

**Metabolism of Deoxynivalenol and Deoxynivalenol-3-Glucoside by Human Faecal Microbiota**

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Mycotoxins are common food contaminants which are found in most regions of the world. Deoxynivalenol (DON) is a potent mycotoxin produced by *Fusarium* moulds which affects nutrient absorption and intestinal barrier function. Free DON and the plant metabolite DON-3- $\beta$ -D-glucoside (D3G) are frequently found in cereals such as wheat and maize. Gut microbiota of various animals have been shown to degrade DON to the less toxic metabolite deepoxy-deoxynivalenol (DOM-1). The aim of this study was to assess the ability of the human faecal microbiota to release DON from D3G and to detoxify DON to DOM-1. Faecal samples from ten volunteers were spiked with DON or D3G and incubated anaerobically for up to one week. All ten were found to release free DON from D3G and two were capable of detoxifying DON to DOM-1. This is the first report of the detoxification of DON to DOM-1 by human microbiota. Complete hydrolysis of D3G was accomplished in 2-6h of incubation with samples from all volunteers. Metabolism of DON to DOM-1 was completed in 1-3d with samples from one volunteer and 7d with the other. Storage of faecal samples in cryoprotectant at  $-20^{\circ}\text{C}$  for 2 weeks resulted in a slightly diminished rate of D3G hydrolysis and DON metabolism activity whereas 6 month storage resulted in a slower rate of D3G hydrolysis and almost complete loss of DON metabolism. Further work is needed to better characterise detoxification and toxin release by human microbiota.

***In vitro* effects of three wheat bran-derived fibres -wheat bran, ultrafine milled bran and soluble wheat bran fibre (AXOS)- on the gut microbiome**Joan Vermeiren<sup>1</sup>, Lorenza Conterno<sup>2</sup>, Francesca Fava<sup>2</sup>, Kieran Tuohy<sup>2</sup>, Douwina Bosscher<sup>1</sup><sup>1</sup>Cargill R&D Centre Europe, Vilvoorde, Belgium, <sup>2</sup>Research and Innovation Centre-Fondazione Edmund Mach, San Michele (TN), Italy

Wheat bran is an important source of dietary fibres in our Western diet and has demonstrated intestinal benefits related to transit time acceleration and faecal bulking. The objective of the present study was to investigate the impact of either mechanically or enzymatically treated wheat bran products, i.e. ultrafine milled wheat bran and soluble wheat bran fibre (SWBF containing min. 70% AXOS) on the intestinal microbial composition and activity *in vitro*.

Mechanical milling of the wheat bran resulted in ultrafine particles with a size  $<100\mu\text{m}$ . Enzymatic treatment reduced the arabinoxylan chain length into shorter arabinoxylan-oligosaccharides (AXOS). These two compounds and the parent bran were subjected to *in vitro* gastrointestinal digestion followed by batch fermentations (24hrs). The fermentations were done in triplicate inoculated with faecal samples from 3 healthy volunteers. Positive and negative controls were inulin and cellulose resp.

Quantitative PCR and FISH analyses showed that SWBF stimulated bifidobacteria the most in comparison to wheat bran, ultrafine wheat bran and both the positive and negative controls. Total short-chain fatty acid (SCFA) levels were highest for SWBF with butyrate levels accounting for up to 30 mol%. Total SCFA levels for the parent and ultrafine wheat bran were in the same order as for inulin, and significantly higher vs. cellulose, with increased proportions of acetate produced from the wheat bran compounds.

In conclusion, the results confirm the prebiotic potential of SWBF *in vitro* and its ability to generate SCFA with high butyrate production, both indicators of beneficial modulation of the gut microbiome.

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