

# EFFECT OF WHEAT ALEURONE ON THE MICROBIAL GUT FLORA AND ON THE FORMATION OF SCFA AFTER SIMULATED GASTRO-INTESTINAL PASSAGE

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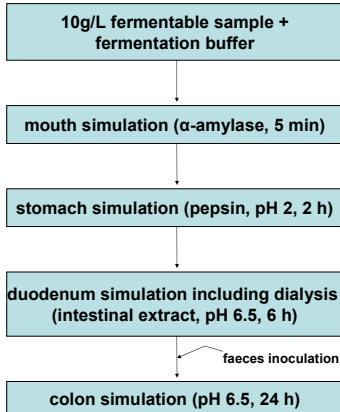
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## INTRODUCTION

Dietary fibre, such as wheat aleurone, can support microbial fermentation in the gastro-intestinal tract resulting in a higher content of health-relevant metabolites, e.g. short chain fatty acids (SCFA), which contribute to colon cancer prevention. In the present study, digestion was simulated *in vitro* with conditions adjusted to gastro-intestinal passage using wheat aleurone. After simulation of the gastro-intestinal passage DNA extracts of the pelletized faecal samples were subjected to qPCR for the enumeration of total *Eubacteria*, Lactobacilli and Bifidobacteria. The supernatant was used for quantification of SCFA by GC-MS.

In vitro digestion

### METHODIC APPROACH



qPCR

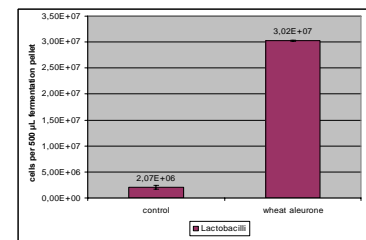
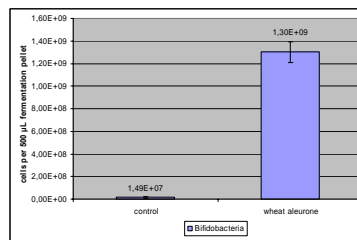
Enumeration of total *Eubacteria*, Lactobacilli and Bifidobacteria was gained by qPCR using species specific primer systems. Detection was done with SYBR Green.

GC-MS

SCFA were quantified by GC-MS after liquid-liquid extraction with tBME and derivatisation with 10%TMSH

## RESULTS

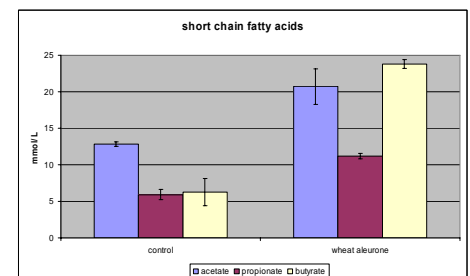
In comparison to the control, cell counts of Bifidobacteria in the faeces pellet were enhanced a hundredfold with the digestion of wheat aleurone. Lactobacilli were slightly influenced by the simulated digestion with wheat aleurone.



	control	wheat aleurone
total <i>Eubacteria</i> [%]	99.57 ± 19.65	93.56 ± 0.94
Lactobacilli [%]	0.02 ± 0.00	0.05 ± 0.00
Bifidobacteria [%]	0.37 ± 0.21	6.28 ± 0.44

Relating to the total *eubacterial* cell counts in the presence of wheat aleurone the number of Bifidobacteria in the faeces pellet was increased from 0.37 % (control) to 6.28 % of the total bacterial counts.

At the same time the supernatant of wheat aleurone contained 1.6 to 3.8 fold higher amounts of SCFA than the control. Moreover, the molar ratio of SCFA in the sample with wheat aleurone was shifted in favour of butyrate.



## CONCLUSION

As long as Bifidobacteria are able to metabolize complex carbohydrates, it is obvious that the cell counts of Bifidobacteria are higher in the sample with the digestion of wheat aleurone. By contrast, Lactobacilli are particularly prevalent in the upper gastrointestinal tract and rather ferment simple sugars. This explains the only slight increase in their cell counts. Total SCFA especially butyrate are enhanced in the sample with wheat aleurone. This is an important factor because butyrate prevents colon cancer by initiating cell differentiation and apoptosis. To enhance gut health, a fibre-rich diet (e.g. with aleurone-enriched products) could have a prebiotic effect by increasing the cell counts of Bifidobacteria and resulting in a higher amount of SCFA.