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## 近期发表论文

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### Starch structure-property relations as a function of barley germination times

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#### Abstract

Two varieties of barley samples were subjected to germination conditions to investigate the underlying mechanisms underpinning changes in molecular structure, chemical compositions and thermal properties of starch during this process. Starch thermal transitions were examined using differential scanning calorimetry, and the molecular fine structure of amylose and amylopectin were determined using size-exclusion chromatography and fluorophore-assisted carbohydrate electrophoresis, respectively. Both amylose and amylopectin chains were hydrolyzed during germination, but a preferential attack of amylopectin chains was observed with concomitant increases of relative amylose content, resulting in increased gelatinization temperatures (onset, peak, conclusion) and reduction in enthalpy change. Amylolytic enzyme activities increased during germination, resulting in decreased starch content. After malting, significant degradation of amylose chains followed by the reduction of gelatinization temperatures was seen. Roasting of pale malts was found to degrade starch and protein whilst completely stopping enzyme activities. The resulting coloured malts had extremely low starch enthalpy change due to the loss of amylopectin crystallinity at high temperature. This study provides insights into starch structural changes of barley throughout malting and roasting, which are determining factors for fermentable sugar production during mashing.

**Key words:** Barley; Gel permeation chromatography; Germination; Malting; Roasting; Starch

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