Microbial uptake and utilization of low molecular weight organic substrates in soil depend on carbon oxidation state
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**Figure 1.** Temporal dynamics of $^{14}$C-labelled sugar, organic acid and amino acid disappearance from soil solution. Values represent means ± SE ($n = 4$). Lines are the following: blue: solid - glucose, dotted - fructose; green: solid - formic acid, dashed - malic acid, dotted - succinic acid; brown: solid - glycine, dashed - alanine.
Figure 2. Relationship between the half-life (min) of different LMWOS in soil solution and their C oxidation state (top panel) and number of C atoms in the molecule (bottom panel). Values represent means ± SE (n = 4). The error bars for the half-life times of LMWOS in DOC are smaller than size of icon symbols.
Figure 3. Cumulative $^{14}$C-CO$_2$ production from mineralization of $^{14}$C-labelled LMWOS in soil. Values represent means ± SE $(n = 4)$. In case error bars are not present, they are smaller than size of icon symbols.
Figure 4. Relationship between $^{14}$C remaining in the cytosol, SOC and CO$_2$ pools and C oxidation state (top panel) and $^{14}$C remaining in the cytosol and number of C atoms and -COOH groups (bottom panel) in different LMWOS. Values represent means ± SE ($n=4$). $P$-values for the regression lines on the top panel figure are less than 0.002; $p$-values for the regression lines on the bottom panel figure are less than 0.004. The substance names are shown only once.
Figure 5. Relationship between $^{14}$C incorporated into cytosol (anabolism)/$^{14}$C incorporated into CO$_2$ (catabolism) and C oxidation state at the end of LMWOS mineralization experiment.
Figure 6. Schematic representation showing the dependence of microbial uptake rate (red), utilization (green) and mineralization efficiency (black) of three distinct classes of LMWOS as a function of substrate C oxidation state.