

Bangor University

DOCTOR OF PHILOSOPHY

Use of novel chitosan derivatives for the control of food-borne pathogens

Lahmer, Rabya

Award date: 2013

Awarding institution: Bangor University

Link to publication

General rights Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
You may not further distribute the material or use it for any profit-making activity or commercial gain
You may freely distribute the URL identifying the publication in the public portal ?

Take down policy If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Chapter 1: Introduction

Rabya A. Lahmer

School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor

University, Gwynedd, LL57 2UW, UK.

Chapter 2: Literature Review

Rabya A. Lahmer

School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor

University, Gwynedd, LL57 2UW, UK.

Chapter 3: Co-factorial influence of pH-concentration on antimicrobial activity of chitosan against *E. coli* O157[:]H7

Rabya A. Lahmer, David L. Jones, A. Prysor Williams*

School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK.

| *Corresponding author: | Prysor Williams | |
|--|---|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College | |
| of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. | | |
| Correspondence Fax: | +44 1248 354997 | |
| Correspondence Tel.: | +44 1248 382579 | |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk | |

Presented to the 3th Symposium for Libyan Students in UK Universities, Sheffield Hallam University; Jun 2010. UK. Abstract published in conference book.

Chapter 4: Differential biocidal actions of chitosan and acetic acid against *E. coli* O157

Rabya A. Lahmer, A. Prysor Williams*, David L. Jones

School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK

| *Corresponding author: | Prysor Williams | |
|--|---|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College | |
| of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. | | |
| Correspondence Fax: | +44 1248 354997 | |
| Correspondence Tel.: | +44 1248 382579 | |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk | |

Chapter 5: Antibacterial action of chitosan-arginine against Escherichia coli O157 in chicken juice

Rabya A. Lahmer¹, A. Prysor Williams^{1*}, Stacy Townsend², Shenda Baker², Davey L. Jones¹

¹School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor

University, Bangor, UK, LL57 2UW;

²Synedgen, Inc., 1420 N Claremont Blvd Suite 105D, Claremont, CA 91711.

| *Corresponding author: | Prysor Williams | |
|--|---|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College | |
| of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. | | |
| Correspondence Fax: | +44 1248 354997 | |
| Correspondence Tel.: | +44 1248 382579 | |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk | |

Published in Food Control 26, 206-211 (2012); presented and published in SfAM Summer Conference (2011) and 5th Saudi Science Conference 16-18/4/2012

Chapter 6: Susceptibility of *Escherichia coli* O157 to chitosanarginine in beef juice is affected by bacterial cell growth phase

R. A. Lahmer¹, A. P. Williams¹*, S. Townsend², S. Baker², D. L. Jones¹

¹School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Bangor, UK, LL57 2UW;

²Synedgen, Inc., 1420 N Claremont Blvd Suite 105D, Claremont, CA 91711.

| *Corresponding author: | Prysor Williams |
|-------------------------|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. |
| Correspondence Fax: | +44 1248 354997 |
| Correspondence Tel: | +44 1248 382637 |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk |

Presented and published to 23rd International ICFMH Symposium; FoodMicro2012: Global Issues in Food Microbiology, 3-7 September (2012); Istanbul-Turkey; and All Wales and West Microbiology meeting, Swansea University, September 13-14th, 2012

Chapter 7: Preparation of novel antimicrobial meat packaging using chitosan-arginine

Rabya A. Lahmer¹, A. Prysor Williams^{1*}, Stacy Townsend², Shenda Baker², Davey L. Jones¹

¹School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Bangor, UK, LL57 2UW;

²Synedgen, Inc., 1420 N Claremont Blvd Suite 105D, Claremont, CA 91711.

| *Corresponding author: | Prysor Williams |
|-------------------------|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. |
| Correspondence Fax: | +44 1248 354997 |
| Correspondence Tel: | +44 1248 382637 |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk |

Chapter 8: General discussion

Rabya A. Lahmer

School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor

University, Gwynedd, LL57 2UW, UK.

Appendix

Appendix 1: Survival and metabolic activity of lux-marked *Escherichia coli* O157:H7 in different types of milk.

Appendix 2: Appendix 2: Testing of surface spoilage bacteria in meats by application of Woolcool[®] packaging.

Appendix 3: A comparison of the microbiological quality of meat packaged in Woolcool[®] boxes compared to conventional EPS boxes.

Appendix 4: Photographs of experimental apparatus

Appendix 1: Survival and metabolic activity of lux-marked Escherichia coli O157:H7 in different types of milk

Nawfal A. Alhelfi, ¹ Rabya A. Lahmer, ² Davey L. Jones, ² and A. Prysor Williams^{2*}

¹Department of Food Science, Agriculture College, University of Basra, Basra, Iraq; and ²School of

Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Bangor,

LL57 2UW, UK

| *Corresponding author: | Prysor Williams | |
|--|---|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College | |
| of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. | | |
| Correspondence Fax: | +44 1248 354997 | |
| Correspondence Tel.: | +44 1248 382579 | |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk | |

Published in Journal of Dairy Research, Published online, 04 April 2012, 1-5

Appendix 2: Testing of surface spoilage bacteria in meats by application of Woolcool[®] packaging

Rabya A. Lahmer¹, Simon Curling², Prysor A. Williams^{1*},

¹School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor

University, Bangor, UK, LL57 2UW;

²BioComposite Centre, Bangor University, Deiniol Road, Bangor, Gwynedd. LL57 2UW

| *Corresponding author: | Prysor Williams | |
|--|---|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College | |
| of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. | | |
| Correspondence Fax: | +44 1248 354997 | |
| Correspondence Tel.: | +44 1248 382579 | |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk | |

Appendix 3: A comparison of the microbiological quality of meat packaged in Woolcool[®] boxes compared to conventional EPS boxes

Rabya A. Lahmer¹, Simon Curling², Prysor A. Williams¹*,

¹School of Environment, Natural Resources & Geography, College of Natural Sciences, Bangor University, Bangor, UK, LL57 2UW;

²BioComposite Centre, Bangor University, Deiniol Road, Bangor, Gwynedd. LL57 2UW

| *Corresponding author: | Prysor Williams | |
|--|---|--|
| Correspondence address: | School of Environment, Natural Resources & Geography, College | |
| of Natural Sciences, Bangor University, Gwynedd, LL57 2UW, UK. | | |
| Correspondence Fax: | +44 1248 354997 | |
| Correspondence Tel.: | +44 1248 382579 | |
| Correspondence E-mail: | prysor.williams@bangor.ac.uk | |

Appendix 4: Photographs of experimental apparatus