41.23 (5.27)
		T. versicolor	14.21 (3.81)	56.95 (11.81
		L. sajor-caju	8.52 (2.53)	43.82 (3.55)
	8	*P. sanguineus*	5.02 (2.33)	39.03 (5.33)
		T. versicolor	16.55 (6.39)	53.25 (7.52)
		L. sajor-caju	10.50 (2.41)	47.94 (4.65)
	10	*P. sanguineus*	16.16 (5.04)	53.27 (15.62)
		T. versicolor	27.11 (4.04)	73.47 (11.98)
		L. sajor-caju	12.11 (1.35)	51.71 (4.51)
	12	*P. sanguineus*	21.74 (4.13)	53.45 (13.09)
		T. versicolor	33.26 (2.71)	72.16 (18.22)
		L. sajor-caju	14.14 (2.30)	46.73 (3.70)
H. brasiliensis	2	*P. sanguineus*	1.51 (0.27)	40.39 (2.16)
		T. versicolor	2.32 (0.49)	74.35 (3.11)
		L. sajor-caju	2.55 (0.33)	39.64 (2.92)
	4	*P. sanguineus*	10.12 (1.67)	66.74 (14.39)
		T. versicolor	9.82 (3.38)	62.67 (9.11)
		L. sajor-caju	4.51 (0.86)	45.39 (2.90)
	6	*P. sanguineus*	17.97 (1.23)	67.06 (4.29)
		T. versicolor	17.20 (4.83)	65.78 (8.63)
		L. sajor-caju	12.59 (1.12)	59.23 (4.92)
	8	*P. sanguineus*	24.46 (3.09)	64.0 (11.15)
		T. versicolor	23.17 (2.77)	88.29 (18.30)
		L. sajor-caju	14.15 (3.28)	53.97 (14.79)
	10	*P. sanguineus*	32.65 (4.80)	76.03 (13.64)
		T. versicolor	28.68 (3.47)	90.01 (10.43)
		L. sajor-caju	18.66 (1.05)	71.37 (10.53)
	12	*P. sanguineus*	36.91 (3.86)	99.40 (22.60)
		T. versicolor	31.60 (3.82)	89.95 (21.99)
		L. sajor-caju	20.85 (4.20)	57.37 (1.99)

Mean (± SD) of 12 replicates for each species.

Appendix

Table A5.2 Average weight loss (AWL, %) and moisture content (MC, %) of 12 Malaysian woods species (decay test 1) forward *P. sanguineus*

Timber species	AWL	Range of AWL	MC	Range of MC
N. heimii	0.56 (0.08)^{e}	0.37-0.70	22.39 (1.47)^{g}	19.89-24.33
C. lanceolatum	1.21 (1.23)^{d}	0.24-3.04	30.85 (2.31)^{d}	27.54-34.46
M. utilis	0.72 (0.21)^{d}	0.45–1.26	37.63 (7.56)^{d}	30.61-58.91
P. pinnata	4.38 (2.70)^{c}	1.08-11.15	48.01 (11.80)^{b}	36.46-68.06
D. grandiflorus	0.69 (0.58)^{de}	0.14-1.83	25.80 (1.33)^{f}	24.55-29.16
D. kunstleri	29.98 (4.50)^{a}	21.95-35.91	48.00 (18.77)^{bc}	33.22-96.77
K. ivorensis	3.90 (6.24)^{c}	0.11-17.65	37.86 (13.94)^{cd}	22.70-66.79
F. fragrans	5.21 (1.77)^{c}	3.37-9.62	34.34 (7.35)^{d}	27.32-47.32
S. curtisii	0.26 (0.17)^{f}	-0.20-0.43	26.85 (1.64)^{e}	24.11-30.02
A. angustifolia	28.97 (10.54)^{a}	10.66-44.11	52.17 (15.48)^{b}	30.79-74.38
C. scortechinii	6.99 (0.52)^{b}	6.24-7.73	31.98 (4.61)^{d}	27.57-41.24
H. brasiliensis	30.45 (14.78)^{a}	8.07-44.80	74.20 (37.37)^{a}	41.87-145.83

Mean (± SD) of 12 replicates for each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Table A5.3 Average weight loss (AWL, %) and moisture content (MC, %) of 12 Malaysian woods species (decay test 1) forward *T.versicolor*

Timber species	AWL	Range of AWL	MC	Range of MC
N. heimii	0.34 (0.16)^{g}	0.09-0.59	28.48 (1.67)^{g}	25.68-30.83
C. lanceolatum	5.24 (3.08)^{e}	0.16-9.18	43.58 (9.04)^{ef}	30.59-59.09
M. utilis	7.22 (2.63)^{e}	3.25-11.93	62.32 (5.63)^{c}	54.73-71.41
P. pinnata	20.89 (7.88)^{c}	12.53-35.59	68.91 (9.83)^{b}	49.00-85.62
D. grandiflorus	6.48 (1.92)^{e}	3.63-9.61	42.23 (2.65)^{ef}	37.72-45.76
D. kunstleri	14.08 (11.45)^{cd}	1.50-29.65	57.53 (16.47)^{cd}	39.42-98.98
K. ivorensis	27.86 (7.11)^{b}	15.85-37.57	99.20 (24.41)^{a}	67.70-147.47
F. fragrans	12.57 (2.71)^{d}	8.01-17.11	71.25 (10.15)^{b}	57.33-88.99
S. curtisii	1.65 (0.57)^{f}	0.51-2.31	48.52 (8.22)^{de}	39.26-62.21
A. angustifolia	35.19 (7.54)^{a}	24.01-50.01	85.11 (40.37)^{ab}	51.45-200.15
C. scortechinii	10.08 (2.06)^{d}	7.95-14.94	60.71 (11.15)^{c}	48.90-84.41
H. brasiliensis	36.95 (6.23)^{a}	31.96-52.51	110.81 (62.08)^{a}	58.83-274.38

Mean (± SD) of 12 replicates for each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Table A5.4 Average weight loss (AWL, %) and moisture content (MC, %) of 12 Malaysian woods species (decay test 1) forward *L. sajor-caju*

Timber species	AWL	Range of AWL	MC	Range of MC
N. heimii	0.57 (0.16)^{f}	0.16-0.73	23.66 (1.64)^{f}	22.11-28.25
C. lanceolatum	4.23 (1.12)^{d}	2.47-6.52	33.81 (5.96)^{e}	24.74-42.85
M. utilis	3.58 (0.82)^{d}	2.29-5.50	41.54 (4.41)^{cd}	33.87-47.56
P. pinnata	4.00 (0.72)^{d}	2.21-4.79	39.04 (4.29)^{d}	21.12-43.58
D. grandiflorus	1.03 (0.54)^{e}	0.23-1.68	31.25 (2.36)^{e}	27.78-34.99
D. kunstleri	11.81 (10.19)^{b}	0.07-22.94	47.86 (7.84)^{b}	37.53-63.47
K. ivorensis	3.67 (2.68)^{d}	0.85-8.30	44.13 (5.62)^{bc}	38.89-51.40
F. fragrans	6.52 (1.52)^{c}	4.64-9.51	40.71 (7.50)^{cd}	31.68-51.76
S. curtisii	1.27 (0.35)^{e}	0.41-1.74	34.77 (4.64)^{e}	29.55-44.41
A. angustifolia	15.32 (2.34)^{b}	12.43-20.42	57.30 (15.62)^{a}	43.85-92.86
C. scortechinii	7.11 (0.53)^{c}	6.44-8.35	33.56 (2.92)^{f}	29.23-39.12
H. brasiliensis	25.35 (7.78)^{a}	10.64-33.17	66.70 (12.61)^{a}	45.70-88.22

Mean (± SD) of 12 replicates for each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Table A5.5 Analysis of variance (ANOVA) table for sample between species of average weight loss with *P. sanguineus* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	429.51	429.51	114.52	0.000
	Error	8	82.51	3.75		
	Total	9	512.02			
N. heimii vs *M. utilis*	Species	1	1393.5	1393.5	46.97	0.000
	Error	8	652.7	29.7		
	Total	9	2046.2			
N. heimii vs *P. pinnata*	Species	1	3936.3	3936.3	55.71	0.000
	Error	8	1554.5	70.7		
	Total	9	5490.8			
N. heimii vs *D. grandiflorus*	Species	1	69.56	69.56	35.31	0.000
	Error	8	43.34	1.97		
	Total	9	112.91			
N. heimii vs *D. kunstleri*	Species	1	3935.0	3935.0	22.21	0.000
	Error	8	3898.0	177.0		
	Total	9	7833.0			
N. heimii vs *K. ivorensis*	Species	1	1435.7	1435.7	14.61	0.001
	Error	8	2161.8	98.3		
	Total	9	3597.5			
N. heimii vs *F. fragrans*	Species	1	856.8	856.8	30.50	0.000
	Error	8	618.1	28.1		
	Total	9	1474.9			
N. heimii vs *S. curtisii*	Species	1	119.46	119.46	49.40	0.000
	Error	8	53.20	2.42		
	Total	9	172.66			
N. heimii vs *A. angustifolia*	Species	1	5319.0	5319.0	44.02	0.000
	Error	8	2658.0	121.0		
	Total	9	7977.0			
N. heimii vs *C. scortechinii*	Species	1	551.6	551.6	47.14	0.000
	Error	8	257.4	11.7		
	Total	9	809.0			
N. heimii vs *H. brasiliensis*	Species	1	16101.0	16101.0	23.02	0.000
	Error	8	15386.0	699.0		
	Total	9	31487.0			
C. lanceolatum vs *M. utilis*	Species	1	275.7	275.7	8.82	0.007
	Error	8	687.6	31.3		
	Total	9	963.4			
C. lanceolatum vs *P. pinnata*	Species	1	1765.3	1765.3	24.43	0.000
	Error	8	1589.4	125.4		
	Total	9	3354.7			
C. lanceolatum vs *D. grandiflorus*	Species	1	153.4	153.22	43.09	0.000
	Error	8	78.3	3.56		
	Total	9	231.7			
C. lanceolatum vs *D. kunstleri*	Species	1	1765.0	1765.0	9.87	0.005
	Error	8	3933.0	179.0		
	Total	9	5698.0			
C. lanceolatum vs *K. ivorensis*	Species	1	294.7	294.7	2.95	0.100
	Error	8	2196.7	99.9		
	Total	9	2491.4			
C. lanceolatum vs *F. fragrans*	Species	1	73.0	73.0	2.46	0.131
	Error	8	653.1	29.7		
	Total	9	726.1			

Table A5.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	95.94	95.94	23.94	0.000
	Error	8	88.15	4.01		
	Total	9	184.09			
C. lanceolatum vs *A.angustifolia*	Species	1	2725.0	2725.0	22.26	0.000
	Error	8	2693.0	122.0		
	Total	9	5419.0			
C. lanceolatum vs *C. scortechinii*	Species	1	7.6	7.6	0.57	0.457
	Error	8	292.4	13.3		
	Total	9	300.0			
C. lanceolatum vs *H. brasiliensis*	Species	1	11271.0	11271.0	16.08	0.001
	Error	8	15421.0	701.0		
	Total	9	26692.0			
M. utilis vs *P. pinnata*	Species	1	645.7	645.7	6.58	0.018
	Error	8	2159.6	98.2		
	Total	9	2805.2			
M. utilis vs *D. grandiflorus*	Species	1	840.4	840.4	28.51	0.000
	Error	8	648.4	29.5		
	Total	9	1488.9			
M. utilis vs *D. kunstleri*	Species	1	645.0	645.0	3.15	0.090
	Error	8	4503.0	205.0		
	Total	9	5149.0			
M. utilis vs *K. ivorensis*	Species	1	0	0	0.00	0.961
	Error	8	2767.0	126		
	Total	9	2767.0			
M. utilis vs *F. fragrans*	Species	1	64.9	64.9	1.17	0.292
	Error	8	1223.2	55.6		
	Total	9	1288.2			
M. utilis vs *S. curtisii*	Species	1	697.0	697.0	23.29	0.000
	Error	8	658.3	29.9		
	Total	9	1355.3			
M. utilis vs *A.angustifolia*	Species	1	1267.0	1267.0	8.54	0.008
	Error	8	3264.0	148		
	Total	9	4531.0			
M. utilis vs *C. scortechinii*	Species	1	191.7	191.7	4.89	0.038
	Error	8	862.5	39.2		
	Total	9	1054.2			
M. utilis vs *H. brasiliensis*	Species	1	8021.0	8021.0	11.03	0.003
	Error	8	15991.0	727.0		
	Total	9	24012.0			
P. pinnata vs *D. grandiflorus*	Species	1	2959.3	2959.3	42.00	0.000
	Error	8	1550.3	70.5		
	Total	9	4509.6			
P. pinnata vs *D. kunstleri*	Species	1	0	0	0.00	1.000
	Error	8	5405.0	246.0		
	Total	9	5405.0			
P. pinnata vs *K. ivorensis*	Species	1	617.0	617.0	3.70	0.067
	Error	8	3669.0	167.0		
	Total	9	4286.0			
P. pinnata vs *F. fragrans*	Species	1	1120.2	1120.2	11.60	0.003
	Error	8	2125.0	96.6		
	Total	9	3245.2			

Table A5.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	2684.3	2684.3	37.85	0.000
	Error	8	1560.1	70.9		
	Total	9	4244.4			
P. pinnata vs *A.angustifolia*	Species	1	104.0	104.0	0.55	0.467
	Error	8	4165.0	189.0		
	Total	9	4269.0			
P. pinnata vs *C. scortechinii*	Species	1	1541.0	1541.0	19.21	0.000
	Error	8	1764.3	80.2		
	Total	9	3305.3			
P. pinnata vs *H. brasiliensis*	Species	1	4115.0	4115.0	5.36	0.030
	Error	8	16893.0	768.0		
	Total	9	21008.0			
D. grandiflorus vs *D. kunstleri*	Species	1	2958.0	2958.0	16.71	0.000
	Error	8	3894.0	177.0		
	Total	9	6852.0			
D. grandiflorus vs *K. ivorensis*	Species	1	873.2	873.2	8.90	0.007
	Error	8	2157.5	98.1		
	Total	9	3030.8			
D. grandiflorus vs *F. fragrans*	Species	1	438.1	438.1	15.70	0.001
	Error	8	613.9	27.9		
	Total	9	1052.0			
D. grandiflorus vs *S. curtisii*	Species	1	6.70	6.70	3.01	0.097
	Error	8	48.98	2.23		
	Total	9	55.68			
D. grandiflorus vs *A.angustifolia*	Species	1	4172.0	4172.0	34.58	0.000
	Error	8	2654.0	121.0		
	Total	9	6826.0			
D. grandiflorus vs *C. scortechinii*	Species	1	229.4	229.4	19.93	0.000
	Error	8	253.2	11.5		
	Total	9	482.6			
D. grandiflorus vs *H. brasiliensis*	Species	1	14054.0	14054.0	20.10	0.000
	Error	8	15381.0	699.0		
	Total	9	29435.0			
D. kunstleri vs *K. ivorensis*	Species	1	617.0	617.0	2.26	0.147
	Error	8	6012.0	273.0		
	Total	9	6629.0			
D. kunstleri vs *F. fragrans*	Species	1	1120.0	1120.0	5.51	0.028
	Error	8	4469.0	203.0		
	Total	9	5588.0			
D. kunstleri vs *S. curtisii*	Species	1	2683.0	2683.0	1512	0.001
	Error	8	3904.0	177.0		
	Total	9	6587.0			
D. kunstleri vs *A.angustifolia*	Species	1	104.0	104.0	0.35	0.559
	Error	8	6509.0	296.0		
	Total	9	6613.0			
D. kunstleri vs *C. scortechinii*	Species	1	1540.0	1540.0	8.25	0.009
	Error	8	4108.0	187.0		
	Total	9	5648.0			
D. kunstleri vs *H. brasiliensis*	Species	1	4116.0	4116.0	4.71	0.041
	Error	8	19236.0	874.0		
	Total	9	23353.0			

Table A5.5 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	74.0	74.0	0.60	0.447
	Error	8	2732.0	124.0		
	Total	9	2807.0			
K. ivorensis vs *S. curtisii*	Species	1	726.9	726.9	7.38	0.013
	Error	8	2167.4	98.5		
	Total	9	2894.3			
K. ivorensis vs *A. angustifolia*	Species	1	1228.0	1228.0	5.66	0.026
	Error	8	4773.0	217.0		
	Total	9	6001.0			
K. ivorensis vs *C. scortechinii*	Species	1	208.0	208.0	1.93	0.179
	Error	8	2372.0	108.0		
	Total	9	2579.0			
K. ivorensis vs *H. brasiliensis*	Species	1	7921.0	7921.0	9.96	0.005
	Error	8	17500.0	795.0		
	Total	9	25420.0			
F. fragrans vs *S. curtisii*	Species	1	336.4	366.4	11.87	0.002
	Error	8	623.8	28.4		
	Total	9	960.2			
F. fragrans vs *A. angustifolia*	Species	1	1906.0	1906.0	12.99	0.002
	Error	8	3229.0	147.0		
	Total	9	5135.0			
F. fragrans vs *C. scortechinii*	Species	1	33.5	33.5	0.89	0.356
	Error	8	828.0	37.6		
	Total	9	861.5			
F. fragrans vs *H. brasiliensis*	Species	1	9529.0	9529.0	13.14	0.001
	Error	8	15956.0	725.0		
	Total	9	25485.0			
S. curtisii vs *A.angustifolia*	Species	1	3844.0	3844.0	31.74	0.000
	Error	8	2664.0	121.0		
	Total	9	6508.0			
S. curtisii vs *C. scortechinii*	Species	1	157.6	157.6	13.18	0.001
	Error	8	263.1	12.0		
	Total	9	420.7			
S. curtisii vs *H. brasiliensis*	Species	1	13447.0	13447.0	19.22	0.000
	Error	8	15391.0	700.0		
	Total	9	28838.0			
A.angustifolia vs *C. scortechinii*	Species	1	2445.0	2445.0	18.75	0.000
	Error	8	2868.0	130.0		
	Total	9	5313.0			
A.angustifolia vs *H. brasiliensis*	Species	1	2912.0	2912.0	3.56	0.072
	Error	8	17997.0	818.0		
	Total	9	20908.0			
C. scortechinii vs *H. brasiliensis*	Species	1	10692.0	10692.0	15.08	0.001
	Error	8	15596.0	709.0		
	Total	9	26288.0			

Table A5.6 Analysis of variance (ANOVA) table for samples between species of average weight loss with *T.versicolor* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	1432.6	1432.6	37.97	0.000
	Error	8	830.0	37.7		
	Total	9	2262.6			
N. heimii vs *M. utilis*	Species	1	6870.7	6870.7	398.08	0.000
	Error	8	379.7	17.3		
	Total	9	7250.4			
N. heimii vs *P. pinnata*	Species	1	9806.5	9806.5	197.07	0.000
	Error	8	1094.7	49.8		
	Total	9	10901.3			
N. heimii vs *D. grandiflorus*	Species	1	1134.19	1134.19	230.61	0.000
	Error	8	108.20	4.92		
	Total	9	1242.38			
N. heimii vs *D. kunstleri*	Species	1	4919.0	1919.0	32.61	0.000
	Error	8	3319.0	151.0		
	Total	9	8238.0			
N. heimii vs *K. ivorensis*	Species	1	30008.0	30008.0	100.28	0.000
	Error	8	6584.0	299.0		
	Total	9	36591.0			
N. heimii vs *F. fragrans*	Species	1	10975.5	10975.5	207.25	0.000
	Error	8	1165.0	53.0		
	Total	9	12140.5			
N. heimii vs *S. curtisii*	Species	1	2408.5	2408.5	68.46	0.000
	Error	8	774.0	35.2		
	Total	9	3182.5			
N. heimii vs *A. angustifolia*	Species	1	19239.0	19239.0	23.57	0.000
	Error	8	17960.0	816.0		
	Total	9	37199.0			
N. heimii vs *C. scortechinii*	Species	1	6231.5	6231.5	98.01	0.000
	Error	8	1398.8	63.6		
	Total	9	7630.3			
N. heimii vs *H. brasiliensis*	Species	1	40671.0	40671.0	21.09	0.000
	Error	8	42428.0	1929.0		
	Total	9	83099.0			
C. lanceolatum vs *M. utilis*	Species	1	2028.6	2028.6	38.87	0.000
	Error	8	1148.2	52.2		
	Total	9	3176.8			
C. lanceolatum vs *P. pinnata*	Species	1	3742.8	3742.8	44.19	0.000
	Error	8	1863.2	84.7		
	Total	9	5606.0			
C. lanceolatum vs *D. grandiflorus*	Species	1	17.4	17.4	0.44	0.516
	Error	8	876.7	39.8		
	Total	9	894.1			
C. lanceolatum vs *D. kunstleri*	Species	1	1042.0	1042.0	5.61	0.027
	Error	8	4087.0	186.0		
	Total	9	5130.0			
C. lanceolatum vs *K. ivorensis*	Species	1	18327.0	18327.0	54.84	0.000
	Error	8	7352.0	334.0		
	Total	9	25679.0			
C. lanceolatum vs *F. fragrans*	Species	1	4477.5	4477.5	50.95	0.000
	Error	8	1933.5	87.9		
	Total	9	6411.0			

Table A5.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	126.0	126.0	1.80	0.197
	Error	8	1542.5	70.1		
	Total	9	1668.5			
C. lanceolatum vs *A.angustifolia*	Species	1	10172.0	10172.0	11.95	0.002
	Error	8	18729.0	851.0		
	Total	9	28900.0			
C. lanceolatum vs *C. scortechinii*	Species	1	1688.4	1688.4	17.14	0.000
	Error	8	2167.3	98.5		
	Total	9	3855.7			
C. lanceolatum vs *H. brasiliensis*	Species	1	26837.0	26837.0	13.67	0.001
	Error	8	43196.0	1963.0		
	Total	9	70034.0			
M. utilis vs *P. pinnata*	Species	1	260.4	260.4	4.06	0.056
	Error	8	1412.9	64.2		
	Total	9	1673.3			
M. utilis vs *D. grandiflorus*	Species	1	2421.8	2421.8	124.97	0.000
	Error	8	426.3	19.4		
	Total	9	2848.1			
M. utilis vs *D. kunstleri*	Species	1	163.0	163.0	0.98	0.332
	Error	8	3637.0	165.0		
	Total	9	3800.0			
M. utilis vs *K. ivorensis*	Species	1	8161.0	8161.0	26.01	0.000
	Error	8	6902.0	314.0		
	Total	9	15063.0			
M. utilis vs *F. fragrans*	Species	1	478.5	478.5	7.10	0.014
	Error	8	1483.2	67.4		
	Total	9	1961.7			
M. utilis vs *S. curtisii*	Species	1	1143.3	1143.3	23.03	0.000
	Error	8	1092.1	49.6		
	Total	9	2235.5			
M. utilis vs *A.angustifolia*	Species	1	3115.0	3115.0	3.75	0.066
	Error	8	18278.0	831.0		
	Total	9	21394.0			
M. utilis vs *C. scortechinii*	Species	1	15.6	15.6	0.20	0.659
	Error	8	1717.0	78.0		
	Total	9	1732.6			
M. utilis vs *H. brasiliensis*	Species	1	14109.0	14109.0	7.26	0.013
	Error	8	42746.0	1943.0		
	Total	9	56855.0			
P. pinnata vs *D. grandiflorus*	Species	1	4270.7	4270.7	82.32	0.000
	Error	8	1141.4	51.9		
	Total	9	5412.0			
P. pinnata vs *D. kunstleri*	Species	1	835.0	835.0	4.22	0.052
	Error	8	4352.0	198.0		
	Total	9	5187.0			
P. pinnata vs *K. ivorensis*	Species	1	5506.0	5506.0	15.90	0.001
	Error	8	7617.0	346.0		
	Total	9	13122.0			
P. pinnata vs *F. fragrans*	Species	1	32.9	32.9	0.33	0.572
	Error	8	2198.2	99.9		
	Total	9	2231.1			

Table A5.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	2495.2	2495.2	30.38	0.000
	Error	8	1807.2	82.1		
	Total	9	4302.3			
P. pinnata vs *A.angustifolia*	Species	1	1574.0	1574.0	1.82	0.191
	Error	8	18993.0	863.0		
	Total	9	20568.0			
P. pinnata vs *C. scortechinii*	Species	1	404.0	404.0	3.65	0.069
	Error	8	2432.0	111.0		
	Total	9	2836.0			
P. pinnata vs *H. brasiliensis*	Species	1	10536.0	10536.0	5.33	0.031
	Error	8	43461.0	1976.0		
	Total	9	53997.0			
D. grandiflorus vs *D. kunstleri*	Species	1	1329.0	1329.0	8.69	0.007
	Error	8	3365.0	153.0		
	Total	9	4695.0			
D. grandiflorus vs *K. ivorensis*	Species	1	19474.0	19474.0	64.62	0.000
	Error	8	6630.0	301.0		
	Total	9	26104.0			
D. grandiflorus vs *F. fragrans*	Species	1	5053.3	5053.3	91.75	0.000
	Error	8	1211.7	55.1		
	Total	9	6264.9			
D. grandiflorus vs *S. curtisii*	Species	1	237.1	237.1	6.36	0.019
	Error	8	820.6	37.3		
	Total	9	1057.7			
D. grandiflorus vs *A.angustifolia*	Species	1	11031.0	11031.0	13.48	0.001
	Error	8	18007.0	818.0		
	Total	9	29037.0			
D. grandiflorus vs *C. scortechinii*	Species	1	2048.7	2048.7	31.18	0.000
	Error	8	1445.4	65.7		
	Total	9	3494.1			
D. grandiflorus vs *H. brasiliensis*	Species	1	28222.0	28222.0	14.62	0.001
	Error	8	42475.0	1931.0		
	Total	9	70696.0			
D. kunstleri vs *K. ivorensis*	Species	1	10628.0	10628.0	23.76	0.000
	Error	8	9841.0	447.0		
	Total	9	20469.0			
D. kunstleri vs *F. fragrans*	Species	1	1199.0	1199.0	5.97	0.023
	Error	8	4422.0	201.0		
	Total	9	5621.0			
D. kunstleri vs *S. curtisii*	Species	1	444.0	444.0	2.42	0.134
	Error	8	4031.0	183.0		
	Total	9	4475.0			
D. kunstleri vs *A.angustifolia*	Species	1	4702.0	4702.0	4.88	0.038
	Error	8	21217.0	964.0		
	Total	9	25919.0			
D. kunstleri vs *C. scortechinii*	Species	1	78.0	78.0	0.37	0.551
	Error	8	4656.0	212.0		
	Total	9	4734.0			
D. kunstleri vs *H. brasiliensis*	Species	1	17301.0	173.01	8.33	0.009
	Error	8	45685.0	2077.0		
	Total	9	62987.0			

Table A5.6 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	4687.0	4687.0	13.41	0.001
	Error	8	7687.0	349.0		
	Total	9	12374.0			
K. ivorensis vs *S. curtisii*	Species	1	15414.0	15414.0	46.48	0.000
	Error	8	7296.0	332.0		
	Total	9	22709.0			
K. ivorensis vs *A. angustifolia*	Species	1	1192.0	1192.0	1.07	0.312
	Error	8	24482.0	1113.0		
	Total	9	25674.0			
K. ivorensis vs *C. scortechinii*	Species	1	8890.0	8890.0	24.69	0.000
	Error	8	7921.0	360.0		
	Total	9	16811.0			
K. ivorensis vs *H. brasiliensis*	Species	1	809.0	809.0	0.36	0.553
	Error	8	48950.0	2225.0		
	Total	9	49759.0			
F. fragrans vs *S. curtisii*	Species	1	3101.1	3101.1	36.34	0.000
	Error	8	1877.5	85.3		
	Total	9	4978.6			
F. fragrans vs *A. angustifolia*	Species	1	1152.0	1152.0	1.33	0.261
	Error	8	19064.0	867.0		
	Total	9	20216.0			
F. fragrans vs *C. scortechinii*	Species	1	667.0	667.0	5.86	0.024
	Error	8	2502.0	114.0		
	Total	9	3169.0			
F. fragrans vs *H. brasiliensis*	Species	1	9391.0	9391.0	4.75	0.040
	Error	8	43531.0	1979.0		
	Total	9	52922.0			
S. curtisii vs *A.angustifolia*	Species	1	8033.0	8033.0	9.46	0.006
	Error	8	18672.0	849.0		
	Total	9	26705.0			
S. curtisii vs *C. scortechinii*	Species	1	891.8	891.8	9.29	0.006
	Error	8	2111.3	96.0		
	Total	9	3003.1			
S. curtisii vs *H. brasiliensis*	Species	1	23285.0	23285.0	11.87	0.002
	Error	8	43140.0	1961.0		
	Total	9	66426.0			
A.angustifolia vs *C. scortechinii*	Species	1	3572.0	3572.0	4.07	0.056
	Error	8	19297.0	877.0		
	Total	9	22869.0			
A.angustifolia vs *H. brasiliensis*	Species	1	3965.0	3965.0	1.45	0.242
	Error	8	60326.0	2742.0		
	Total	9	64291.0			
C. scortechinii vs *H. brasiliensis*	Species	1	15063.0	15063.0	7.57	0.012
	Error	8	43765.0	1989.0		
	Total	9	58828.0			

Table A5.7 Analysis of variance (ANOVA) table for samples between species of average weight loss with *L. sajor-caju* (decay test 1).

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	618.7	618.7	32.36	0.000
	Error	8	420.7	19.1		
	Total	9	1039.4			
N. heimii vs *M. utilis*	Species	1	1919.5	1919.5	173.09	0.000
	Error	8	244.0	11.1		
	Total	9	2163.5			
N. heimii vs *P. pinnata*	Species	1	1420.6	1420.6	134.88	0.000
	Error	8	231.7	10.5		
	Total	9	1652.3			
N. heimii vs *D. grandiflorus*	Species	1	346.3	346.3	83.81	0.000
	Error	8	90.9	4.1		
	Total	9	437.2			
N. heimii vs *D. kunstleri*	Species	1	3514.1	3514.1	109.58	0.000
	Error	8	705.5	32.1		
	Total	9	4219.6			
N. heimii vs *K. ivorensis*	Species	1	2515.9	2515.9	146.66	0.000
	Error	8	377.4	17.2		
	Total	9	2893.3			
N. heimii vs *F. fragrans*	Species	1	1744.5	1744.5	59.16	0.000
	Error	8	648.8	29.5		
	Total	9	2393.2			
N. heimii vs *S. curtisii*	Species	1	741.3	741.3	61.13	0.000
	Error	8	266.8	12.1		
	Total	9	1008.0			
N. heimii vs *A. angustifolia*	Species	1	6793.0	6793.0	55.10	0.000
	Error	8	2712.0	123.0		
	Total	9	9505.0			
N. heimii vs *C. scortechinii*	Species	1	588.6	588.6	105.14	0.000
	Error	8	123.2	5.6		
	Total	9	711.8			
N. heimii vs *H. brasiliensis*	Species	1	11116.5	11116.5	137.54	0.000
	Error	8	1778.1	80.8		
	Total	9	12894.6			
C. lanceolatum vs *M. utilis*	Species	1	358.7	358.7	13.03	0.002
	Error	8	605.5	27.5		
	Total	9	964.2			
C. lanceolatum vs *P. pinnata*	Species	1	164.3	164.3	6.09	0.022
	Error	8	593.3	27.0		
	Total	9	757.5			
C. lanceolatum vs *D. grandiflorus*	Species	1	39.2	39.2	1.91	0.181
	Error	8	452.5	20.6		
	Total	9	491.7			
C. lanceolatum vs *D. kunstleri*	Species	1	1183.7	1183.7	24.40	0.000
	Error	8	1067.1	48.5		
	Total	9	2250.8			
C. lanceolatum vs *K. ivorensis*	Species	1	639.3	639.3	19.03	0.000
	Error	8	739.0	33.6		
	Total	9	1378.3			
C. lanceolatum vs *F. fragrans*	Species	1	285.4	285.4	6.21	0.021
	Error	8	1010.3	45.9		
	Total	9	1295.7			

Table A5.7 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	5.5	5.5	0.19	0.664
	Error	8	628.3	28.6		
	Total	9	633.9			
C. lanceolatum vs *A.angustifolia*	Species	1	3311.0	3311.0	23.70	0.000
	Error	8	3074.0	140.0		
	Total	9	6385.0			
C. lanceolatum vs *C. scortechinii*	Species	1	0.4	0.4	0.02	0.897
	Error	8	484.7	22.0		
	Total	9	485.1			
C. lanceolatum vs *H. brasiliensis*	Species	1	6490.0	6490.0	66.73	0.000
	Error	8	2139.7	97.3		
	Total	9	8629.7			
M. utilis vs *P. pinnata*	Species	1	37.5	37.5	1.98	0.173
	Error	8	416.6	18.9		
	Total	9	454.0			
M. utilis vs *D. grandiflorus*	Species	1	635.2	635.2	50.68	0.000
	Error	8	275.7	12.5		
	Total	9	910.9			
M. utilis vs *D. kunstleri*	Species	1	239.2	239.2	5.91	0.024
	Error	8	890.4	40.5		
	Total	9	1129.6			
M. utilis vs *K. ivorensis*	Species	1	40.3	40.3	1.58	0.222
	Error	8	562.2	25.6		
	Total	9	602.5			
M. utilis vs *F. fragrans*	Species	1	4.2	4.2	0.11	0.743
	Error	8	833.6	37.9		
	Total	9	837.8			
M. utilis vs *S. curtisii*	Species	1	275.1	275.1	13.40	0.001
	Error	8	451.6	20.5		
	Total	9	726.7			
M. utilis vs *A.angustifolia*	Species	1	1490.0	1490.0	11.32	0.003
	Error	8	2897.0	132.0		
	Total	9	4387.0			
M. utilis vs *C. scortechinii*	Species	1	382.3	382.3	27.31	0.000
	Error	8	308.0	14.0		
	Total	9	690.3			
M. utilis vs *H. brasiliensis*	Species	1	3797.3	3797.3	42.56	0.000
	Error	8	1962.9	89.2		
	Total	9	5760.3			
P. pinnata vs *D. grandiflorus*	Species	1	364.1	364.1	30.40	0.000
	Error	8	263.5	12.0		
	Total	9	627.6			
P. pinnata vs *D. kunstleri*	Species	1	466.1	466.1	11.68	0.002
	Error	8	878.1	39.9		
	Total	9	1344.2			
P. pinnata vs *K. ivorensis*	Species	1	155.5	155.5	6.22	0.021
	Error	8	550.0	25.0		
	Total	9	705.4			
P. pinnata vs *F. fragrans*	Species	1	16.6	16.6	0.44	0.512
	Error	8	821.3	37.3		
	Total	9	837.9			

Table A5.7 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	109.5	109.5	5.48	0.029
	Error	8	439.3	20.0		
	Total	9	548.9			
P. pinnata vs *A.angustifolia*	Species	1	2001.0	2001.0	15.26	0.001
	Error	8	2885.0	131.0		
	Total	9	4885.0			
P. pinnata vs *C. scortechinii*	Species	1	180.4	180.4	13.42	0.001
	Error	8	295.7	13.4		
	Total	9	476.1			
P. pinnata vs *H. brasiliensis*	Species	1	4589.3	4589.3	51.76	0.000
	Error	8	1950.7	88.7		
	Total	9	6540.0			
D. grandiflorus vs *D. kunstleri*	Species	1	1654.0	1654.0	49.35	0.000
	Error	8	737.3	33.5		
	Total	9	2391.3			
D. grandiflorus vs *K. ivorensis*	Species	1	995.4	995.4	53.52	0.000
	Error	8	409.2	18.6		
	Total	9	1404.6			
D. grandiflorus vs *F. fragrans*	Species	1	536.2	536.2	17.34	0.000
	Error	8	680.5	30.9		
	Total	9	1216.8			
D. grandiflorus vs *S. curtisii*	Species	1	74.2	74.2	5.47	0.029
	Error	8	298.5	13.6		
	Total	9	372.8			
D. grandiflorus vs *A.angustifolia*	Species	1	4072.0	4072.0	32.65	0.000
	Error	8	2744.0	125.0		
	Total	9	6815.0			
D. grandiflorus vs *C. scortechinii*	Species	1	31.93	31.93	4.53	0.045
	Error	8	154.93	7.04		
	Total	9	186.86			
D. grandiflorus vs *H. brasiliensis*	Species	1	7538.6	7538.6	91.64	0.000
	Error	8	1809.9	82.3		
	Total	9	9348.5			
D. kunstleri vs *K. ivorensis*	Species	1	83.2	83.2	1.79	0.195
	Error	8	1023.8	46.5		
	Total	9	1107.0			
D. kunstleri vs *F. fragrans*	Species	1	306.7	306.7	5.21	0.032
	Error	8	1295.2	58.9		
	Total	9	1601.9			
D. kunstleri vs *S. curtisii*	Species	1	1027.4	1027.4	24.75	0.000
	Error	8	913.2	41.5		
	Total	9	1940.6			
D. kunstleri vs *A.angustifolia*	Species	1	535.0	535.0	3.51	0.074
	Error	8	3358.0	153.0		
	Total	9	3894.0			
D. kunstleri vs *C. scortechinii*	Species	1	1226.4	1226.4	35.06	0.000
	Error	8	769.6	35.0		
	Total	9	1995.9			
D. kunstleri vs *H. brasiliensis*	Species	1	2130.0	2130.0	19.33	0.000
	Error	8	2425.0	110.0		
	Total	9	4555.0			

Table A5.7 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	70.4	70.4	1.60	0.219
	Error	8	967.0	44.0		
	Total	9	1037.4			
K. ivorensis vs *S. curtisii*	Species	1	525.9	525.9	19.78	0.000
	Error	8	585.0	26.6		
	Total	9	1110.9			
K. ivorensis vs *A. angustifolia*	Species	1	1041.0	1041.0	7.56	0.012
	Error	8	3030.0	138.0		
	Total	9	4071.0			
K. ivorensis vs *C. scortechinii*	Species	1	670.8	670.8	33.43	0.000
	Error	8	441.4	20.1		
	Total	9	1112.2			
K. ivorensis vs *H. brasiliensis*	Species	1	3055.4	3055.4	32.06	0.000
	Error	8	2096.4	95.3		
	Total	9	5151.8			
F. fragrans vs *S. curtisii*	Species	1	211.4	211.4	5.43	0.029
	Error	8	856.4	38.9		
	Total	9	1067.8			
F. fragrans vs *A. angustifolia*	Species	1	1653.0	1653.0	11.01	0.003
	Error	8	3302.0	150.0		
	Total	9	4954.0			
F. fragrans vs *C. scortechinii*	Species	1	306.5	306.5	9.46	0.006
	Error	8	712.8	32.4		
	Total	9	1019.3			
F. fragrans vs *H. brasiliensis*	Species	1	4054.0	5054.0	37.66	0.000
	Error	8	2368.0	108.0		
	Total	9	6421.0			
S. curtisii vs *A.angustifolia*	Species	1	3046.0	3046.0	22.95	0.000
	Error	8	2920.0	133.0		
	Total	9	5966.0			
S. curtisii vs *C. scortechinii*	Species	1	8.8	8.8	0.59	0.452
	Error	8	330.8	15.0		
	Total	9	339.6			
S. curtisii vs *H. brasiliensis*	Species	1	6116.6	6116.6	67.77	0.000
	Error	8	1985.7	90.3		
	Total	9	8102.4			
A.angustifolia vs *C. scortechinii*	Species	1	3382.0	3382.0	26.81	0.000
	Error	8	2776.0	126.0		
	Total	9	6158.0			
A.angustifolia vs *H. brasiliensis*	Species	1	830.0	530.0	2.63	0.119
	Error	8	4431.0	201.0		
	Total	9	4961.0			
C. scortechinii vs *H. brasiliensis*	Species	1	6589.4	6589.4	78.69	0.000
	Error	8	1842.1	83.7		
	Total	9	8431.5			

Table A5.8 Analysis of variance (ANOVA) table for sample within species of average weight loss with *P. sanguineus* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	0.02793	0.00931	1.51	0.285
	Error	8	0.04942	0.00618		
	Total	11	0.07735			
C. lanceolatum	Replicates	3	3.83	1.28	0.80	0.526
	Error	8	12.72	1.59		
	Total	11	16.55			
M. utilis	Replicates	3	0.1499	0.0500	1.22	0.365
	Error	8	0.3285	0.0411		
	Total	11	0.4783			
P. pinnata	Replicates	3	16.68	5.56	0.70	0.578
	Error	8	63.52	7.94		
	Total	11	80.20			
D. grandiflorus	Replicates	3	1.097	0.366	1.13	0.395
	Error	8	2.597	0.325		
	Total	11	3.694			
D. kunstleri	Replicates	3	99.2	33.1	1.51	0.285
	Error	8	175.4	21.9		
	Total	11	274.6			
K. ivorensis	Replicates	3	6.64	2.21	0.26	0.853
	Error	8	68.31	8.54		
	Total	11	74.95			
F. fragrans	Replicates	3	16.65	5.55	2.51	0.132
	Error	8	17.67	2.21		
	Total	11	34.31			
S. curtisii	Replicates	3	0.0762	0.0254	0.83	0.515
	Error	8	0.2458	0.0307		
	Total	11	0.3220			
A. angustifolia	Replicates	3	788.2	262.7	4.84	0.033
	Error	8	434.3	54.3		
	Total	11	1222.4			
C. scortechinii	Replicates	3	0.770	0.257	0.95	0.462
	Error	8	2.168	0.271		
	Total	11	2.938			
H. brasiliensis	Replicates	3	1655.2	551.7	5.89	0.020
	Error	8	748.8	93.6		
	Total	11	2404.1			

Table A5.9 Analysis of variance (ANOVA) table for sample within species of average weight loss with *T. versicolor* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	0.0268	0.0089	0.27	0.848
	Error	8	0.2694	0.0337		
	Total	11	0.2963			
C. lanceolatum	Replicates	3	1.68	0.56	0.06	0.980
	Error	8	75.24	9.40		
	Total	11	76.92			
M. utilis	Replicates	3	35.36	11.79	2.31	0.153
	Error	8	40.83	5.10		
	Total	11	76.19			
P. pinnata	Replicates	3	87.0	29.0	0.39	0.764
	Error	8	596.2	74.5		
	Total	11	683.3			
D. grandiflorus	Replicates	3	30.86	10.29	8.49	0.007
	Error	8	9.70	1.21		
	Total	11	40.56			
D. kunstleri	Replicates	3	250.4	83.5	0.89	0.485
	Error	8	746.2	93.3		
	Total	11	996.6			
K. ivorensis	Replicates	3	310.9	103.6	3.39	0.075
	Error	8	244.9	30.6		
	Total	11	555.8			
F. fragrans	Replicates	3	5.88	1.96	0.21	0.887
	Error	8	75.03	9.38		
	Total	11	80.91			
S. curtisii	Replicates	3	0.338	0.113	0.28	0.840
	Error	8	3.254	0.407		
	Total	11	3.592			
A. angustifolia	Replicates	3	148.0	49.3	0.83	0.515
	Error	8	477.7	59.7		
	Total	11	625.7			
C. scortechinii	Replicates	3	20.06	6.69	2.02	0.190
	Error	8	26.48	3.31		
	Total	11	46.55			
H. brasiliensis	Replicates	3	172.0	57.3	1.80	0.225
	Error	8	254.8	31.8		
	Total	11	426.7			

Table A5.10 Analysis of variance (ANOVA) table for sample within species of average weight loss with *L. sajor-caju* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	0.1128	0.0376	1.67	0.251
	Error	8	0.1806	0.0226		
	Total	11	0.2934			
C. lanceolatum	Replicates	3	1.58	0.53	0.35	0.791
	Error	8	12.12	1.51		
	Total	11	13.70			
M. utilis	Replicates	3	2.817	0.939	1.65	0.253
	Error	8	4.542	0.568		
	Total	11	7.359			
P. pinnata	Replicates	3	2.019	0.673	1.45	0.299
	Error	8	3.709	0.464		
	Total	11	5.728			
D. grandiflorus	Replicates	3	0.4046	0.1349	2.21	0.165
	Error	8	0.4886	0.0611		
	Total	11	0.8932			
D. kunstleri	Replicates	3	75.6	25.2	0.37	0.779
	Error	8	549.6	68.7		
	Total	11	625.2			
K. ivorensis	Replicates	3	1.93	0.64	0.07	0.976
	Error	8	77.20	9.65		
	Total	11	79.13			
F. fragrans	Replicates	3	17.30	5.77	5.68	0.022
	Error	8	8.12	1.02		
	Total	11	25.43			
S. curtisii	Replicates	3	0.425	0.142	1.20	0.369
	Error	8	0.941	0.118		
	Total	11	1.365			
A. angustifolia	Replicates	3	36.75	12.25	4.19	0.047
	Error	8	23.40	2.93		
	Total	11	60.15			
C. scortechinii	Replicates	3	0.984	0.328	1.24	0.359
	Error	8	2.123	0.265		
	Total	11	3.106			
H. brasiliensis	Replicates	3	428.3	142.8	4.81	0.034
	Error	8	237.6	29.7		
	Total	11	665.9			

Table A5.11 Analysis of variance (ANOVA) table for sample between species of average moisture content with *P. sanguineus* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	429.5	429.5	114.52	0.000
	Error	8	82.5	3.8		
	Total	9	512.0			
N. heimii vs *M. utilis*	Species	1	1393.5	1393.5	46.97	0.000
	Error	8	652.7	29.7		
	Total	9	2046.2			
N. heimii vs *P. pinnata*	Species	1	3936.3	3936.3	55.71	0.000
	Error	8	1554.5	70.7		
	Total	9	5490.8			
N. heimii vs *D. grandiflorus*	Species	1	69.6	69.6	35.31	0.000
	Error	8	43.3	2.00		
	Total	9	112.9			
N. heimii vs *D. kunstleri*	Species	1	3935.0	3935.0	22.21	0.000
	Error	8	3898.0	177.0		
	Total	9	7833.0			
N. heimii vs *K. ivorensis*	Species	1	1435.7	1435.7	14.61	0.001
	Error	8	2161.8	98.3		
	Total	9	3597.5			
N. heimii vs *F. fragrans*	Species	1	856.8	856.8	30.50	0.000
	Error	8	618.1	28.1		
	Total	9	1474.9			
N. heimii vs *S. curtisii*	Species	1	119.5	119.5	49.40	0.000
	Error	8	53.2	2.4		
	Total	9	172.7			
N. heimii vs *A. angustifolia*	Species	1	5319.0	5319.0	44.02	0.000
	Error	8	2658.0	121.0		
	Total	9	7977.0			
N. heimii vs *C. scortechinii*	Species	1	551.6	551.6	47.14	0.000
	Error	8	257.4	11.7		
	Total	9	809.0			
N. heimii vs *H. brasiliensis*	Species	1	16101.0	16101.0	23.02	0.000
	Error	8	15386.0	699.0		
	Total	9	31487.0			
C. lanceolatum vs *M. utilis*	Species	1	275.7	275.7	8.82	0.007
	Error	8	687.6	31.3		
	Total	9	963.4			
C. lanceolatum vs *P. pinnata*	Species	1	1765.3	1765.3	24.43	0.000
	Error	8	1589.4	72.2		
	Total	9	3354.7			
C. lanceolatum vs *D. grandiflorus*	Species	1	153.4	153.4	43.09	0.000
	Error	8	78.3	3.6		
	Total	9	231.7			
C. lanceolatum vs *D. kunstleri*	Species	1	1765.0	1765.0	9.87	0.005
	Error	8	3933.0	179.0		
	Total	9	5698.0			
C. lanceolatum vs *K. ivorensis*	Species	1	294.7	294.7	2.95	0.100
	Error	8	2196.7	99.9		
	Total	9	2491.4			
C. lanceolatum vs *F. fragrans*	Species	1	73.0	73.0	2.46	0.131
	Error	8	653.1	29.7		
	Total	9	726.1			

Table A5.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	95.9	95.9	23.94	0.000
	Error	8	88.2	4.0		
	Total	9	184.1			
C. lanceolatum vs *A.angustifolia*	Species	1	2725.0	2725.0	22.26	0.000
	Error	8	2693.0	122.0		
	Total	9	5418.0			
C. lanceolatum vs *C. scortechinii*	Species	1	7.6	7.6	0.57	0.457
	Error	8	292.4	13.3		
	Total	9	300.0			
C. lanceolatum vs *H. brasiliensis*	Species	1	11271.0	11271.0	16.08	0.001
	Error	8	15421.0	701.0		
	Total	9	26692.0			
M. utilis vs *P. pinnata*	Species	1	645.7	645.7	6.58	0.018
	Error	8	2159.6	98.2		
	Total	9	2805.2			
M. utilis vs *D. grandiflorus*	Species	1	840.4	840.4	28.51	0.000
	Error	8	648.4	29.5		
	Total	9	1488.8			
M. utilis vs *D. kunstleri*	Species	1	645.0	645.0	3.15	0.090
	Error	8	4503.0	205		
	Total	9	5149.0			
M. utilis vs *K. ivorensis*	Species	1	0	0	0.00	0.961
	Error	8	2767	126		
	Total	9	2767			
M. utilis vs *F. fragrans*	Species	1	64.9	64.9	1.17	0.292
	Error	8	1223.2	55.6		
	Total	9	1288.1			
M. utilis vs *S. curtisii*	Species	1	697.0	697.0	23.29	0.000
	Error	8	658.3	29.9		
	Total	9	1355.3			
M. utilis vs *A.angustifolia*	Species	1	1267.0	1267.0	8.54	0.008
	Error	8	3264.0	148.0		
	Total	9	4531.0			
M. utilis vs *C. scortechinii*	Species	1	191.7	191.7	4.89	0.038
	Error	8	862.5	39.2		
	Total	9	1054.2			
M. utilis vs *H. brasiliensis*	Species	1	8021.0	8021.0	11.03	0.003
	Error	8	15991.0	727.0		
	Total	9	24012.0			
P. pinnata vs *D. grandiflorus*	Species	1	2959.3	2959.3	42.00	0.000
	Error	8	1550.3	70.5		
	Total	9	4509.6			
P. pinnata vs *D. kunstleri*	Species	1	0	0	0.00	1.000
	Error	8	5405.0	246.0		
	Total	9	5405.0			
P. pinnata vs *K. ivorensis*	Species	1	617.0	617.0	3.70	0.067
	Error	8	3669.0	167.0		
	Total	9	4286.0			
P. pinnata vs *F. fragrans*	Species	1	1120.2	1120.2	11.60	0.003
	Error	8	2125.0	96.6		
	Total	9	3245.2			

Table A5.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	2684.3	2684.3	37.85	0.000
	Error	8	1560.1	70.9		
	Total	9	4244.4			
P. pinnata vs *A.angustifolia*	Species	1	104.0	104.0	0.55	0.467
	Error	8	4165.0	189.0		
	Total	9	4269.0			
P. pinnata vs *C. scortechinii*	Species	1	1541.0	1541.0	19.21	0.000
	Error	8	1764.3	80.2		
	Total	9	3305.3			
P. pinnata vs *H. brasiliensis*	Species	1	4115.0	4115.0	5.36	0.030
	Error	8	16893.0	768.0		
	Total	9	21008.0			
D. grandiflorus vs *D. kunstleri*	Species	1	2958.0	2958.0	16.71	0.000
	Error	8	3894.0	177.0		
	Total	9	6852.0			
D. grandiflorus vs *K. ivorensis*	Species	1	873.2	873.2	8.90	0.007
	Error	8	2157.5	98.1		
	Total	9	3030.7			
D. grandiflorus vs *F. fragrans*	Species	1	438.1	438.1	1.70	0.001
	Error	8	613.9	27.9		
	Total	9	1052.0			
D. grandiflorus vs *S. curtisii*	Species	1	6.7	6.7	3.01	0.097
	Error	8	49.0	2.2		
	Total	9	55.7			
D. grandiflorus vs *A.angustifolia*	Species	1	4172.0	4172.0	34.58	0.000
	Error	8	2654.0	121.0		
	Total	9	6826.0			
D. grandiflorus vs *C. scortechinii*	Species	1	229.4	229.4	19.93	0.000
	Error	8	253.2	11.5		
	Total	9	482.6			
D. grandiflorus vs *H. brasiliensis*	Species	1	14054.0	14054.0	20.10	0.000
	Error	8	15381.0	699.0		
	Total	9	29435.0			
D. kunstleri vs *K. ivorensis*	Species	1	617.0	617.0	2.26	0.147
	Error	8	6012.0	273.0		
	Total	9	6629.0			
D. kunstleri vs *F. fragrans*	Species	1	1120.0	1120.0	5.51	0.028
	Error	8	4469.0	203.0		
	Total	9	5588.0			
D. kunstleri vs *S. curtisii*	Species	1	2683.0	2683.0	15.12	0.001
	Error	8	3904.0	177.0		
	Total	9	6587.0			
D. kunstleri vs *A.angustifolia*	Species	1	104.0	104.0	0.35	0.559
	Error	8	6509.0	296.0		
	Total	9	6613.0			
D. kunstleri vs *C. scortechinii*	Species	1	1540.0	1540.0	8.25	0.009
	Error	8	4108.0	187.0		
	Total	9	5648.0			
D. kunstleri vs *H. brasiliensis*	Species	1	4116.0	4116.0	4.71	0.041
	Error	8	19236.0	874.0		
	Total	9	23353.0			

Table A5.11 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	74.0	74.0	0.60	0.447
	Error	8	2732.0	124.0		
	Total	9	2807.0			
K. ivorensis vs *S. curtisii*	Species	1	726.9	726.9	7.38	0.013
	Error	8	2167.4	98.5		
	Total	9	2894.3			
K. ivorensis vs *A. angustifolia*	Species	1	1228.0	1228.0	5.66	0.026
	Error	8	4773.0	217.0		
	Total	9	6000.0			
K. ivorensis vs *C. scortechinii*	Species	1	208.0	208.0	1.93	0.179
	Error	8	2372.0	108.0		
	Total	9	2579.0			
K. ivorensis vs *H. brasiliensis*	Species	1	7921.0	7921.0	9.96	0.005
	Error	8	17500.0	795.0		
	Total	9	25420.0			
F. fragrans vs *S. curtisii*	Species	1	336.4	336.4	11.87	0.002
	Error	8	623.8	28.4		
	Total	9	960.2			
F. fragrans vs *A. angustifolia*	Species	1	1906.0	1906.0	12.99	0.002
	Error	8	3229.0	147.0		
	Total	9	5135.0			
F. fragrans vs *C. scortechinii*	Species	1	33.5	33.5	0.89	0.356
	Error	8	828.0	37.6		
	Total	9	861.5			
F. fragrans vs *H. brasiliensis*	Species	1	9529.0	9529.0	13.14	0.001
	Error	8	15956.0	725.0		
	Total	9	25485.0			
S. curtisii vs *A.angustifolia*	Species	1	3844.0	3844.0	31.74	0.000
	Error	8	2664.0	121.0		
	Total	9	6508.0			
S. curtisii vs *C. scortechinii*	Species	1	157.6	157.6	13.18	0.001
	Error	8	263.1	12.0		
	Total	9	420.7			
S. curtisii vs *H. brasiliensis*	Species	1	13447.0	13447.0	19.22	0.000
	Error	8	15391.0	700.0		
	Total	9	28838.0			
A.angustifolia vs *C. scortechinii*	Species	1	2445.0	2445.0	18.75	0.000
	Error	8	2868.0	130.0		
	Total	9	5313.0			
A.angustifolia vs *H. brasiliensis*	Species	1	2912.0	2912.0	3.56	0.072
	Error	8	17997.0	818.0		
	Total	9	20908.0			
C. scortechinii vs *H. brasiliensis*	Species	1	10692.0	10692.0	15.08	0.001
	Error	8	15596.0	709.0		
	Total	9	26288.0			

Table A5.12 Analysis of variance (ANOVA) table for samples between species of average moisture content with *T.versicolor* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	1432.6	1432.6	37.97	0.000
	Error	8	830.0	37.7		
	Total	9	2262.6			
N. heimii vs *M. utilis*	Species	1	6870.7	6870.7	398.0	0.000
	Error	8	379.7	17.3		
	Total	9	7250.4			
N. heimii vs *P. pinnata*	Species	1	9806.5	9806.5	197.07	0.000
	Error	8	1094.7	49.8		
	Total	9	10901.3			
N. heimii vs *D. grandiflorus*	Species	1	1134.2	1134.2	230.61	0.000
	Error	8	108.2	4.9		
	Total	9	1242.4			
N. heimii vs *D. kunstleri*	Species	1	4919.0	4919.0	32.61	0.000
	Error	8	3319.0	151.0		
	Total	9	8238.0			
N. heimii vs *K. ivorensis*	Species	1	30008.0	30008.0	100.28	0.000
	Error	8	6584.0	299.0		
	Total	9	36591.0			
N. heimii vs *F. fragrans*	Species	1	10975.5	10975.5	207.25	0.000
	Error	8	1165.0	53.0		
	Total	9	12140.5			
N. heimii vs *S. curtisii*	Species	1	2408.5	2408.5	68.46	0.000
	Error	8	774.0	35.2		
	Total	9	3182.5			
N. heimii vs *A. angustifolia*	Species	1	19239.0	19239.0	23.57	0.000
	Error	8	17960.0	816.0		
	Total	9	37199.0			
N. heimii vs *C. scortechinii*	Species	1	6231.5	6231.5	98.01	0.000
	Error	8	1398.8	63.6		
	Total	9	7630.3			
N. heimii vs *H. brasiliensis*	Species	1	40671.0	40671.0	21.09	0.000
	Error	8	42428.0	1929.0		
	Total	9	83099.0			
C. lanceolatum vs *M. utilis*	Species	1	2028.6	2028.6	38.87	0.000
	Error	8	1148.2	52.2		
	Total	9	3176.8			
C. lanceolatum vs *P. pinnata*	Species	1	3742.8	3742.0	44.19	0.000
	Error	8	1863.2	84.7		
	Total	9	5606.0			
C. lanceolatum vs *D. grandiflorus*	Species	1	17.4	17.4	0.44	0.516
	Error	8	876.7	39.8		
	Total	9	894.1			
C. lanceolatum vs *D. kunstleri*	Species	1	1042.0	1042.0	5.61	0.027
	Error	8	4087.0	186.0		
	Total	9	5130.0			
C. lanceolatum vs *K. ivorensis*	Species	1	18327.0	18327.0	54.84	0.000
	Error	8	7352.0	334.0		
	Total	9	25679.0			
C. lanceolatum vs *F. fragrans*	Species	1	4477.5	4477.5	50.95	0.000
	Error	8	1933.5	87.9		
	Total	9	6411.0			

Table A5.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	126.0	126.0	1.80	0.194
	Error	8	1542.5	70.1		
	Total	9	1668.5			
C. lanceolatum vs *A.angustifolia*	Species	1	10172.0	10172.0	1195.0	0.002
	Error	8	18729.0	851.0		
	Total	9	28900.0			
C. lanceolatum vs *C. scortechinii*	Species	1	1688.4	1688.4	17.14	0.000
	Error	8	2167.3	98.5		
	Total	9	3855.7			
C. lanceolatum vs *H. brasiliensis*	Species	1	26837.0	26837.0	13.67	0.001
	Error	8	43196.0	1963.0		
	Total	9	70034.0			
M. utilis vs *P. pinnata*	Species	1	260.4	260.4	4.06	0.056
	Error	8	1412.9	64.2		
	Total	9	1673.3			
M. utilis vs *D. grandiflorus*	Species	1	2421.8	2421.8	124.97	0.000
	Error	8	426.3	19.4		
	Total	9	2848.1			
M. utilis vs *D. kunstleri*	Species	1	163.0	163.0	0.98	0.332
	Error	8	3637.0	165.0		
	Total	9	3800.0			
M. utilis vs *K. ivorensis*	Species	1	8161.0	8161.0	26.01	0.000
	Error	8	6902.0	314.0		
	Total	9	15063.0			
M. utilis vs *F. fragrans*	Species	1	478.5	478.5	7.10	0.014
	Error	8	1483.2	67.4		
	Total	9	1961.7			
M. utilis vs *S. curtisii*	Species	1	1143.3	1143.3	23.03	0.000
	Error	8	1092.1	49.6		
	Total	9	2235.5			
M. utilis vs *A.angustifolia*	Species	1	3115.0	3115.0	3.75	0.066
	Error	8	18278.0	831.0		
	Total	9	21394.0			
M. utilis vs *C. scortechinii*	Species	1	15.6	15.6	0.20	0.659
	Error	8	1717.0	78.0		
	Total	9	1732.6			
M. utilis vs *H. brasiliensis*	Species	1	14109.0	14109.0	7.26	0.013
	Error	8	42746.0	1943.0		
	Total	9	56885.0			
P. pinnata vs *D. grandiflorus*	Species	1	4270.7	4270.7	82.32	0.000
	Error	8	1141.4	51.9		
	Total	9	5412.0			
P. pinnata vs *D. kunstleri*	Species	1	835.0	835.0	4.22	0.052
	Error	8	4352.0	198.0		
	Total	9	5187.0			
P. pinnata vs *K. ivorensis*	Species	1	5506.0	5506.0	15.90	0.001
	Error	8	7617.0	346.0		
	Total	9	13122.0			
P. pinnata vs *F. fragrans*	Species	1	32.9	32.9	0.33	0.572
	Error	8	2198.2	99.9		
	Total	9	2231.1			

Table A5.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	2495.2	2495.2	30.38	0.000
	Error	8	1807.2	82.1		
	Total	9	4302.3			
P. pinnata vs *A.angustifolia*	Species	1	1574.0	1574.0	1.82	0.191
	Error	8	18993.0	863.0		
	Total	9	20568.0			
P. pinnata vs *C. scortechinii*	Species	1	404.0	404.0	3.65	0.069
	Error	8	2432.0	111.0		
	Total	9	2836.0			
P. pinnata vs *H. brasiliensis*	Species	1	10536.0	10536.0	5.33	0.031
	Error	8	43461.0	1976.0		
	Total	9	53997.0			
D. grandiflorus vs *D. kunstleri*	Species	1	1329.0	1329.0	8.69	0.000
	Error	8	3365.0	153.0		
	Total	9	4695.0			
D. grandiflorus vs *K. ivorensis*	Species	1	19474.0	19474.0	64.64	0.000
	Error	8	6630.0	301.0		
	Total	9	26104.0			
D. grandiflorus vs *F. fragrans*	Species	1	5053.3	5053.3	91.75	0.000
	Error	8	1211.7	55.1		
	Total	9	6265.0			
D. grandiflorus vs *S. curtisii*	Species	1	237.1	237.1	6.36	0.019
	Error	8	820.6	37.3		
	Total	9	1057.7			
D. grandiflorus vs *A.angustifolia*	Species	1	11031.0	11031.0	13.48	0.001
	Error	8	18007.0	818.0		
	Total	9	29037.0			
D. grandiflorus vs *C. scortechinii*	Species	1	2048.7	2048.7	31.18	0.000
	Error	8	1445.4	65.7		
	Total	9	3494.1			
D. grandiflorus vs *H. brasiliensis*	Species	1	28222.0	28222.0	14.62	0.001
	Error	8	42475.0	1931.0		
	Total	9	70697.0			
D. kunstleri vs *K. ivorensis*	Species	1	10628.0	10628.0	23.76	0.000
	Error	8	9841.0	447.0		
	Total	9	20469.0			
D. kunstleri vs *F. fragrans*	Species	1	1199.0	1199.0	5.97	0.023
	Error	8	4422.0	201.0		
	Total	9	5621.0			
D. kunstleri vs *S. curtisii*	Species	1	444.0	444.0	2.42	0.134
	Error	8	4031.0	183.0		
	Total	9	4475.0			
D. kunstleri vs *A.angustifolia*	Species	1	4702.0	4702.0	4.88	0.038
	Error	8	21217.0	964.0		
	Total	9	25919.0			
D. kunstleri vs *C. scortechinii*	Species	1	78.0	78.0	0.37	0.551
	Error	8	4656.0	212.0		
	Total	9	4734.0			
D. kunstleri vs *H. brasiliensis*	Species	1	17301.0	17301.0	8.33	0.009
	Error	8	45685.0	2077.0		
	Total	9	62987.0			

Table A5.12 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	4687.0	4687.0	13.42	0.001
	Error	8	7687.0	349.0		
	Total	9	12374.0			
K. ivorensis vs *S. curtisii*	Species	1	15414.0	15414.0	46.48	0.000
	Error	8	7296.0	332.0		
	Total	9	22709.0			
K. ivorensis vs *A. angustifolia*	Species	1	1192.0	1192.0	1.07	0.312
	Error	8	24482.0	1113.0		
	Total	9	25674.0			
K. ivorensis vs *C. scortechinii*	Species	1	8890.0	8890.0	24.69	0.000
	Error	8	7921.0	360.0		
	Total	9	16811.0			
K. ivorensis vs *H. brasiliensis*	Species	1	809.0	809.0	0.36	0.553
	Error	8	48950.0	2225.0		
	Total	9	49759.0			
F. fragrans vs *S. curtisii*	Species	1	3101.1	3101.1	36.34	0.000
	Error	8	1877.5	85.3		
	Total	9	4978.6			
F. fragrans vs *A. angustifolia*	Species	1	1152.0	1152.0	1.33	0.261
	Error	8	19064.0	867.0		
	Total	9	20216.0			
F. fragrans vs *C. scortechinii*	Species	1	667.0	667.0	5.86	0.024
	Error	8	2502.0	114.0		
	Total	9	3169.0			
F. fragrans vs *H. brasiliensis*	Species	1	9391.0	9391.0	4.75	0.040
	Error	8	43531.0	1979.0		
	Total	9	52922.0			
S. curtisii vs *A.angustifolia*	Species	1	8033.0	8033.0	9.46	0.006
	Error	8	18672.0	849		
	Total	9	26705.0			
S. curtisii vs *C. scortechinii*	Species	1	891.8	891.8	9.29	0.006
	Error	8	2111.3	96.0		
	Total	9	3003.1			
S. curtisii vs *H. brasiliensis*	Species	1	23285.0	23285.0	11.87	0.002
	Error	8	43140.0	1961.0		
	Total	9	66426.0			
A.angustifolia vs *C. scortechinii*	Species	1	3572.0	3572.0	4.07	0.056
	Error	8	19297.0	877.0		
	Total	9	22869.0			
A.angustifolia vs *H. brasiliensis*	Species	1	3965.0	3965.0	1.45	0.242
	Error	8	60326.0	2742.0		
	Total	9	64291.0			
C. scortechinii vs *H. brasiliensis*	Species	1	15063.0	15063.0	7.57	0.012
	Error	8	43765.0	1989.0		
	Total	9	58828.0			

Table A5.13 Analysis of variance (ANOVA) table for samples between species of average moisture content with *L. sajor-caju* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	382.3	382.3	27.31	0.000
	Error	8	308.0	14.0		
	Total	9	690.3			
N. heimii vs *M. utilis*	Species	1	1919.5	1919.5	173.09	0.000
	Error	8	244.0	11.1		
	Total	9	2163.5			
N. heimii vs *P. pinnata*	Species	1	1420.6	1420.6	134.88	0.000
	Error	8	231.7	10.5		
	Total	9	1652.3			
N. heimii vs *D. grandiflorus*	Species	1	346.32	346.32	83.81	0.000
	Error	8	90.90	4.13		
	Total	9	437.22			
N. heimii vs *D. kunstleri*	Species	1	3514.1	3514.1	109.58	0.000
	Error	8	705.5	32.1		
	Total	9	4219.6			
N. heimii vs *K. ivorensis*	Species	1	2515.9	2515.9	146.66	0.000
	Error	8	377.4	17.2		
	Total	9	2893.3			
N. heimii vs *F. fragrans*	Species	1	1744.5	1744.5	59.16	0.000
	Error	8	648.8	29.5		
	Total	9	2393.2			
N. heimii vs *S. curtisii*	Species	1	741.3	741.3	61.13	0.000
	Error	8	266.8	12.1		
	Total	9	1008.0			
N. heimii vs *A. angustifolia*	Species	1	6793.0	6793.0	55.10	0.000
	Error	8	2712.0	123.0		
	Total	9	9505.0			
N. heimii vs *C. scortechinii*	Species	1	588.55	588.55	105.14	0.000
	Error	8	123.15	5.60		
	Total	9	711.71			
N. heimii vs *H. brasiliensis*	Species	1	11116.5	11116.5	137.54	0.000
	Error	8	1778.1	80.8		
	Total	9	12894.6			
C. lanceolatum vs *M. utilis*	Species	1	358.7	358.7	13.03	0.002
	Error	8	605.5	27.5		
	Total	9	964.2			
C. lanceolatum vs *P. pinnata*	Species	1	164.3	164.3	6.09	0.022
	Error	8	593.3	27.0		
	Total	9	757.5			
C. lanceolatum vs *D. grandiflorus*	Species	1	39.2	39.2	1.91	0.181
	Error	8	452.5	20.6		
	Total	9	491.7			
C. lanceolatum vs *D. kunstleri*	Species	1	1183.7	1183.7	24.40	0.000
	Error	8	1067.1	48.5		
	Total	9	2250.8			
C. lanceolatum vs *K. ivorensis*	Species	1	639.3	639.3	19.03	0.000
	Error	8	739.0	33.6		
	Total	9	1378.3			
C. lanceolatum vs *F. fragrans*	Species	1	285.4	285.4	6.21	0.021
	Error	8	1010.3	45.9		
	Total	9	1295.7			

Table A5.13 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	5.5	5.5	0.19	0.664
	Error	8	628.3	28.6		
	Total	9	633.8			
C. lanceolatum vs *A.angustifolia*	Species	1	3311.0	3311.0	23.70	0.000
	Error	8	3074.0	140.0		
	Total	9	6385.0			
C. lanceolatum vs *C. scortechinii*	Species	1	0.4	0.4	0.02	0.897
	Error	8	484.7	22.0		
	Total	9	485.1			
C. lanceolatum vs *H. brasiliensis*	Species	1	6490.0	6490.0	66.73	0.000
	Error	8	2139.7	97.3		
	Total	9	8629.7			
M. utilis vs *P. pinnata*	Species	1	37.5	37.5	1.98	0.173
	Error	8	416.6	18.9		
	Total	9	454.0			
M. utilis vs *D. grandiflorus*	Species	1	635.2	635.2	50.68	0.000
	Error	8	275.7	12.5		
	Total	9	910.0			
M. utilis vs *D. kunstleri*	Species	1	239.2	239.2	5.91	0.024
	Error	8	890.4	40.5		
	Total	9	1129.6			
M. utilis vs *K. ivorensis*	Species	1	40.3	40.3	1.58	0.222
	Error	8	562.2	25.6		
	Total	9	602.5			
M. utilis vs *F. fragrans*	Species	1	4.2	4.2	0.11	0.743
	Error	8	833.6	37.9		
	Total	9	837.8			
M. utilis vs *S. curtisii*	Species	1	275.1	275.1	13.40	0.001
	Error	8	451.6	20.5		
	Total	9	726.7			
M. utilis vs *A.angustifolia*	Species	1	1490.0	1490.0	11.32	0.003
	Error	8	2897.0	132.0		
	Total	9	4387.0			
M. utilis vs *C. scortechinii*	Species	1	382.3	382.3	27.31	0.000
	Error	8	308.0	14.0		
	Total	9	690.3			
M. utilis vs *H. brasiliensis*	Species	1	3797.3	3797.3	42.56	0.000
	Error	8	1962.9	89.2		
	Total	9	5760.2			
P. pinnata vs *D. grandiflorus*	Species	1	364.1	364.1	30.40	0.000
	Error	8	263.5	12.0		
	Total	9	627.6			
P. pinnata vs *D. kunstleri*	Species	1	466.1	466.1	11.68	0.002
	Error	8	878.1	39.9		
	Total	9	1344.2			
P. pinnata vs *K. ivorensis*	Species	1	155.5	155.5	6.22	0.021
	Error	8	550.0	25.0		
	Total	9	705.4			
P. pinnata vs *F. fragrans*	Species	1	16.6	16.6	0.44	0.512
	Error	8	821.3	37.3		
	Total	9	838.0			

Table A5.13 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	109.5	109.5	5.48	0.029
	Error	8	439.3	20.0		
	Total	9	548.9			
P. pinnata vs *A.angustifolia*	Species	1	2001.0	2001.0	15.26	0.001
	Error	8	2885.0	131.0		
	Total	9	4885.0			
P. pinnata vs *C. scortechinii*	Species	1	180.4	180.4	13.42	0.001
	Error	8	295.7	13.4		
	Total	9	476.1			
P. pinnata vs *H. brasiliensis*	Species	1	4589.3	4589.3	51.76	0.000
	Error	8	1950.7	88.7		
	Total	9	6540.0			
D. grandiflorus vs *D. kunstleri*	Species	1	1654.0	1654.0	49.35	0.000
	Error	8	737.3	33.5		
	Total	9	2391.3			
D. grandiflorus vs *K. ivorensis*	Species	1	995.4	995.4	53.52	0.000
	Error	8	409.2	18.6		
	Total	9	1404.5			
D. grandiflorus vs *F. fragrans*	Species	1	536.2	536.2	17.34	0.000
	Error	8	680.5	30.9		
	Total	9	1216.8			
D. grandiflorus vs *S. curtisii*	Species	1	742.2	74.2	5.47	0.029
	Error	8	298.5	13.6		
	Total	9	372.8			
D. grandiflorus vs *A.angustifolia*	Species	1	4072.0	4072.0	32.65	0.000
	Error	8	2744.0	125.0		
	Total	9	6815.0			
D. grandiflorus vs *C. scortechinii*	Species	1	31.93	31.93	4.53	0.045
	Error	8	154.93	7.04		
	Total	9	186.86			
D. grandiflorus vs *H. brasiliensis*	Species	1	7538.6	7538.6	91.64	0.000
	Error	8	1809.9	82.3		
	Total	9	9348.5			
D. kunstleri vs *K. ivorensis*	Species	1	83.2	83.2	1.79	0.195
	Error	8	1023.8	46.5		
	Total	9	1107.0			
D. kunstleri vs *F. fragrans*	Species	1	306.7	306.7	5.21	0.032
	Error	8	1295.2	58.9		
	Total	9	1601.9			
D. kunstleri vs *S. curtisii*	Species	1	1027.4	1027.4	24.75	0.000
	Error	8	913.2	41.5		
	Total	9	1940.6			
D. kunstleri vs *A.angustifolia*	Species	1	535.0	535.0	3.51	0.074
	Error	8	3358.0	153.0		
	Total	9	3894.0			
D. kunstleri vs *C. scortechinii*	Species	1	1226.4	1226.4	35.06	0.000
	Error	8	769.6	35.0		
	Total	9	1995.9			
D. kunstleri vs *H. brasiliensis*	Species	1	2130.0	2130.0	19.33	0.000
	Error	8	2425.0	110.0		
	Total	9	4555.0			

Table A5.13 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	70.4	70.4	1.60	0.219
	Error	8	967.0	44.0		
	Total	9	1037.4			
K. ivorensis vs *S. curtisii*	Species	1	525.9	525.9	19.78	0.000
	Error	8	585.0	26.6		
	Total	9	1110.9			
K. ivorensis vs *A. angustifolia*	Species	1	1041.0	1041.0	7.56	0.012
	Error	8	3030.0	138.0		
	Total	9	4071.0			
K. ivorensis vs *C. scortechinii*	Species	1	670.8	670.8	33.43	0.000
	Error	8	441.4	20.1		
	Total	9	1112.2			
K. ivorensis vs *H. brasiliensis*	Species	1	3055.4	3055.4	32.06	0.000
	Error	8	2096.4	95.3		
	Total	9	5151.8			
F. fragrans vs *S. curtisii*	Species	1	211.4	211.4	5.43	0.029
	Error	8	856.4	38.9		
	Total	9	1067.8			
F. fragrans vs *A. angustifolia*	Species	1	1653.0	1653.0	11.01	0.003
	Error	8	3302.0	150.0		
	Total	9	4955.0			
F. fragrans vs *C. scortechinii*	Species	1	306.5	306.5	9.46	0.006
	Error	8	712.8	32.4		
	Total	9	1019.3			
F. fragrans vs *H. brasiliensis*	Species	1	4054.0	4054.0	37.66	0.000
	Error	8	2368.0	108.0		
	Total	9	6421.0			
S. curtisii vs *A.angustifolia*	Species	1	3046.0	3046.0	22.95	0.000
	Error	8	2920.0	133.0		
	Total	9	5966.0			
S. curtisii vs *C. scortechinii*	Species	1	8.8	8.8	0.59	0.452
	Error	8	330.8	15.0		
	Total	9	339.6			
S. curtisii vs *H. brasiliensis*	Species	1	6116.6	6116.6	67.77	0.000
	Error	8	1985.7	90.3		
	Total	9	8102.3			
A.angustifolia vs *C. scortechinii*	Species	1	3382.0	3382.0	26.81	0.000
	Error	8	2776.0	126.0		
	Total	9	6158.0			
A.angustifolia vs *H. brasiliensis*	Species	1	530.0	530.0	2.63	0.119
	Error	8	4431.0	201.0		
	Total	9	4961.0			
C. scortechinii vs *H. brasiliensis*	Species	1	6589.4	6589.4	78.69	0.000
	Error	8	1842.1	83.7		
	Total	9	8431.5			

Table A5.14 Analysis of variance (ANOVA) table for sample within species of average moisture content with *P. sanguineus* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	16.061	5.354	5.55	0.023
	Error	8	7.719	0.965		
	Total	11	23.780			
C. lanceolatum	Replicates	3	8.15	2.72	0.43	0.737
	Error	8	50.59	6.32		
	Total	11	58.73			
M. utilis	Replicates	3	198.7	66.2	1.23	0.360
	Error	8	430.2	53.8		
	Total	11	628.9			
P. pinnata	Replicates	3	1401.1	467.0	28.83	0.000
	Error	8	129.6	16.2		
	Total	11	1530.7			
D. grandiflorus	Replicates	3	8.08	2.69	1.87	0.212
	Error	8	11.49	1.44		
	Total	11	19.56			
D. kunstleri	Replicates	3	2614.0	871.0	5.53	0.024
	Error	8	1260.0	158.0		
	Total	11	3875.0			
K. ivorensis	Replicates	3	458.0	153.0	0.73	0.564
	Error	8	1680.0	210.0		
	Total	11	2138.0			
F. fragrans	Replicates	3	379.6	126.5	4.72	0.035
	Error	8	214.7	26.8		
	Total	11	594.3			
S. curtisii	Replicates	3	21.881	7.294	7.74	0.009
	Error	8	7.536	0.942		
	Total	11	29.417			
A. angustifolia	Replicates	3	1570.0	523.0	3.93	0.054
	Error	8	1065.0	133.0		
	Total	11	2635.0			
C. scortechinii	Replicates	3	181.21	60.40	9.21	0.006
	Error	8	52.44	6.56		
	Total	11	233.65			
H. brasiliensis	Replicates	3	5952.0	1984.0	1.69	0.246
	Error	8	9410.0	1176.0		
	Total	11	15362.0			

Table A5.15 Analysis of variance (ANOVA) table for sample within species of average moisture content with *T. versicolor* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	6.59	2.20	0.73	0.564
	Error	8	24.20	3.02		
	Total	11	30.79			
C. lanceolatum	Replicates	3	126.5	42.2	0.50	0.692
	Error	8	672.7	84.1		
	Total	11	799.3			
M. utilis	Replicates	3	41.6	13.9	0.36	0.783
	Error	8	307.3	38.4		
	Total	11	348.9			
P. pinnata	Replicates	3	177.0	59.0	0.53	0.673
	Error	8	887.0	111.0		
	Total	11	1064.0			
D. grandiflorus	Replicates	3	45.50	15.17	3.80	0.058
	Error	8	31.91	3.99		
	Total	11	77.41			
D. kunstleri	Replicates	3	462.0	154.0	0.44	0.734
	Error	8	2826.0	353.0		
	Total	11	3288.0			
K. ivorensis	Replicates	3	2633.0	878.0	1.79	0.227
	Error	8	3920.0	490.0		
	Total	11	6553.0			
F. fragrans	Replicates	3	293.0	98.0	0.93	0.471
	Error	8	842.0	105.0		
	Total	11	1134.0			
S. curtisii	Replicates	3	70.2	23.4	0.28	0.840
	Error	8	673.0	84.1		
	Total	11	743.2			
A. angustifolia	Replicates	3	6657.0	2219.0	1.57	0.270
	Error	8	11273.0	1409.0		
	Total	11	17929.0			
C. scortechinii	Replicates	3	354.0	118.0	0.93	0.469
	Error	8	1014.0	127.0		
	Total	11	1368.0			
H. brasiliensis	Replicates	3	21578.0	7193.0	2.76	0.111
	Error	8	20819.0	2602.0		
	Total	11	42397.0			

Table A5.16 Analysis of variance (ANOVA) table for sample within species of average moisture content with *L. sajor-caju* (decay test 1)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	8.21	2.74	1.02	0.432
	Error	8	21.36	2.67		
	Total	11	29.57			
C. lanceolatum	Replicates	3	337.55	112.52	16.80	0.001
	Error	8	53.59	6.70		
	Total	11	391.14			
M. utilis	Replicates	3	188.47	62.82	19.38	0.001
	Error	8	25.93	3.24		
	Total	11	214.41			
P. pinnata	Replicates	3	114.7	38.2	3.50	0.070
	Error	8	87.4	10.9		
	Total	11	202.1			
D. grandiflorus	Replicates	3	33.07	11.02	3.12	0.088
	Error	8	28.27	3.53		
	Total	11	61.34			
D. kunstleri	Replicates	3	405.8	135.3	4.00	0.052
	Error	8	270.2	33.8		
	Total	11	676.0			
K. ivorensis	Replicates	3	51.0	17.0	0.46	0.719
	Error	8	296.9	37.1		
	Total	11	347.9			
F. fragrans	Replicates	3	403.4	134.5	4.99	0.031
	Error	8	215.8	27.0		
	Total	11	619.2			
S. curtisii	Replicates	3	77.8	25.9	1.30	0.339
	Error	8	159.4	19.9		
	Total	11	237.2			
A. angustifolia	Replicates	3	2389.9	796.6	21.78	0.000
	Error	8	292.5	36.6		
	Total	11	2682.4			
C. scortechinii	Replicates	3	52.64	17.55	3.43	0.073
	Error	8	40.94	5.12		
	Total	11	93.59			
H. brasiliensis	Replicates	3	122.0	41.0	0.20	0.894
	Error	8	1627.0	203.0		
	Total	11	1749.0			

Table A5.17 Analysis of variance (ANOVA) table for samples between species of average weight loss of sterile control blocks (decay test 2)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	0.44480	0.44480	77.03	0.000
	Error	8	0.12704	0.00577		
	Total	9	0.57184			
N. heimii vs *M. utilis*	Species	1	0.37764	0.37764	49.18	0.000
	Error	8	0.16894	0.00768		
	Total	9	0.54658			
N. heimii vs *P. pinnata*	Species	1	0.36173	0.36173	49.32	0.000
	Error	8	0.16136	0.00733		
	Total	9	0.52309			
N. heimii vs *D. grandiflorus*	Species	1	0.3139	0.3139	24.19	0.000
	Error	8	0.2855	0.0130		
	Total	9	0.5994			
N. heimii vs *D. kunstleri*	Species	1	0.70149	0.70149	103.28	0.000
	Error	8	0.14943	0.00679		
	Total	9	0.85093			
N. heimii vs *K. ivorensis*	Species	1	0.3810	0.3810	23.53	0.000
	Error	8	0.3562	0.0162		
	Total	9	0.7373			
N. heimii vs *F. fragrans*	Species	1	0.47358	0.47358	58.90	0.000
	Error	8	0.17688	0.00804		
	Total	9	0.65046			
N. heimii vs *S. curtisii*	Species	1	0.50415	0.50415	60.37	0.000
	Error	8	0.18373	0.00835		
	Total	9	0.68788			
N. heimii vs *A. angustifolia*	Species	1	0.1073	0.1073	5.45	0.029
	Error	8	0.4328	0.0197		
	Total	9	0.5400			
N. heimii vs *C. scortechinii*	Species	1	0.30467	0.30467	30.49	0.000
	Error	8	0.21982	0.00999		
	Total	9	0.52449			
N. heimii vs *H. brasiliensis*	Species	1	0.5855	0.5855	57.88	0.000
	Error	8	0.2225	0.0101		
	Total	9	0.8080			
C. lanceolatum vs *M. utilis*	Species	1	0.00275	0.00275	1.20	0.286
	Error	8	0.05051	0.00230		
	Total	9	0.05326			
C. lanceolatum vs *P. pinnata*	Species	1	0.00429	0.00429	2.20	0.152
	Error	8	0.04294	0.00195		
	Total	9	0.04723			
C. lanceolatum vs *D. grandiflorus*	Species	1	0.01138	0.01138	1.50	0.234
	Error	8	0.16707	0.00759		
	Total	9	0.17845			
C. lanceolatum vs *D. kunstleri*	Species	1	0.02911	0.02911	20.66	0.000
	Error	8	0.03100	0.00141		
	Total	9	0.06011			
C. lanceolatum vs *K. ivorensis*	Species	1	0.0025	0.0025	0.23	0.638
	Error	8	0.2378	0.0108		
	Total	9	0.2403			
C. lanceolatum vs *F. fragrans*	Species	1	0.00045	0.00045	0.17	0.684
	Error	8	0.05845	0.00266		
	Total	9	0.05890			

Table A5.17 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	0.00186	0.00186	0.63	0.437
	Error	8	0.06531	0.00297		
	Total	9	0.06716			
C. lanceolatum vs *A.angustifolia*	Species	1	0.1152	0.1152	8.06	0.010
	Error	8	0.3143	0.0143		
	Total	9	0.4296			
C. lanceolatum vs *C. scortechinii*	Species	1	0.01322	0.01322	2.87	0.104
	Error	8	0.10139	0.00461		
	Total	9	0.11461			
C. lanceolatum vs *H. brasiliensis*	Species	1	0.00965	0.00965	2.04	0.167
	Error	8	0.10411	0.00473		
	Total	9	0.11376			
M. utilis vs *P. pinnata*	Species	1	0.00017	0.00017	0.04	0.835
	Error	8	0.08484	0.00386		
	Total	9	0.08501			
M. utilis vs *D. grandiflorus*	Species	1	0.00295	0.00295	0.31	0.583
	Error	8	0.20897	0.00950		
	Total	9	0.21191			
M. utilis vs *D. kunstleri*	Species	1	0.04974	0.04974	15.01	0.001
	Error	8	0.07290	0.00331		
	Total	9	0.12264			
M. utilis vs *K. ivorensis*	Species	1	0.0000	0.0000	0.00	0.981
	Error	8	0.2797	0.0127		
	Total	9	0.2797			
M. utilis vs *F. fragrans*	Species	1	0.00542	0.00542	1.19	0.287
	Error	8	0.10035	0.00456		
	Total	9	0.10578			
M. utilis vs *S. curtisii*	Species	1	0.00912	0.00912	1.87	0.185
	Error	8	0.10720	0.00487		
	Total	9	0.11633			
M. utilis vs *A.angustifolia*	Species	1	0.0824	0.0824	5.09	0.034
	Error	8	0.3562	0.0162		
	Total	9	0.4386			
M. utilis vs *C. scortechinii*	Species	1	0.00391	0.00391	0.60	0.447
	Error	8	0.14329	0.00651		
	Total	9	0.14721			
M. utilis vs *H. brasiliensis*	Species	1	0.02269	0.02269	3.42	0.078
	Error	8	0.14601	0.00664		
	Total	9	0.16870			
P. pinnata vs *D. grandiflorus*	Species	1	0.00170	0.00170	0.19	0.671
	Error	8	0.20139	0.00915		
	Total	9	0.20309			
P. pinnata vs *D. kunstleri*	Species	1	0.05575	0.05575	18.78	0.000
	Error	8	0.06533	0.00297		
	Total	9	0.12108			
P. pinnata vs *K. ivorensis*	Species	1	0.0003	0.0003	0.02	0.888
	Error	8	0.2721	0.0124		
	Total	9	0.2724			
P. pinnata vs *F. fragrans*	Species	1	0.00752	0.00752	1.78	0.195
	Error	8	0.09278	0.00422		
	Total	9	0.10030			

Table A5.17 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	0.01179	0.01179	2.60	0.121
	Error	8	0.09963	0.00453		
	Total	9	0.11142			
P. pinnata vs *A.angustifolia*	Species	1	0.0750	0.0750	4.73	0.041
	Error	8	0.3487	0.0158		
	Total	9	0.4237			
P. pinnata vs *C. scortechinii*	Species	1	0.00245	0.00245	0.40	0.535
	Error	8	0.13572	0.00617		
	Total	9	0.13816			
P. pinnata vs *H. brasiliensis*	Species	1	0.03680	0.02680	4.26	0.051
	Error	8	0.13843	0.00629		
	Total	9	0.16524			
D. grandiflorus vs *D. kunstleri*	Species	1	0.07690	0.07690	8.93	0.007
	Error	8	0.18945	0.00861		
	Total	9	0.26635			
D. grandiflorus vs *K. ivorensis*	Species	1	0.0033	0.0033	0.18	0.675
	Error	8	0.3963	0.0180		
	Total	9	0.3995			
D. grandiflorus vs *F. fragrans*	Species	1	0.01637	0.01637	1.66	0.211
	Error	8	0.20690	0.00989		
	Total	9	0.23327			
D. grandiflorus vs *S. curtisii*	Species	1	0.0224	0.0224	2.21	0.152
	Error	8	0.2238	0.0102		
	Total	9	0.2462			
D. grandiflorus vs *A.angustifolia*	Species	1	0.0543	0.0542	2.52	0.127
	Error	8	0.4728	0.0215		
	Total	9	0.5270			
D. grandiflorus vs *C. scortechinii*	Species	1	0.0001	0.0001	0.01	0.940
	Error	8	0.2598	0.0118		
	Total	9	0.2599			
D. grandiflorus vs *H. brasiliensis*	Species	1	0.0420	0.0420	3.52	0.074
	Error	8	0.2626	0.0119		
	Total	9	0.3046			
D. kunstleri vs *K. ivorensis*	Species	1	0.0485	0.0485	4.10	0.055
	Error	8	0.2602	0.0118		
	Total	9	0.3087			
D. kunstleri vs *F. fragrans*	Species	1	0.02231	0.02231	6.07	0.022
	Error	8	0.08084	0.00367		
	Total	9	0.10315			
D. kunstleri vs *S. curtisii*	Species	1	0.01626	0.01626	4.08	0.056
	Error	8	0.08769	0.00399		
	Total	9	0.10395			
D. kunstleri vs *A.angustifolia*	Species	1	0.2602	0.2602	17.00	0.000
	Error	8	0.3367	0.0153		
	Total	9	0.5969			
D. kunstleri vs *C. scortechinii*	Species	1	0.08156	0.08156	14.50	0.001
	Error	8	0.12378	0.00563		
	Total	9	0.20534			
D. kunstleri vs *H. brasiliensis*	Species	1	0.00524	0.00524	0.91	0.350
	Error	8	0.12650	0.00575		
	Total	9	0.13174			

Table A5.17 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	0.0050	0.0050	0.38	0.542
	Error	8	0.2877	0.0131		
	Total	9	0.2927			
K. ivorensis vs *S. curtisii*	Species	1	0.0086	0.0086	0.64	0.431
	Error	8	0.2945	0.0134		
	Total	9	0.3031			
K. ivorensis vs *A. angustifolia*	Species	1	0.0840	0.0840	3.40	0.079
	Error	8	0.5436	0.0247		
	Total	9	0.6275			
K. ivorensis vs *C. scortechinii*	Species	1	0.0043	0.0043	0.28	0.600
	Error	8	0.3306	0.0150		
	Total	9	0.3349			
K. ivorensis vs *H. brasiliensis*	Species	1	0.0219	0.0219	1.44	0.242
	Error	8	0.3333	0.0152		
	Total	9	0.3552			
F. fragrans vs *S. curtisii*	Species	1	0.00048	0.00048	0.09	0.765
	Error	8	0.11514	0.00523		
	Total	9	0.11562			
F. fragrans vs *A. angustifolia*	Species	1	0.1301	0.1301	7.89	0.010
	Error	8	0.3642	0.0166		
	Total	9	0.4943			
F. fragrans vs *C. scortechinii*	Species	1	0.01855	0.01855	2.70	0.115
	Error	8	0.15123	0.00687		
	Total	9	0.16978			
F. fragrans vs *H. brasiliensis*	Species	1	0.00593	0.00593	0.85	0.367
	Error	8	0.15395	0.00700		
	Total	9	0.15988			
S. curtisii vs *A.angustifolia*	Species	1	0.1463	0.1463	8.68	0.007
	Error	8	0.3710	0.0169		
	Total	9	0.5174			
S. curtisii vs *C. scortechinii*	Species	1	0.02499	0.02499	3.48	0.076
	Error	8	0.15808	0.00719		
	Total	9	0.18307			
S. curtisii vs *H. brasiliensis*	Species	1	0.00304	0.00304	0.42	0.526
	Error	8	0.16080	0.00731		
	Total	9	0.16384			
A.angustifolia vs *C. scortechinii*	Species	1	0.0504	0.0504	2.72	0.113
	Error	8	0.4071	0.0185		
	Total	9	0.4575			
A.angustifolia vs *H. brasiliensis*	Species	1	0.1915	0.1915	10.28	0.004
	Error	8	0.4098	0.0186		
	Total	9	0.6014			
C. scortechinii vs *H. brasiliensis*	Species	1	0.04545	0.04545	5.08	0.035
	Error	8	0.19689	0.00895		
	Total	9	0.24234			

Table A5.18 Analysis of variance (ANOVA) table for samples between species of average moisture content of sterile control blocks (decay test 2)

Species	Source	DF	SS	MS	F	P
N. heimii vs *C. lanceolatum*	Species	1	73.492	73.492	159.68	0.000
	Error	8	10.126	0.460		
	Total	9	83.618			
N. heimii vs *M. utilis*	Species	1	298.28	295.28	79.11	0.000
	Error	8	82.12	3.73		
	Total	9	377.40			
N. heimii vs *P. pinnata*	Species	1	181.500	181.500	306.87	0.000
	Error	8	13.012	0.591		
	Total	9	194.512			
N. heimii vs *D. grandiflorus*	Species	1	36.463	36.463	67.72	0.000
	Error	8	11.846	0.538		
	Total	9	48.309			
N. heimii vs *D. kunstleri*	Species	1	89.03	89.03	70.63	0.000
	Error	8	27.73	1.26		
	Total	9	116.76			
N. heimii vs *K. ivorensis*	Species	1	199.51	199.51	63.43	0.000
	Error	8	69.20	3.15		
	Total	9	268.71			
N. heimii vs *F. fragrans*	Species	1	3.45	3.45	0.51	0.481
	Error	8	147.48	6.70		
	Total	9	150.93			
N. heimii vs *S. curtisii*	Species	1	111.230	111.230	143.51	0.000
	Error	8	17.052	0.775		
	Total	9	128.282			
N. heimii vs *A. angustifolia*	Species	1	808.31	808.31	375.10	0.000
	Error	8	47.41	2.15		
	Total	9	855.71			
N. heimii vs *C. scortechinii*	Species	1	507.98	507.98	112.96	0.000
	Error	8	98.93	4.50		
	Total	9	606.91			
N. heimii vs *H. brasiliensis*	Species	1	2641.4	2641.1	43.92	0.000
	Error	8	1322.8	60.1		
	Total	9	3964.2			
C. lanceolatum vs *M. utilis*	Species	1	74.15	74.15	22.37	0.000
	Error	8	72.94	3.32		
	Total	9	147.09			
C. lanceolatum vs *P. pinnata*	Species	1	24.005	24.005	137.81	0.000
	Error	8	3.832	0.174		
	Total	9	27.837			
C. lanceolatum vs *D. grandiflorus*	Species	1	6.423	6.423	53.00	0.000
	Error	8	2.666	0.121		
	Total	9	9.088			
C. lanceolatum vs *D. kunstleri*	Species	1	0.745	0.745	0.88	0.358
	Error	8	15.550	0.843		
	Total	9	19.294			
C. lanceolatum vs *K. ivorensis*	Species	1	30.83	30.83	11.30	0.003
	Error	8	60.02	2.73		
	Total	9	90.85			
C. lanceolatum vs *F. fragrans*	Species	1	45.10	45.10	7.17	0.014
	Error	8	138.30	6.29		
	Total	9	183.40			

Table A5.18 (*Continued*)

Species	Source	DF	SS	MS	F	P
C. lanceolatum vs *S. curtisii*	Species	1	3.896	3.896	10.89	0.000
	Error	8	7.872	0.358		
	Total	9	11.768			
C. lanceolatum vs *A.angustifolia*	Species	1	394.34	394.34	226.94	0.000
	Error	8	38.23	1.74		
	Total	9	432.57			
C. lanceolatum vs *C. scortechinii*	Species	1	195.04	195.04	47.81	0.000
	Error	8	89.75	4.08		
	Total	9	284.79			
C. lanceolatum vs *H. brasiliensis*	Species	1	1833.5	1833.5	30.71	0.000
	Error	8	1313.7	59.7		
	Total	9	3147.2			
M. utilis vs *P. pinnata*	Species	1	13.78	13.78	4.00	0.058
	Error	8	75.82	3.45		
	Total	9	89.60			
M. utilis vs *D. grandiflorus*	Species	1	124.22	124.22	36.60	0.000
	Error	8	74.66	3.39		
	Total	9	198.88			
M. utilis vs *D. kunstleri*	Species	1	60.03	60.03	14.59	0.001
	Error	8	90.54	4.12		
	Total	9	150.58			
M. utilis vs *K. ivorensis*	Species	1	9.36	9.36	1.56	0.225
	Error	8	132.01	6.00		
	Total	9	141.37			
M. utilis vs *F. fragrans*	Species	1	234.91	234.91	24.58	0.000
	Error	8	210.29	9.56		
	Total	9	445.20			
M. utilis vs *S. curtisii*	Species	1	44.05	44.05	12.14	0.002
	Error	8	79.86	3.63		
	Total	9	123.92			
M. utilis vs *A.angustifolia*	Species	1	126.49	126.49	25.25	0.000
	Error	8	110.22	5.01		
	Total	9	236.71			
M. utilis vs *C. scortechinii*	Species	1	28.67	28.67	3.90	0.061
	Error	8	161.74	7.35		
	Total	9	190.42			
M. utilis vs *H. brasiliensis*	Species	1	1170.2	1170.2	18.58	0.000
	Error	8	1385.7	63.0		
	Total	9	2555.9			
P. pinnata vs *D. grandiflorus*	Species	1	55.260	55.260	218.96	0.000
	Error	8	5.552	0.252		
	Total	9	60.812			
P. pinnata vs *D. kunstleri*	Species	1	16.294	16.294	16.72	0.000
	Error	8	21.436	0.974		
	Total	9	33.730			
P. pinnata vs *K. ivorensis*	Species	1	0.43	0.43	0.15	0.703
	Error	8	62.91	2.86		
	Total	9	63.33			
P. pinnata vs *F. fragrans*	Species	1	134.91	134.91	21.02	0.000
	Error	8	141.19			
	Total	9	276.10			

Table A5.18 (*Continued*)

Species	Source	DF	SS	MS	F	P
P. pinnata vs *S. curtisii*	Species	1	8.559	8.559	17.50	0.000
	Error	8	10.758	0.489		
	Total	9	19.318			
P. pinnata vs *A.angustifolia*	Species	1	223.76	223.76	119.73	0.000
	Error	8	41.11	1.87		
	Total	9	264.87			
P. pinnata vs *C. scortechinii*	Species	1	82.20	82.20	19.52	0.000
	Error	8	92.64	4.21		
	Total	9	174.83			
P. pinnata vs *H. brasiliensis*	Species	1	1437.9	1437.9	24.03	0.000
	Error	8	1316.6	59.8		
	Total	9	2754.5			
D. grandiflorus vs *D. kunstleri*	Species	1	11.541	11541	12.53	0.002
	Error	8	20.270	0.921		
	Total	9	31.811			
D. grandiflorus vs *K. ivorensis*	Species	1	65.39	65.39	23.30	0.000
	Error	8	61.74	2.81		
	Total	9	127.13			
D. grandiflorus vs *F. fragrans*	Species	1	17.48	17.48	2.75	0.112
	Error	8	140.02	6.36		
	Total	9	157.50			
D. grandiflorus vs *S. curtisii*	Species	1	20.323	20.323	46.61	0.000
	Error	8	9.592	0.436		
	Total	9	29.915			
D. grandiflorus vs *A.angustifolia*	Species	1	501.41	501.41	276.14	0.000
	Error	8	39.95	1.82		
	Total	9	541.36			
D. grandiflorus vs *C. scortechinii*	Species	1	272.25	272.25	65.48	0.000
	Error	8	91.47	4.16		
	Total	9	363.72			
D. grandiflorus vs *H. brasiliensis*	Species	1	2057.0	2057.0	34.40	0.000
	Error	8	1315.4	59.8		
	Total	9	3372.3			
D. kunstleri vs *K. ivorensis*	Species	1	21.99	21.99	6.23	0.021
	Error	8	77.63	3.53		
	Total	9	99.61			
D. kunstleri vs *F. fragrans*	Species	1	57.43	57.43	8.10	0.009
	Error	8	155.90	7.09		
	Total	9	213.34			
D. kunstleri vs *S. curtisii*	Species	1	1.23	1.23	1.07	0.313
	Error	8	25.48	1.16		
	Total	9	26.71			
D. kunstleri vs *A.angustifolia*	Species	1	360.81	360.81	142.17	0.000
	Error	8	55.83	2.54		
	Total	9	416.65			
D. kunstleri vs *C. scortechinii*	Species	1	171.68	171.68	35.18	0.000
	Error	8	107.36	4.88		
	Total	9	279.04			
D. kunstleri vs *H. brasiliensis*	Species	1	1760.3	1760.3	29.09	0.000
	Error	8	1331.3	60.5		
	Total	9	3091.6			

Table A5.18 (*Continued*)

Species	Source	DF	SS	MS	F	P
K. ivorensis vs *F. fragrans*	Species	1	150.50	150.50	16.77	0.000
	Error	8	197.38	8.97		
	Total	9	347.87			
K. ivorensis vs *S. curtisii*	Species	1	12.80	12.80	4.21	0.052
	Error	8	66.95	3.04		
	Total	9	79.75			
K. ivorensis vs *A. angustifolia*	Species	1	204.66	204.66	46.27	0.000
	Error	8	97.30	4.42		
	Total	9	301.96			
K. ivorensis vs *C. scortechinii*	Species	1	70.79	70.79	10.46	0.004
	Error	8	148.83	6.76		
	Total	9	219.62			
K. ivorensis vs *H. brasiliensis*	Species	1	1388.9	1388.9	22.26	0.000
	Error	8	1372.7	62.4		
	Total	9	2761.6			
F. fragrans vs *S. curtisii*	Species	1	75.51	75.51	11.44	0.003
	Error	8	145.23	6.60		
	Total	9	220.73			
F. fragrans vs *A. angustifolia*	Species	1	706.16	706.16	88.48	0.000
	Error	8	175.58	7.98		
	Total	9	881.74			
F. fragrans vs *C. scortechinii*	Species	1	427.7	427.7	41.43	0.000
	Error	8	227.1	10.3		
	Total	9	654.8			
F. fragrans vs *H. brasiliensis*	Species	1	2453.7	2453.7	37.20	0.000
	Error	8	1451.0	66.0		
	Total	9	3904.7			
S. curtisii vs *A.angustifolia*	Species	1	319.84	319.84	155.83	0.000
	Error	8	45.15	2.05		
	Total	9	365.00			
S. curtisii vs *C. scortechinii*	Species	1	143.80	143.80	32.72	0.000
	Error	8	96.68	4.39		
	Total	9	240.48			
S. curtisii vs *H. brasiliensis*	Species	1	1668.4	1668.4	27.79	0.000
	Error	8	1320.6	60.0		
	Total	9	2989.0			
A.angustifolia vs *C. scortechinii*	Species	1	34.72	34.72	6.01	0.023
	Error	8	127.03	5.77		
	Total	9	161.75			
A.angustifolia vs *H. brasiliensis*	Species	1	527.2	527.2	8.59	0.008
	Error	8	1351.0	61.4		
	Total	9	1878.2			
C. scortechinii vs *H. brasiliensis*	Species	1	832.5	832.5	13.06	0.002
	Error	8	1402.5	63.7		
	Total	9	2235.0			

Table A5.19 Analysis of variance (ANOVA) table for sample within species of average weight loss for sterile blocks (decay test 2)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	0.04993	0.01664	1.83	0.220
	Error	8	0.07280	0.00910		
	Total	11	0.12273			
C. lanceolatum	Replicates	3	0.0039503	0.0013168	29.47	0.000
	Error	8	0.0003574	0.0000447		
	Total	11	0.0043077			
M. utilis	Replicates	3	0.00233	0.00078	0.14	0.932
	Error	8	0.04388	0.00548		
	Total	11	0.04621			
P. pinnata	Replicates	3	0.01839	0.00613	2.42	0.141
	Error	8	0.02024	0.00253		
	Total	11	0.03863			
D. grandiflorus	Replicates	3	0.0464	0.0155	1.06	0.417
	Error	8	0.1164	0.0145		
	Total	11	0.1628			
D. kunstleri	Replicates	3	0.019207	0.006402	6.84	0.013
	Error	8	0.007489	0.000936		
	Total	11	0.026696			
K. ivorensis	Replicates	3	0.0421	0.0140	0.59	0.641
	Error	8	0.1915	0.0239		
	Total	11	0.233			
F. fragrans	Replicates	3	0.01990	0.00663	1.55	0.275
	Error	8	0.03425	0.00428		
	Total	11	0.05414			
S. curtisii	Replicates	3	0.01731	0.00577	1.06	0.419
	Error	8	0.04368	0.00546		
	Total	11	0.06100			
A. angustifolia	Replicates	3	0.1538	0.0513	2.63	0.122
	Error	8	0.1562	0.0195		
	Total	11	0.3100			
C. scortechinii	Replicates	3	0.0096	0.0032	0.29	0.829
	Error	8	0.0875	0.0109		
	Total	11	0.0971			
H. brasiliensis	Replicates	3	0.0131	0.0044	0.40	0.755
	Error	8	0.0867	0.0108		
	Total	11	0.0998			

Table A5.20 Analysis of variance (ANOVA) table for sample within species of average moisture content for sterile blocks (decay test 2)

Species	Source	DF	SS	MS	F	P
N. heimii	Replicates	3	2.597	0.866	0.98	0.448
	Error	8	7.056	0.882		
	Total	11	9.653			
C. lanceolatum	Replicates	3	0.0344	0.0115	0.21	0.887
	Error	8	0.4385	0.0548		
	Total	11	0.4729			
M. utilis	Replicates	3	27.28	9.09	1.61	0.262
	Error	8	45.19	5.65		
	Total	11	72..47			
P. pinnata	Replicates	3	2.6793	0.8931	10.51	0.004
	Error	8	0.6800	0.0850		
	Total	11	3.3593			
D. grandiflorus	Replicates	3	0.700	0.233	1.25	0.354
	Error	8	1.493	0.187		
	Total	11	2.193			
D. kunstleri	Replicates	3	10.198	3.399	3.45	0.072
	Error	8	7.879	0.985		
	Total	11	18.077			
K. ivorensis	Replicates	3	10.44	3.48	0.57	0.652
	Error	8	49.11	6.14		
	Total	11	59.55			
F. fragrans	Replicates	3	56.3	14.1	1.21	0.387
	Error	8	81.5	11.6		
	Total	11	137.8			
S. curtisii	Replicates	3	3.074	1.025	1.89	0.209
	Error	8	4.326	0.541		
	Total	11	7.399			
A. angustifolia	Replicates	3	25.36	8.45	5.46	0.025
	Error	8	12.39	1.55		
	Total	11	37.75			
C. scortechinii	Replicates	3	67.79	22.60	8.41	0.007
	Error	8	21.49	2.69		
	Total	11	89.28			
H. brasiliensis	Replicates	3	205.0	68.0	0.49	0.696
	Error	8	1108.0	138.0		
	Total	11	1313.0			

Appendix 6. Chapter 6 Bark and heartwood extractives

Table A6.1 Analysis of variance (ANOVA) table for sample between concentrations for filter paper consumption against *C. curvignathus*

Wood species	Concentrations	Source	DF	SS	MS	F	P
N. heimii	0% vs 0.5%	Replicates	1	285.175	285.175	2600.54	0.000
		Error	18	1.974	0.110		
		Total	19	287.149			
	0% vs1%	Replicates	1	374.2595	374.2595	7249.16	0.000
		Error	18	0.9293	0.0516		
		Total	19	375.1888			
	0% vs 2%	Replicates	1	403.7846	403.7846	6807.15	0.000
		Error	18	1.0677	0.0593		
		Total	19	404.8523			
	0.5% vs 1%	Replicates	1	6.0451	6.0451	102.85	0.000
		Error	18	1.0580	0.0588		
		Total	19	7.1031			
	0.5% vs 2%	Replicates	1	10.2866	10.2866	154.76	0.000
		Error	18	1.1964	0.0665		
		Total	19	11.4830			
	1% vs 2%	Replicates	1	0.56041	0.56041	66.44	0.000
		Error	18	0.15183	0.00844		
		Total	19	0.71224			
C. lanceolatum	0% vs 0.5%	Replicates	1	232.509	232.509	628.76	0.000
		Error	18	6.656	0.370		
		Total	19	239.166			
	0% vs1%	Replicates	1	378.593	378.593	1284.34	0.000
		Error	18	5.306	0.295		
		Total	19	383.899			
	0% vs 2%	Replicates	1	470.766	470.766	3048.15	0.000
		Error	18	2.780	0.154		
		Total	19	473.546			
	0.5% vs 1%	Replicates	1	17.719	17.718	48.31	0.000
		Error	18	6.601	0.367		
		Total	19	24.319			
	0.5% vs 2%	Replicates	1	41.588	41.588	183.68	0.000
		Error	18	4.075	0.226		
		Total	19	45.664			
	1% vs 2%	Replicates	1	5.016	5.016	33.13	0.000
		Error	18	2.725	0.151		
		Total	19	7.741			
M. utilis	0% vs 0.5%	Replicates	1	145.782	145.782	276.22	0.000
		Error	18	9.500	0.528		
		Total	19	155.282			
	0% vs1%	Replicates	1	215.724	215.724	416.33	0.000
		Error	18	9.327	0.518		
		Total	19	225.051			
	0% vs 2%	Replicates	1	402.970	402.970	813.54	0.000
		Error	18	8.916	0.495		
		Total	19	411.886			
	0.5% vs 1%	Replicates	1	6.8306	6.8306	109.98	0.000
		Error	18	1.1180	0.0621		
		Total	19	7.9486			
	0.5% vs 2%	Replicates	1	64.0017	64.0017	1629.42	0.000
		Error	18	0.7070	0.0393		
		Total	19	64.7088			
	1% vs 2%	Replicates	1	29.0151	29.0151	978.20	0.000
		Error	18	0.5339	0.0297		
		Total	19	29.5490			

Table A6.1 (*Continued*)

Wood species	Concentrations	Source	DF	SS	MS	F	P
S. curtisii	0% vs 0.5%	Replicates	1	134.076	134.076	370.99	0.000
		Error	18	6.505	0.361		
		Total	19	140.581			
	0% vs1%	Replicates	1	245.187	245.187	495.16	0.000
		Error	18	8.913	0.495		
		Total	19	254.100			
	0% vs 2%	Replicates	1	410.490	410.490	1392.71	0.000
		Error	18	5.305	0.295		
		Total	19	415.795			
	0.5% vs 1%	Replicates	1	16.641	16.641	57.10	0.000
		Error	18	5.245	0.291		
		Total	19	21.886			
	0.5% vs 2%	Replicates	1	75.3670	75.3670	828.33	0.000
		Error	18	1.6378	0.0910		
		Total	19	77.0048			
	1% vs 2%	Replicates	1	21.179	21.179	94.23	0.000
		Error	18	4.046	0.225		
		Total	19	25.225			

Table A6.2 Analysis of variance (ANOVA) table for sample between concentrations for wood consumption against *C. gestroi*

Wood species	Concentrations	Source	DF	SS	MS	F	P
N. heimii	0% vs 0.5%	Replicates	1	224.023	224.023	365.07	0.004
		Error	18	11.046	0.614		
		Total	19	235.069			
	0% vs1%	Replicates	1	259.721	259.721	424.79	0.352
		Error	18	11.005	0.611		
		Total	19	270.727			
	0% vs 2%	Replicates	1	275.517	275.517	460.30	0.000
		Error	18	10.774	0.599		
		Total	19	286.291			
	0.5% vs 1%	Replicates	1	1.3190	1.3190	43.64	0.000
		Error	18	0.5440	0.0302		
		Total	19	1.8630			
	0.5% vs 2%	Replicates	1	2.6611	2.6611	153.10	0.000
		Error	18	0.3128	0.0174		
		Total	19	2.9740			
	1% vs 2%	Replicates	1	0.2331	0.2331	15.39	0.001
		Error	18	0.2727	0.0152		
		Total	19	0.5058			
C. lanceolatum	0% vs 0.5%	Replicates	1	94.077	94.077	116.13	0.000
		Error	18	14.582	0.810		
		Total	19	108.658			
	0% vs1%	Replicates	1	204.905	204.905	460.23	0.000
		Error	18	8.014	0.445		
		Total	19	212.919			
	0% vs 2%	Replicates	1	257.124	257.124	742.49	0.000
		Error	18	6.233	0.346		
		Total	19	263.358			
	0.5% vs 1%	Replicates	1	21.300	21.300	37.29	0.000
		Error	18	10.281	0.571		
		Total	19	31.581			
	0.5% vs 2%	Replicates	1	40.142	40.142	85.00	0.000
		Error	18	8.501	0.472		
		Total	19	48.643			
	1% vs 2%	Replicates	1	2.960	2.960	27.56	0.000
		Error	18	1.933	0.107		
		Total	19	4.894			
M. utilis	0% vs 0.5%	Replicates	1	55.972	55.972	90.85	0.000
		Error	18	11.090	0.616		
		Total	19	67.062			
	0% vs1%	Replicates	1	161.104	161.104	430.25	0.000
		Error	18	6.740	0.374		
		Total	19	167.844			
	0% vs 2%	Replicates	1	230.174	230.174	696.53	0.000
		Error	18	5.948	0.330		
		Total	19	236.122			
	0.5% vs 1%	Replicates	1	27.157	27.157	68.81	0.000
		Error	18	7.104	0.395		
		Total	19	34.261			
	0.5% vs 2%	Replicates	1	59.136	59.136	168.63	0.000
		Error	18	6.312	0.351		
		Total	19	65.449			
	1% vs 2%	Replicates	1	6.144	6.144	56.37	0.000
		Error	18	1.962	0.109		
		Total	19	8.107			

Table A6.2 *(continued)*

Wood species	Concentrations	Source	DF	SS	MS	F	P
S. curtisii	0% vs 0.5%	Replicates	1	72.06	72.06	72.09	0.000
		Error	18	17.99	1.00		
		Total	19	90.05			
	0% vs1%	Replicates	1	175.612	175.612	807.48	0.000
		Error	18	3.915	0.217		
		Total	19	179.527			
	0% vs 2%	Replicates	1	223.961	223.961	963.79	0.000
		Error	18	4.183	0.232		
		Total	19	228.144			
	0.5% vs 1%	Replicates	1	22.687	22.687	28.32	0.000
		Error	18	14.420	0.801		
		Total	19	37.107			
	0.5% vs 2%	Replicates	1	41.945	41.945	51.40	0.000
		Error	18	14.688	0.816		
		Total	19	56.634			
	1% vs 2%	Replicates	1	2.9359	2.9359	86.74	0.040
		Error	18	0.6093	0.0338		
		Total	19	3.5452			

Appendix

Table A6.3 Weight loss caused by infection of white and brown-rot fungi on *H. brasiliensis* impregnated with the extracted of 4 Malaysian woods species extractives

Extracted species	Solution concentration (%)	Mean weight loss (%)		
		T. versicolor	*L. sajor-caju*	*C. puteana*
N. heimii	0 (control)	50.65 (2.24)[a]	33.28 (1.90)[a]	34.03 (2.90)[a]
	2	37.09 (1.36)[b]	27.79 (1.72)[b]	25.92 (2.56)[b]
	4	35.57 (2.72)[bc]	23.87 (1.70)[bc]	24.81 (3.24)[bc]
	6	33.41 (3.32)[c]	21.58 (3.20)[cd]	19.29 (1.04)[c]
	8	29.72 (4.08)[d]	18.75 (2.69)[d]	16.18 (0.84)[d]
C. lanceolatum	0 (control)	50.88 (1.43)[a]	32.52 (3.65)[a]	33.98 (2.88)[a]
	2	44.11 (1.88)[b]	28.11 (1.87)[a]	27.48 (3.46)[b]
	4	42.36 (2.90)[bc]	24.36 (3.95)[bc]	25.41 (2.08)[bc]
	6	40.65 (0.99)[c]	23.56 (1.78)[c]	23.18 (1.91)[c]
	8	37.70 (1.29)[d]	20.50 (0.85)[d]	19.18 (1.02)[d]
M. utilis	0 (control)	49.41 (1.57)[a]	33.00 (1.53)[a]	34.03 (2.90)[a]
	2	46.19 (1.45)[b]	30.93 (2.77)[ab]	29.72 (2.59)[b]
	4	44.20 (3.00)[bc]	28.23 (4.01)[bc]	26.54 (1.48)[c]
	6	42.78 (2.96)[cd]	27.66 (1.59)[c]	23.09 (2.67)[d]
	8	40.53 (2.59)[d]	22.36 (1.65)[d]	22.41 (1.23)[d]
S. curtisii	0 (control)	50.17 (2.10)[a]	32.73 (4.55)[a]	34.52 (2.15)[a]
	2	42.43 (1.30)[b]	30.23 (4.55)[ab]	29.06 (4.41)[b]
	4	40.65 (1.79)[b]	27.34 (1.94)[b]	23.48 (4.45)[c]
	6	38.65 (1.05)[c]	23.86 (2.34)[c]	21.29 (1.61)[c]
	8	36.37 (2.39)[d]	21.06 (1.69)[d]	20.52 (3.00)[c]

Mean (± SD) of 12 replicates of each species. Percentage values followed by the same letter are not significantly different at the 0.01 level of probability.

Table 6.4 Decay susceptibility index (%) against white and brown-rot fungi on *H. brasiliensis* impregnated with the extracted of four Malaysian woods species extractives

Extracted species	Solution concentration (%)	Fungus		
		T. versicolor	*L. sajor-caju*	*C. puteana*
N. heimii	0 (control)	0	0	0
	2	27	34	24
	4	30	44	27
	6	34	49	43
	8	41	56	52
C. lanceolatum	0 (control)	0	0	0
	2	13	14	19
	4	17	25	25
	6	20	28	32
	8	26	36	44
M. utilis	0 (control)	0	0	0
	2	7	6	13
	4	11	14	22
	6	13	16	32
	8	18	32	34
S. curtisii	0 (control)	0	0	0
	2	15	6	16
	4	19	16	32
	6	23	27	38
	8	28	36	41

Appendix

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Comparative termite resistance of twelve Malaysian timber species in laboratory tests

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Abstract

The effect of wood density and extractive compounds on heartwood durability against subterranean termites was studied. Twelve species of Malaysian hardwoods were tested against *Coptotermes curvignathus* and *C. gestroi* using a standard laboratory method. The results indicated that amount of extractive content is related to Malaysian hardwood termite durability.

Keywords: *Coptotermes curvignathus*; *C. gestroi*; natural durability; termite resistance; wood density, extractive contents.

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Appendix

Introduction

Termites cause significant and serious damage to wood products (Sajap 1999, Lee et al. 2003). In Malaysia, it has been estimated that in 1995, US $5 million was spent for termites control (Yap and Lee 1996), US $8-10 million in 2000 and US $10-12 million in 2003 (Ngee et al. 2004).

Species of *Coptotermes* in Malaysia cause more than 85% of total building and structures infestations (Lee 2002, Lee and Chung 2003). Among the five main species (*C. gestroi, C. havilandi, C. kalshoveni, C. curvignathus* and *C. sepangensis*) in Malaysia, *C. curvignathus* and *C. gestroi* are the two most widespread and aggressive species (Sajap and Wahab 1997). *C. gestroi* is commonly reported in buildings and structures (Kirton and Brown 2003), while *C. curvignathus* seriously attacks especially rubber, coconut and oil palm plantations and buildings (Tho and Kirton 1990, Sajap et al. 1997, Baskaran et al. 1999, Lee et al. 2007). Worldwide, in regions where *Coptotermes* spp. occur, they are regarded as being particularly destructive. The closely related species, *Coptotermes formosanus*, is a major invasive pest problem (Vargo et al. 2006).

The heartwoods of many species have natural resistance against termite infestation although, only a few of these have been thoroughly examined (Wolcott 1947, Sandermann et al. 1958, Ganapaty et al. 2004). Termite-resistant heartwoods contain extractives which have termite toxicity and/or repellency properties (Scheffrahn 1991).

Only the heartwood contains sufficient extractives to impart insect and decay resistance (Grace 2003). The extractive content of the heartwood varies with the physiological age of wood in the tree as well as its growth site. For example, teak from the old-growth forests in Laos and Myanmar was found to be more resistant to Formosan subterranean (*Coptotermes formosanus*) termite attack than heartwood samples derived from younger stands in Malaysia (Grace and Yamamoto 1994, Grace et al. 1996). Variations also occur in the response of different termites to the extractive content (Gay et al. 1955, Becker 1969, Smythe and Carter 1970, Carter and Camargo 1983). Wood density can also affect termite susceptibility (Dutilleul et al. 1998, Bultman et al. 1979, McConnell et al. 2010).

The purpose of this study was to determine the relationship between the density and extractive contents of 12 Malaysian hardwoods to two subterranean termites

native to Malaysia as part of a wider study on extractive action. This reports the results of a preliminary selection process and provides comparative quantitative data.

Materials and methods

No-Choice Test

A total of 12 Malaysian timber species examined for termite test resistance in these laboratory tests are listed in Table 1 together with local family names. Although Khaya ivorensis is not native to Malaysia, it has been included here because it has been plantation-grown in plantation in Malaysia for some years.

Wood specimen blocks measuring 19 x 19 x 19 mm were cut from the outer heartwood from the basal portion of one tree from each tree species and subjected to termite bioassays according to the no-choice test procedure of ASTM D3345-74 (ASTM 1988) standard methods.

Two subterranean termites, *Coptotermes curvignathus* Holmgren and *C. gestroi* Wasmann (Isoptera: Rhinotermitidae), were collected from active field colonies at the Forest Research Institute Malaysia (FRIM) campus using a trapping technique (Kirton et al. 1998). Screw-top bottles of 8 cm in diameter by 13 cm high were filled with 200 g of sterilized sand and 30 ml distilled water. The bottles were left overnight to equilibrate to laboratory conditions before test initiation. One block of each timber species was placed on the surface of the damp sand and 400 termites (360 workers and 40 soldiers) were added to each bottle. All bottles were stored in an incubator maintained at 26°C and 95% relative humidity for 28 days. Within this period, if it was found that all termites appeared dead, the bottle would be taken out and the number of days until 100% mortality would be recorded. At the end of the fourth week the blocks were removed, cleaned, dried overnight and reweighed. The remaining live termites were weighed and recorded for each of the bottles. As detailed in the standard the condition of the test blocks were rated visually using a 1-10 scale where 10 was sound and 0 was total failure.

Wood density determination.

The basic density of samples (19 x 19 x 19 mm, radial, tangential, longitudinal) was determined according to ASTM Standard D143 (2009), i.e. a displacement method. For each timber species, 15 replicates were taken giving a total of 180 wood blocks.

Extraction process

For each wood species, five air-dried milled wood samples (2.00 g) were Soxhlet extracted with Toluene: Industrial Methylated Spirit (Tol: IMS) (2:1) for 6 hours following ASTM standard D1105 (1996). The solvent was removed by rotary vacuum evaporation at 45-50°C, and the extracts were weighed. The extraction yields were expressed as a percentage of the wood dry weight.

Statistical analysis

An analysis of variance (ANOVA) was carried out using the MINITAB 15 software to test the between- and within-tree differences in termite resistance. Correlation analysis was carried out on the raw data to assess the importance of wood density and extractive contents on the durability against termites.

Results and discussion

Wood consumption and visual rating

The means and standard deviations of wood consumption and visual rating are given in Table 2. In general *C. curvignathus* was more aggressive in the test, giving higher wood consumption than *C. gestroi*; this was also reflected in mortality. High mortality was experienced with most wood species tested except for *H. brasiliensis* and *A. angustifolia* and this makes mortality a poor discriminator of good durability in this test. By all assessment methods, both *H. brasiliensis* and *A. angustifolia* were particularly susceptible to both termite species. Conversely, *N. heimii, C. lanceolatum, M. utilis* and *S. curtisii* were highly resistant and this is reflected in field exposure data for three species but not for *S. curtisii*, which is only rated moderately durable (Mohd Dahlan and Tam 1985). Other woods showed intermediate performance with slight variations in ranking between the wood species. In conclusion, the best distinction for the wood durability against termites is the *C. curvignathus* and wood consumption.

The two reported reasons why termites respond differently in wood in bioassay tests are the amount and type of extractives and wood density. Generally, extractives have a bigger impact on durability than density (Sen-Sarma 1963). This is clearly shown in the data presented here (Tables 3 and 4). Samples with high extractive content had high termite resistance and some high density, lower extractive

content species showed poor performance (*D. kunstleri* and *D. grandiflorus*). However *K. ivorensis*, of lower density, moderately high extractive content showed poorer performance; much better performance was achieved with *S. curtisii*, with a similar extractive content and density. As a general, the average density of wood that sustained no detectable termite damage was 750 kg/m^3, the average density of woods that were only slightly attacked by termites was 830 kg/m^3 but woods with an average density of only 650 kg/m^3 were moderately attacked. The effect of this wood density on the natural durability was still unclear.

Conclusions

The termite resistance tests showed that *Neobalanocarpus heimii* proved extremely durable against both termite species. The presence of greater than 2 wt. % extractives resulted in at least 70% termite mortality during the 28 days of the test.

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Appendix

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Appendix

Table 1 Twelve Malaysian timber species tested under laboratory conditions

Timber species	Trade name	Family
Alstonia angustifolia A. D. C.	Pulai	Apocynaceae
Cinnamomum scortechinii Gamble	Medang	Lauraceae
Cotylelobium lanceolatum Craib	Resak	Dipterocarpaceae
Diallium kunstleri var *trifoliolatum* de Wit Rojo	Keranji	Leguminosae
Dipterocarpus grandiflorus Blanco	Keruing	Dipterocarpaceae
Fagraea fragrans Roxb.	Tembusu	Loganiaceae
Hevea brasiliensis Willd. Muell. Arg	Rubberwood	Euphorbiaceae
Khaya ivorensis A. Chev.	Khaya	Meliaceae
Madhuca utilis Ridl. H. J. Lam	Bitis	Sapotaceae
Neobalanocarpus heimii King P. S. Ashton	Cengal	Dipterocarpaceae
Pometia pinnata J. R. Forster & J. G. Forster	Kasai	Sapindaceae
Shorea curtisii Dyer ex King	Seraya	Dipterocarpaceae

Table 2 Wood consumption, visual rating and termite mortality in bio-assay tests of twelve Malaysian timbers against subterranean termites

Timber species	*C. curvignathus*		*C. gestroi*	
	Wood consumption (%) (± SD)	Visual rating (± SD)	Wood consumption (%) (± SD)	Visual rating (± SD)
Madhuca utilis	1.36 (0.31)^{f}	9.67 (0.49)^{ab}	1.54 (0.70)^{e}	9.53 (0.50)^{b}
Neobalanocarpus heimii	0.86 (0.44)^{f}	9.80 (0.41)^{a}	0.72 (0.30)^{f}	9.93 (0.32)^{a}
Pometia pinnata	3.80 (0.68)^{e}	9.13 (0.35)^{e}	1.64 (0.41)^{e}	9.47 (0.52)^{c}
Diallium kunstleri var *trifoliolatum*	5.54 (1.10)^{d}	9.00 (0.65)^{ef}	3.66 (1.84)^{c}	9.07 (0.96)^{d}
Dipterocarpus grandiflorus	3.55 (1.61)^{e}	9.33 (0.82)^{d}	2.48 (2.07)^{d}	9.40 (0.83)^{c}
Khaya ivorensis	4.88 (1.92)^{d}	8.93 (0.88)^{f}	2.67 (2.57)^{d}	9.13 (0.99)^{d}
Cinnamomum scortechinii	6.02 (1.06)^{c}	8.60 (0.80)^{f}	2.74 (1.59)^{d}	8.87 (0.83)^{e}
Alstonia angustifolia	8.22 (1.70)^{b}	7.53 (0.92)^{g}	7.37 (4.23)^{b}	7.80 (2.21)^{f}
Cotylelobium lanceolatum	1.00 (0.40)^{f}	9.60 (0.51)^{ab}	0.82 (1.33)^{f}	9.67 (0.49)^{ab}
Hevea brasiliensis	12.36 (1.75)^{a}	5.87 (1.92)^{h}	11.08 (3.27)^{a}	6.60 (1.80)^{g}
Shorea curtisii	1.51 (0.48)^{f}	9.47 (0.52)^{c}	1.36 (0.35)^{e}	9.47 (0.52)^{c}
Fagraea fragrans	2.97 (0.55)^{e}	9.40 (0.51)^{cd}	1.90 (0.61)^{e}	9.40 (0.51)^{c}

Means (± SD) of 15 replicates of 400 termites each. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test

Appendix

Table 3 Average of wood density and extractive contents of twelve Malaysian timbers

Scientific name	Density (kg/m^3) at 12% moisture content	Extractives (%)
Madhuca utilis	712 (7.70)	9.02 (0.20)
Neobalanocarpus heimii	797 (6.27)	14.79 (0.25)
Pometia pinnata	711 (10.26)	9.14 (0.59)
Diallium kunstleri	730 (13.16)	5.02 (0.47)
Dipterocarpus grandiflorus	783 (11.74)	4.51 (0.26)
Khaya ivorensis	487 (12.30)	8.39 (0.11)
Cinnamomum scortechinii	490 (13.33)	4.50 (0.32)
Alstonia angustifolia	411 (10.97)	4.71 (0.24)
Cotylelobium lanceolatum	803 (13.78)	9.34 (0.30)
Hevea brasiliensis	583 (18.38)	2.81 (0.24)
Shorea curtisii	543 (8.26)	7.58 (0.41)
Fagraea fragrans	668 (11.50)	8.81 (0.55)

Means (± SD) of 5 replicates. Means within each column followed by the same letter are not significantly different at the 5% level.

Appendix

Table 4 Correlation coefficients on properties of twelve Malaysian timbers

Property	Termite mortality (%)	Density (kg/m^3)	Extractives
C. curvignathus			
Wood consumption (%)	-0.919***	-0.252ns	-0.555*
Termite mortality (%)	-	0.453ns	0.442ns
Density (g/cm^3)	-	-	0.554*
Extractives (%)	-	-	-
C. gestroi			
Wood consumption (%)	-0.921***	-0.379ns	-0.640*
Termite mortality (%)	-	0.249ns	0.380ns
Density (g/cm^3)	-	-	0.554*
Extractives (%)	-	-	-

Appendix

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Variation in the natural decay resistance of twelve Malaysian broadleaved trees (hardwoods) as a function of wood density and extractives compounds

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Abstract

The importance of factors contributing to the natural decay resistance of twelve Malaysian hardwood species was studied. A sixteen-week decay test was performed with 19 x 19 x 19 mm) wood blocks in test jars against three white-rot fungi (*Pycnoporus sanguineus, Trametes versicolor and Lentinus sajor-caju*) according to the CEN EN 350-1 and adapted to CEN EN 113. The huge variation occurred between wood species as well as within species. The average weight loss of all wood species was -0.20% to 44.80% against *P. sanguineus*, 0.09% to 52.51% against *T. versicolor* and 0.16% to 33.17% against *L. sajor-caju*. The corresponding basic densities were between 0.39 to 1.02 g/cm^3. The mass loss was then compared with chemical characteristics and the wood density in order to determine which factor has the greatest effect on decay resistance. The contributions of wood extractives are highly significant rather than wood density itself.

Keywords: *Pycnoporus sanguineus, Trametes versicolor, Lentinus sajor-caju*, Natural durability, Decay resistance, Wood density, Extractive contents.

Appendix

1. Introduction

It is well-known that information on durability is very useful in order to determine the utilization of the wood as a product. Besides that insects or termites, decay resistance also is the main factor that affects the durability of wood in service. The losses caused by these deteriorating influences enormous and run into many million of dollars each year.

A few studies (Blanchette 1995, Ten Have and Teunissen 2001) reported that white-rot fungi are the only known microorganisms that can break down woody cell wall including lignin, cellulose and hemicellulose to carbon dioxide and water, completely. Meanwhile brown-rot fungi prefer hemicellulose and cellulose, leaving the lignin undigested (Hickin 1971, Blanchette 1995).

One method of obtaining this information is either by graveyard stake (field) test or accelerated laboratory test. Laboratory testing of decay was more preferred or desirable than field test because it offered the potential of a faster answer, more scientific and could be conducted in laboratory with a few pieces of apparatus (Scheffer and Cowling, 1966; Eaton and Hale 1993).

Many studies (Takahashi and Kishima 1973, Wong and Sabri 2000, Jusoh and Kamden 2001) has been done on the natural durability of Malaysian timbers, unfortunately the studies only focused on the variation between timber species rather than investigate somewhat intensively the between-tree variability for decay resistance. These make sense that the damage by these agents on Malaysian hardwood has not fully investigated. Knowledge of their wood destroying properties would help define more precisely the danger that they present.

Early study by Wangaard and Muschler (1952) showed that there is a significant variation in the decay susceptibility of timber with unfavourable consequences for classification of its durability. However, available data on Malaysian timbers were insufficient to predict the variations on tropical timbers. Thus, this study was designed to determine the variability of the natural durability of 12 Malaysian wood species between species and within tree samples. The purpose of this is to employ in vitro laboratory decay tests to estimate the ability of *P. sanguineus, T. versicolor* and *Lentinus sajor-caju* in degrading Malaysian hardwoods.

Appendix

2. Materials and methods

2.1 Raw materials

Wood specimen blocks measuring 19 x 19 x 19 mm were cut from the 15 to 20-year-old Malaysian heartwood species (Table 1) and subjected to decay tests. Only sapwood of *H. brasiliensis* was tested because of the difficulty to define between sapwood-heartwood region of this timber species. The wood samples were conditioned to approximately 12% moisture content, weighed and placed in desiccators until the time to be introduced into the test jars.

2.2 Decay fungi test

The natural durability tests of the twelve Malaysian timber species were carried out according to the standards CEN EN 350-1 (1994) and adapted to CEN EN 113 (1996). Three white-rot fungi, *Pycnoporus sanguineus* (L.ex.Fr.); culture collection – KUM 70117 (*Trametes versicolor* (L.Fries) Pilat; culture collection – KUM 70121 and *Lentinus sajor-caju*; culture collection – KUM 70097 were used. *P. sanguineus and L. sajor-caju* are Malaysian local fungi.

Malt extract agar mixture (8g of malt and 4 g agar dissolved in 200ml distilled water) was prepared as culture medium. Then this culture medium was sterilize and was later poured into 9 cm testing jars before introducing the fungal strain. All the jars were placed in conditioning room with conditions of 22°C in 65% relative humidity for 2 weeks to favor development of the fungus.

Sterilized fabric paper mesh was introduced on the surface of the agar medium and four wood blocks (one control and three of each timber species) were placed on top of the paper mesh. All the test jars were maintained at 25 to 27 °C and 70% RH for 16 weeks. Weekly observations were made to ensure there was no contamination.

The degree of fungal attack was estimated by determining the weight loss after 16 weeks. All the test blocks were taken out and the mycelium was removed from the test blocks prior to drying to a constant weight (nearest 0.01g) at 103 ± 5 °C for 24 hours and reconditioned at 27°C and 70% RH. The test blocks were weighed before and after oven-dried and average percentage weight loss were calculated for each individual timber species and test fungus. In addition, the moisture content of the test blocks was also determined and was calculated based on oven-dry weight.

Appendix

2.3 Wood density determination.

The basic density of samples (19 x 19 x 19 mm, radial, tangential, longitudinal) was determined according to ASTM Standard D143 (2009). For each timber species, 10 replicates were taken giving a total of 120 wood blocks.

2.4 Extraction process

For each wood species, five air-dried milled wood samples (2.00 g based on oven dry weight) were Soxhlet extracted with Toluene:IMS (2:1) for 6 hours sequence following ASTM standard D1105 (1996). The solvent was removed by rotary evaporator, and the extracts were weighed. The extraction yields were expressed as a percentage of the wood dry weight.

2.5 Statistical analysis

An analysis of variance (ANOVA) was carried out using the MINITAB 15 software to test the between- and within-tree differences in termite resistance. Correlation analysis was carried out on the raw data to assess the importance of wood density and extractive contents on the durability against decay fungi.

3. Results and discussion

3.1 Wood density and extractive contents

The difference between the wood density among the twelve Malaysian hardwood species was clearly significant (Table 2) and this reflected the differences durability in weight loss against all fungus tested. The highest wood density was found in *D. grandiflorus* (0.90 g/m^3) and the lowest was in *A. angustifolia* (0.44 g/m^3) with all the test blocks varied between 0.39 to 1.02 g/cm^3. Pairwise comparison showed that all wood species were very significantly different.

The difference of wood density of all wood species was significantly due to genetic, physiological, or silvicultural treatments (Muller-Landau 2004), growth, mortality and specifically (Wright *et al.* 2001), tree age, location in the tree and location within the range of the species (Bowyer *et al.* 2003). Because many of these act in combination, it is quite impossible to find a distinct causal effect for each (Koch 1985).

Table 2 also showed that the extractives contents were significantly different between the wood species (except a few cases). The average extractive content of twelve Malaysian wood species was between 2.50% to 15.0%. The highest value was found in *N. heimii* (14.79%) which is under durable class and the lowest was in *H. brasiliensis* (2.81%) in non durable classes.

The variation of wood extractives among tropical hardwood species had been reported in many studies (Buckley 1931, Douglas & Kiang 1957, Carrick *et al.* 1968, Chan and Teoh 1969, 1972, Abd. Razak *et al.* 1981, 1982, Peh *et al.* 1986, Yamamoto and Hong 1989, Kawamura *et al.* 2010). Extractive contents and concentration may vary widely between timber species (different timber had different characteristics), within the tree itself (different anatomical structure) (Willför 2003, Schultz *et al.* 2008) and genus (different family) (Hillis 1971). These characteristics and the different properties (such as colour and durability) which are useful in wood identification (Theodore 1973).

3.2 Average weight loss

After one week of exposure, almost all the wood samples were covered with fungus but the activity was noted to be slightly slow with *P. sanguineus*. About 20% of *H. brasiliensis* wood blocks was actively covered by *T. versicolor* and *L. sajor-caju* as evidenced by rapid and extensive fungal growth in the culture plates. The weight losses caused by the three fungi are presented in Tables 3, 4 and 5.

Generally, different fungi species appear to dominate different stages of wood degradation (Käärik 1975, Shigo 1967). In fact, they also act differently on wood tissues (Levy 1965, Liese 1970). However, the slower decay rate for many of white-rot was due to the lack of nutrients particularly nitrogen (Butcher and Drysdale 1974). Among the three fungus tested, *Trametes versicolor* (except in *C. lanceolatum, D. kunstleri* and *N. heimii*) was the most aggressive fungus while *Pycnoporus sanguineus* was the least aggressive (except in *N. heimii* and *D. kunstleri*) in 16 week's incubation. The effectiveness of *T. versicolor* at decaying hardwoods was also earlier reported by Schultz and Nicholas (1977) and Enoki *et al* (1988). Other studies (Ryvarden and Johansen 1980, Ryvarden 1993, Salmiah *et al.* 2002) had found that *T. versicolor* was known as a cosmopolitan genus which prefers deciduous woods.

After this period of exposure, the average weight loss of samples exposed ranged from 0.56 to 30.45% for *P. sanguineus*, 0.34 to 36.95% for *T. versicolor* and 0.57 to 25.35% for *L.*

sajor-caju. *N. heimii* the only timber that showed a good level of resistance against all the three fungus tested with a weight loss of less than 1%. Even though the other three timber species (*M. utilis, D. grandiflorus* and *S. curtisii*) showed a weight loss less than 1%, their weight loss varies between 1 and 8% for that of *T. versicolor* and also *L. sajor-caju*. All of test samples from the above species were largely free of fungal attack at the end of the test period.

In other situations, all of three basidiomycete fungi decayed *P. pinnata, C. scortechinii, C. lanceolatum* and *F. fragrans* more heavily but less than *H. brasiliensis*, which were the most heavily decayed (over 25%). The weight loss of *A. angustifolia* and *K. ivorensis* were much higher for *T. versicolor* than for the two other fungus while *P. sanguineus* decay more on *D. kunstleri* than *T. versicolor* and *L. sajor-caju*. According to ASTM Standard D2017 (1993), an average weight loss of 0 to 10% is considered as highly resistant, 11 to 24 is considered as resistant, 25 to 44% is classified as moderately resistant and anything above 45% is considered as slightly resistant or non-resistant. Thus from the weight loss values caused by this fungus species, the four woods species before together with *P. pinnata, K. ivorensis, C. scortechinii, C. lanceolatum* and *F. fragrans* can be categorized under highly resistant while the other three (*D. kunstleri, A. angustifolia* and *H. brasiliensis*) species were under moderately resistant against *P. sanguineus*.

Analysis of variance shows that only *C. scortechinii* and *S. curtisii* are significantly different with other timber species against *P. sanguineus*, *N. heimii, K. ivorensis,* and *S. curtisii* against *T. versicolor* and, *N. heimii* and *H. brasiliensis* against *L. sajor-caju*. The other timber species had not significantly different at $P<0.05$.

The analysis of variance within wood species for average weight loss (Tables 3, 4, and 5) showed that only *A. angustifolia* and *H. brasiliensis* had significantly different with others at $P<0.05$ against *P. sanguineus*, two wood species (*D. grandiflorus* at $P<0.01$ and *K. ivorensis* at$P<0.05$) forwards *T. versicolor*. Three wood species had been found showed a significantly variation in average weight loss against *L. sajor-caju* (*A. angustifolia*, *H. brasiliensis,* and *F. fragrans*).

3.3 Moisture content of the wood

On the other hand, water has also found to be one of the important factors that effect on wood decay. Moisture content in all test blocks exposed to different fungi for 16 weeks shows a different trend for different decay types (Tables 3, 4 and 5).

This study found that the timber species with a lower range of moisture content had lower weight loss while with higher range of moisture content had higher weight loss. This means that moisture content increases with weight loss. All the timber species tested had higher moisture content with *T. versicolor* (range between 25.68% to 274.38%) followed by *L. sajor-caju* (range between 21.12% to 92.86%) then *P. sanguineus* (range between 19.89% to 145.83%). The highest moisture content of test blocks for all three fungus tested were found at *H. brasiliensis* (110.81%, 66.70% and 74.20%, respectively, and the lowest was in *N. hemii* (28.48%, 23.66% and 22.39%, respectively).

The result from this study support the expectation that moisture act as a main factor or absolutely necessary for decay as reported by previous findings (Arthur 1924, Moses 1955, Hon and Shiraishi 1991). The wood moisture content increased considerably with intensity of wood degradation by white-rot fungi (De Groot 1975).

The relationship between moisture content and wood decay are well known before. Moisture content has a significantly effect in controlling the potential of decay fungi activities (Ayerst 1968, Christensen and Kaufmann 1965, Griffin 1977). In fact, moisture must be present before deterioration initiated (Cowling 1963, Scheffer and Cowling 1966). Decay by fungal attack only occurred when the wood has high moisture content (exceeding 20% of oven-dry weight) and exposed to the air. Zeller (1920) brief that in order to geminate the spores and established the fungi mycelium, the wood itself must contain enough moisture to saturate the wood fibre.

3.4 Variation in weight loss between species and within treess

The study observed that there is a variation in the amount of decay (weight loss) for each timber species depending on the particular test fungus, as well as a variation between trees. Because of these variations, it is difficult to obtain a meaningful single-figure estimate of the relative decay resistance of the timber species.

Appendix

Generally, *P. sanguinensis, T. versicolor* and *L. sajor-caju* caused an average weight loss more than 10%. Worall *et al.* (1997) reported that weight loss of 2% is as a threshold for decay and suggested that wood decay fungi causing less than 2% weight loss may be functioning as mycoparasites or scavengers. The detailed results in Tables 3, 4 and 5 also demonstrated that the variation of average weight loss were only significant for two timber species against *P. sanguineus* and *T. versicolor* and three for *L. sajor-caju. A. angustifolia* (64.47%) and *H. brasiliensis* (68.85%) had a huge variation in sample within trees against *P. sanguinesus*, while *D. grandiflorus* (76.09%) and *K. ivorensis* (55.94%) against *T. versicolor. A. angustifolia* (61.09%) and *H. brasiliensis* (64.31%) again, with *F. fragrans* (68.04%) showed a huge variation in average weight loss against *L. sajor-caju.* All of them showed significantly different from each other. Consequently, for the other timber species (except what had mentioned above), there was no significant difference between the average values of weight loss. For this group of timbers, the average weight loss differences range from 2% to 50% for all the three fungi.

High variability in decay resistance of heartwood within and between timber species in this study are in agreement with the bibliography works (Scheffer and Duncan 1947, Findlay 1956, Rudman and Da Costa 1959, Rudman 1964, Smythe and Carter 1970, Mannesman 1973, Hillis 1987, Viitanen *et al.* 1998, DeBell *et al.* 1999, Srinivaasan *et al.* 1999, Dumonceaud 2001, Freitag and Morrell 2001). These variations are mainly controlled genetically (Scheffer & Cowling 1966, Fortin and Poliquin 1976, Clark and Scheffer 1983, Zabel and Morrell 1992), growth rate (Da Costa *et al.* 1961a, Rudman and Gay 1967), tree site (Guyette *et al.* 1992), tree size (Cartwright 1941, Rudman 1962, Rudman *et al.* 1967), soil (Toole 1963), side and age of the tree and the location of the wood in the trunk (Cartwright 1942, Scheffer and Hopp 1949, Anderson *et al.* 1963, Nelson and Heather 1972, Nicholas 1973, Clark and Scheffer 1983, Emerhi *et al.* 2008). In fact Zabel and Morell (1992), emphasized that the durability of timber species may vary in terms of climatic and geographic regions but not (Guilley *et al.* 2004) with the silvicultural schedule. These variations can be more easily found especially in a number of tropical species with very durable heartwood (Scheffer and Duncan 1947; Scheffer and Cowling 1966).

The variation of decay resistance within the tree are correlated with the distribution and nature of toxic extractives (MacLean and Gardner 1956). Recent works on the variation of durability between and within timber species showed that timber species may be ascribed to

certain gums, waxes, resins, tannins and other phenolic substances, essential oils, terpenes, and possibly other materials which become infiltrated into the cell walls and are offensive to the fungus (Scheffer and Cowling 1966).

Indeed, a few of early studies (Hawley *et al.* 1924, Dumonceau 2001, Amusant *et al.* 2004) further explained that the distribution toxicity of extracts within the trees has been correlated or corresponds broadly with the decay resistance variation. In fact, the variations of quality of phenolic compounds not seem to have the same level of inhibitory strength against fungi attack (Aloui *et al.* 2004). Other studies on different timber species shown that the base and outer layer of heartwood are the most durable parts in the trees (Scheffer & Cowling 1966, DeBell *et al.* 1999), which is rich with extractive contents (DeBell *et al.* 1999). Besides the extractive content, other factors which may also contribute to decay variation include the lignin content (Syafi and Yoshimoto 1991) and starch content (Taylor *et al.* 2002) of heartwood.

To make successful decay on wood, fungus also needs certain factors that can make it better on growth. This includes i) free water on the surface of cell lumina; ii) atmospheric oxygen and/or chemical oxygen present in wood; ii) a favourable pH range; iv) a favourable temperature range; v) chemical growth factors like nitrogen compound, vitamins and essential elements; vi) the absence of toxic extractives which prevent or slow down fungal decay and vii) a digestible substrate which provides energy and metabolites for synthesis via metabolism (Zabel and Morell 1992). As far as durability is concerned, the ability of wood to absorb moisture (either from air or objects in contact with wood), is a major factor for determination of durability against decay (Zeller 1920). Thus, it is possible from the present results to distinguish this twelve Malaysian woods species from the other species in the world, since there are also other factors that influenced the timber durability (Mohd Dahlan and Tam 1985). In addition, temperature also impressed more on the fungal growth which govern the decay in wood (Salmiah 2001).

3.5 Variation in wood moisture content between species and within trees

The causal affects of moisture in controlling the growth and development of decay fungi were demonstrated by many studies before (Christensen and Kaufmann 1965, Griffin 1977).

Table 6 showed that variation of proportion within timber species of moisture content occurred in every timber species tested against three white-rot fungi. *N. heimii* (67.54%), *P.*

pinnata (91.53%), *D. kunstleri* (67.48%), *C. scortechinii* (77.56%, *A. angustifolia* (59.60%), *S. curtisii* (74.38% and *F. fragrans* (63.88%) are the timber species that showed a huge variation within the trees of moisture content. Only *D. grandiflorus* (58.77%) had a significantly variation forwards *T. versicolor*. Meanwhile, eight timber species showed a significantly different in variation of moisture content against *L. sajor-caju* (*M. utilis* = 87.90%, *P. pinnata* = 56.76%, *D. kunstleri* = 60.03%, *D. grandiflorus* = 53.92%, *C. scortechinii* = 56.25%, *A. angustifolia* = 89.09%, *C. lanceolatum* = 86.30% and *F. fragrans* = 65.16%). The variation occurred due to the lack of uniformity in wood quality especially anatomical structures between species as well as within a tree. The quantity of water absorbed by a piece of wood also depends on the amount of OH groups which are exposed (Ridout 2000).

Besides the other three factors (warmth, air and wholesome food), moisture is absolutely necessary for decay (Arthur 1924) and majority of fungi required higher water potential (Griffin 1977). It is widely reported that fungal colonization of wood begins when moisture content is about 20% of its oven-dry weight (Eaton and Hale 1993). Otherwise, they can only withstand longer or shorter in periods of dryness when established in the wood below 30% (fiber-saturation) moisture content (Milberg 1987) but cause serious decay above these level (Arthur 1924). Many studies (Eaton and Hale 1993, Nicholas and Crawford 2003) had found that the moisture content between 30 to 80% is the optimum range for decay for most of rot fungi.

3.6 Effect of wood density and extractives compound

Table 7 showed that wood density had a highly negative correlation with the average of weight loss against *T. versicolor*. However, this correlation is not significant against *P. sanguineus* and *L. sajor-caju*. Generally, different fungi species appear to dominate different stages of wood degradation (Käärik 1975) and act differently on wood tissues (Liese 1970). *N. heimii* (0.81 g/cm^3) is the only wood species that has no fungal attack. *D. grandiflorus* which had the highest wood density (0.90 g/cm^3) showed no decay by *P. sanguineus* but slightly decayed by *L. sajor-caju*. The same situation also exist in *C. lanceolatum* (accept against *L. sajor-caju*). Contrarily, *S. curtisii* with the wood density of 0.58 g/cm^3 showed no decay by *P. sanguineus* and slightly decayed against *T. versicolor* and *L. sajor-caju*. The other wood species showed moderate decay by the three fungi. This means that wood density cannot be a good indicator but can be considered as one of the factors to determine the durability against fungus.

The same result had also been found in previous studies in softwoods. Rennerfelt (1947) found no correlation between these two variables in Scots pine, Gäumann (1948) also found the same result in European larch, and Englerth and Scheffer (1954) in four western American conifers.

On the other hand, the extractive contents contributed more in durability. Table 7 showed that the correlation was highly negatively significant ($P<0.001$) against all fungus tested. The relationship between chemical composition in heartwood extractives and decay resistance was first reported by Hawley *et al* (1924). They found that the durability of woods was attributed to its soluble extractives. The sapwood with lower extractive content was less toxic than the corresponding heartwood. In later studies, some researchers have investigated the relationship of extract structure against white-or brown-rot fungi resistance which acts as natural preservatives (Celimene *et al.* 1999).

The durability of wood also varies with various biological agents due to the variations in content of wood extractives (Tsoumis 1991). As described in the previous paper (Alfenas 1982), the natural decay of wood depends on the concentration of toxic extractable substances which are formed during the formation of heartwood. Yamamoto and Hong (1988) demonstrated that some Malaysian tropical hardwoods trees have a bioactivity of decay resistance wood species which containing higher extractive content were more resistant to decay than those wood species with higher wood density value. This argument is largely supported by Zabel and Morrell (1982) and Taylor *et al* (2002) who had studied the relationship between durability and chemical composition in wood.

Although many studies (Taylor *et al.* (2002) had reported that extractive content was the main factor that influenced the natural durability of wood; the variation of decay was also influenced by lignin content (Syafi and Yoshimoto 1991) and starch content (Taylor *et al.* 2002) of wood.

4.0 Conclusions

The natural durability of twelve Malaysian woods species against three white-rot fungus was determined. Timber with lower moisture content had a lower weight loss. Following the trend, higher moisture content increase the weight loss. *T. versicolor* was the most aggressive fungi while *P. sanguineus* was the least.

Appendix

Among twelve hardwoods species used in the present study, four timber species (*M. utilis, N. heimii, C. lanceolatum* and *S. curtisii*) were decayed far less than the other species. Based on previous investigations, it can be interpreted that the slower decaying rates of the four earlier timber species by *P. sanguineus, T. versicolor* and *L. sajor-caju* might be due to the wood chemical composition, in which extractive is a pre-dominator.

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Appendix

Table 1 Twelve Malaysian timber species tested under laboratory conditions

Timber species	Trade name	Family
Alstonia angustifolia A. D. C.	Pulai	Apocynaceae
Cinnamomum scortechinii Gamble	Medang	Lauraceae
Cotylelobium lanceolatum Craib	Resak	Dipterocarpaceae
Diallium kunstleri var *trifoliolatum* de Wit Rojo	Keranji	Leguminosae
Dipterocarpus grandiflorus Blanco	Keruing	Dipterocarpaceae
Fagraea fragrans Roxb.	Tembusu	Loganiaceae
Hevea brasiliensis Willd. Muell. Arg	Rubberwood	Euphorbiaceae
Khaya ivorensis A. Chev.	Khaya	Meliaceae
Madhuca utilis Ridl. H. J. Lam	Bitis	Sapotaceae
Neobalanocarpus heimii King P. S. Ashton	Cengal	Dipterocarpaceae
Pometia pinnata J. R. Forster & J. G. Forster	Kasai	Sapindaceae
Shorea curtisii Dyer ex King	Seraya	Dipterocarpaceae

Appendix

Table 2 Average wood density (g/cm^3) and extractive contents of 12 Malaysian woods species

Timber species	Density	Range of density	Extractive content (%)
M. utilis	0.75 (0.04)^{d}	0.68 - 0.83	9.02 (0.20)^{c}
N. heimii	0.81 (0.04)^{c}	0.73 - 0.90	14.79 (0.25)^{a}
P. pinnata	0.78 (0.05)^{cd}	0.68 – 0.86	9.14 (0.59)^{bc}
D. kunstleri	0.78 (0.02)^{cd}	0.74 – 0.82	5.02 (0.47)^{f}
D. grandiflorus	0.90 (0.05)^{a}	0.76 – 1.01	4.51 (0.26)^{g}
K. ivorensis	0.51 (0.04)^{g}	0.46 – 0.63	8.39 (0.11)^{d}
C. scortechinii	0.53 (0.03)^{g}	0.48 – 0.60	4.51 (0.32)^{g}
A. angustifolia	0.44 (0.05)^{h}	0.39 – 0.48	4.71 (0.24)^{fg}
C. lanceolatum	0.85 (0.04)^{b}	0.80 – 0.93	9.34 (0.30)^{b}
H. brasiliensis	0.59 (0.04)^{f}	0.49 – 0.67	2.81 (0.24)^{h}
S. curtisii	0.58 (0.08)^{f}	0.56 – 0.61	7.58 (0.41)^{e}
F. fragrans	0.68 (0.18)^{e}	0.61 – 0.74	8.81 (0.55)^{cd}

Mean (± SD) of 12 replicates of each species. Means within each column followed by the same letter are not significantly different at the 1% level of ANOVA test.

Appendix

Table 3 Average weight loss (AWL, %) and moisture content (MC, %) of 12 Malaysian woods species (decay test 1) forward *P. sanguineus*

Timber species	AWL	Range of AWL	MC	Range of MC
M. utilis	0.72 (0.21)^{d}	0.45–1.26	37.63 (7.56)^{d}	30.61-58.91
N. heimii	0.56 (0.08)^{e}	0.37-0.70	22.39 (1.47)^{g}	19.89-24.33
P. pinnata	4.38 (2.70)^{c}	1.08-11.15	48.01 (11.80)^{b}	36.46-68.06
D. kunstleri	29.98 (4.50)^{a}	21.95-35.91	48.00 (18.77)^{bc}	33.22-96.77
D. grandiflorus	0.69 (0.58)^{de}	0.14-1.83	25.80 (1.33)^{f}	24.55-29.16
K. ivorensis	3.90 (6.24)^{c}	0.11-17.65	37.86 (13.94)^{cd}	22.70-66.79
C. scortechinii	6.99 (0.52)^{b}	6.24-7.73	31.98 (4.61)^{d}	27.57-41.24
A. angustifolia	28.97 (10.54)^{a}	10.66-44.11	52.17 (15.48)^{b}	30.79-74.38
C. lanceolatum	1.21 (1.23)^{d}	0.24-3.04	30.85 (2.31)^{d}	27.54-34.46
H. brasiliensis	30.45 (14.78)^{a}	8.07-44.80	74.20 (37.37)^{a}	41.87-145.83
S. curtisii	0.26 (0.17)^{f}	-0.20-0.43	26.85 (1.64)^{e}	24.11-30.02
F. fragrans	5.21 (1.77)^{c}	3.37-9.62	34.34 (7.35)^{d}	27.32-47.32

Mean (± SD) of 12 replicates of each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Appendix

Table 4 Average weight loss (AWL, %) and moisture content (MC, %) of 12 Malaysian woods species (decay test 1) forward *T.versicolor*

Timber species	AWL	Range of AWL	MC	Range of MC
M. utilis	7.22 (2.63)^{e}	3.25-11.93	62.32 (5.63)^{c}	54.73-71.41
N. heimii	0.34 (0.16)^{g}	0.09-0.59	28.48 (1.67)^{g}	25.68-30.83
P. pinnata	20.89 (7.88)^{c}	12.53-35.59	68.91 (9.83)^{b}	49.00-85.62
D. kunstleri	14.08 (11.45)^{cd}	1.50-29.65	57.53 (16.47)^{cd}	39.42-98.98
D. grandiflorus	6.48 (1.92)^{e}	3.63-9.61	42.23 (2.65)^{ef}	37.72-45.76
K. ivorensis	27.86 (7.11)^{b}	15.85-37.57	99.20 (24.41)^{a}	67.70-147.47
C. scortechinii	10.08 (2.06)^{d}	7.95-14.94	60.71 (11.15)^{c}	48.90-84.41
A. angustifolia	35.19 (7.54)^{a}	24.01-50.01	85.11 (40.37)^{ab}	51.45-200.15
C. lanceolatum	5.24 (3.08)^{e}	0.16-9.18	43.58 (9.04)^{ef}	30.59-59.09
H. brasiliensis	36.95 (6.23)^{a}	31.96-52.51	110.81 (62.08)^{a}	58.83-274.38
S. curtisii	1.65 (0.57)^{f}	0.51-2.31	48.52 (8.22)^{de}	39.26-62.21
F. fragrans	12.57 (2.71)^{d}	8.01-17.11	71.25 (10.15)^{b}	57.33-88.99

Mean (± SD) of 12 replicates of each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Appendix

Table 5 Average weight loss (AWL, %) and moisture content (MC, %) of 12 Malaysian woods species (decay test 1) forward *L. sajor-caju*

Timber species	AWL	Range of AWL	MC	Range of MC
M. utilis	3.58 (0.82)^{d}	2.29-5.50	41.54 (4.41)^{b}	33.87-47.56b
N. heimii	0.57 (0.16)^{f}	0.16-0.73	23.66 (1.64)^{d}	22.11-28.25d
P. pinnata	4.00 (0.72)^{d}	2.21-4.79	39.04 (4.29)^{c}	21.12-43.58c
D. kunstleri	11.81 (10.19)^{b}	0.07-22.94	47.86 (7.84)^{b}	37.53-63.47b
D. grandiflorus	1.03 (0.54)^{e}	0.23-1.68	31.25 (2.36)^{cd}	27.78-34.99cd
K. ivorensis	3.67 (2.68)^{d}	0.85-8.30	44.13 (5.62)^{b}	38.89-51.40b
C. scortechinii	7.11 (0.53)^{c}	6.44-8.35	33.56 (2.92)^{c}	29.23-39.12c
A. angustifolia	15.32 (2.34)^{b}	12.43-20.42	57.30 (15.62)^{a}	43.85-92.86a
C. lanceolatum	4.23 (1.12)^{d}	2.47-6.52	33.81 (5.96)^{c}	24.74-42.85c
H. brasiliensis	25.35 (7.78)^{a}	10.64-33.17	66.70 (12.61)^{a}	45.70-88.22a
S. curtisii	1.27 (0.35)^{e}	0.41-1.74	34.77 (4.64cd	29.55-44.41cd
F. fragrans	6.52 (1.52)^{c}	4.64-9.51	40.71 (7.50)^{b}	31.68-51.76b

Mean (± SD) of 12 replicates of each species. Means within each column followed by the same letter are not significantly different at the 5% level of ANOVA test.

Table 6 ANOVA results showing the proportion of total variation in average weight loss and moisture content accounted for samples within wood species

Species	Average weight loss			Average moisture content		
	P. sanguineus	*T. versicolor*	*L. sajor-caju*	*P. sanguineus*	*T. versicolor*	*L. sajor-caju*
M. utilis	31.33ns	46.41ns	38.27ns	31.59ns	11.93ns	87.90**
N. heimii	36.11ns	9.06ns	38.44ns	67.54*	21.41ns	27.76ns
P. pinnata	20.80ns	12.74ns	35.25ns	91.53***	16.63ns	56.76*
D. kunstleri	36.12ns	25.13ns	12.10ns	67.48*	14.04ns	60.03*
D. grandiflorus	29.69ns	76.09**	45.30ns	41.28ns	58.77*	53.92*
K. ivorensis	8.86ns	55.94*	2.44ns	21.43ns	40.18ns	14.65ns
C. scortechinii	26.21ns	43.10ns	31.67ns	77.56**	25.90ns	56.25*
A. angustifolia	64.47*	23.66ns	61.09*	59.60*	37.13ns	89.09***
C. lanceolatum	23.14ns	2.19ns	11.57ns	13.87ns	15.83ns	86.30**
H. brasiliensis	68.85*	40.30ns	64.31*	38.75ns	50.90ns	6.95ns
S. curtisii	23.68ns	9.42ns	31.11ns	74.38**	9.45ns	32.78ns
F. fragrans	48.52ns	7.27ns	68.04*	63.88*	25.79ns	65.16*

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$, ns – not significant.

Appendix

Table 7 Correlation coefficients on properties of twelve Malaysian timbers

Property	Weight loss (%)	Density (kg/m^3)	Extractives (%)
P. sanguineus			
Weight loss (%)	-	-0.245ns	-0.575***
Density (g/cm^3)	-	-	0.388**
Extractives (%)	-	-	-
T. versicolor			
Weight loss (%)	-	-0.527***	-0.514***
Density (g/cm^3)	-	-	0.310*
Extractives (%)	-	-	-
L. sajor-caju			
Weight loss (%)	-	-0.102ns	-0.610***
Density (g/cm^3)	-	-	0.419**
Extractives (%)	-	-	-

Appendix

VITA

Roszaini Kadir was born on July 10 1968, at Selangor Darul Ehsan, Malaysia. She graduated with a Diploma in Wood Technology in 1990 from Mara Institute of Technology University and a Bachelor's degree in Forestry in 1993 from Agriculture University of Malaysia. She enrolled in Putra University, Malaysia in December 1993 and graduated with a Master's degree in Non-wood forest products in Mac 1997. She began her study at Bangor University, United Kingdom in 2007 to pursue her PhD's degree in Wood Technology. She has done some durability and termiticidal compound in some Malaysian timber species.