



Research Article

IMPACT OF SELECTED INDUSTRIAL AND LABORATORY PROCESSING TECHNIQUES ON THE PHYTIC ACID CONTENT IN BARLEY FLOUR: A COMPARATIVE APPROACH

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Abstract

Barley is mainly utilized in brewing, and for processing breakfast cereals and fermented bakery products. Phytic acid (PA) is the major storage form of phosphorus in barley. It is considered an antinutrient because it chelates polyvalent mineral cations, hereby reducing their bioavailability in humans and animals. Therefore, the main aim of the study was to apply malting and roasting as treatments in order to understand enzymatic and thermal effects on reducing PA level. Four industrially processed barley flour types—whole or raw barley (RB), malted barley (MB), and malted barley subjected to both mild (MB-l) and intense (MB-i) roasting—along with two raw flours subjected to mild (R-l) and intense (R-i) roasting in the laboratory, were analysed in quadruplicates for their PA contents using the Megazyme® phytic acid assay kit. Data were analysed by one way ANOVA and Tukey HSD tests using SPSS. The PA content of whole raw barley was 0.86 ± 0.03 g/100 g d.b. All malted flours—MB, MB-l, MB-i—contained significantly less ($P < 0.05$) PA than raw flour but treated flours did not differ significantly from one another ($P > 0.05$). Similarly, roasted barley in the laboratory—R-l and R-i—contained significantly ($P < 0.05$) less PA compared to RB. The free phosphorus content of industrial barley flour increased as follows ($P < 0.05$): RB < MB < MB-l < MB-i. Similarly, among the roasted flours, R-i contained the highest free phosphorus level. Endogenous phytase activity during malting was likely the primary factor responsible for phytate degradation. Additionally, it can be suggested that the reduction of PA during roasting in the laboratory, was due to thermal degradation of phytic acid. Among all treatments, intense roasting of raw barley decreased phytic acid content by 32.56% suggesting that as the most promising strategy for reducing PA levels in barley-based food ingredients.