

Wheat and the irritable bowel syndrome – FODMAP levels of modern and ancient species and their retention during bread making

Ziegler et al. 2016

Dietary intake of fermentable oligo-, di- and monosaccharides, and polyols (FODMAP) has previously been shown to aggravate the symptoms of the irritable bowel syndrome (IBS), furthermore being associated with wheat sensitivity and a bread wheat-specific intolerance. To gain more knowledge about FODMAP in bread, FODMAP in whole grain flours and breads made of different varieties of bread wheat, spelt, durum, emmer, and einkorn were determined by high-performance anion exchange chromatography with pulsed amperometric detection (HPAEC-PAD). Fructans and raffinose were the only FODMAP detected in wheat flour. Fructan-meanlevels in einkorn (1.739 ± 0.065 g/100 g DM*) and bread wheat (1.568 ± 0.204 g/100 g DM) were significantly higher than in durum (1.169 ± 0.117 g/100 g DM) and emmer (0.950 ± 0.130 g/100 g DM). The galactosyl-oligosaccharide raffinose was found to range from 0.194 g/100 g DM in durum to 0.382 g/100 g DM in spelt. Among the species, spelt (0.309 ± 0.046 g/100 g DM) tended to have higher contents than bread wheat (0.214 ± 0.014 g/100 g DM) and durum (0.220 ± 0.027 g/100 g DM), however, significant differences in raffinose contents were not observed. In all whole grain flours glucose levels were consistently higher than fructose levels, i.e., excess fructose was absent, thus not contributing to FODMAP. However, bread making had a substantial influence on the glucose to fructose ratio, irrespective of the used variety. After 1 h of proofing both sugars increased and finally fructose levels exceeded those of glucose, thus being considered 'excess fructose' representing a contribution to FODMAP levels. After proofing for 2.5 h, excess fructose, fructan and raffinose concentrations decreased. In the end, prolonging dough proofing times (> 4 hours) allowed to effectively diminish FODMAP levels of the final product by up to 90 %. It turned out that the applied processing method was substantially more important than the selection of the used variety in order to obtain low- FODMAP wheat bakery products, which might be suitable for consumption by IBS patients.

*DM = Dry Matter