

In vitro Evaluation of Prebiotic Potential of Wheat Germ

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Abstract : Wheat germ is a by-product of wheat flour refining. Despite this by-product being a source of proteins, lipids, fibres and complex carbohydrates, and consequently a valuable ingredient to be used in Food Industry, only few applications have been studied. The main goal of this study was to assess the potential prebiotic effect of natural wheat germ. The prebiotic potential was evaluated by in vitro assays with individual microbial strains (*Lactobacillus paracasei* L26 and *Lactobacillus casei* L431). A simulated model of the gastrointestinal digestion was also used including the conditions present in the mouth (artificial saliva), oesophagus-stomach (artificial gastric juice), duodenum (artificial intestinal juice) and ileum. The effect of natural wheat germ and wheat germ after digestion on the growth of lactic acid bacteria was studied by growing those microorganisms in de Man, Rogosa and Sharpe (MRS) broth (with 2% wheat germ and 1% wheat germ after digestion) and incubating at 37 °C for 48 h with stirring. A negative control consisting of MRS broth without glucose was used and the substrate was also compared to a commercial prebiotic fructooligosaccharides (FOS). Samples were taken at 0, 3, 6, 9, 12, 24 and 48 h for bacterial cell counts (CFU/mL) and pH measurement. Results obtained showed that wheat germ has a stimulatory effect on the bacteria tested, presenting similar (or even higher) results to FOS, when comparing to the culture medium without glucose. This was demonstrated by the viable cell counts and also by the decrease on the medium pH. Both *L. paracasei* L26 and *L. casei* L431 could use these compounds as a substitute for glucose with an enhancement of growth. In conclusion, we have shown that wheat germ stimulate the growth of probiotic lactic acid bacteria. In order to understand if the composition of gut bacteria is altered and if wheat germ could be used as potential prebiotic, further studies including faecal fermentations should be carried out. Nevertheless, wheat germ seems to have potential to be a valuable compound to be used in Food Industry, mainly in the Bakery Industry.

Keywords : by-products, functional ingredients, prebiotic potential, wheat germ

Conference Title : ICFSNH 2015 : International Conference on Food Science, Nutrition and Health

Conference Location : Venice, Italy

Conference Dates : June 22-23, 2015