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Title and subtitle

Fermentation of dietary fibre in the intestinal tract

Abstract

The present work presents data on the breakdown of different dietary fibre in the rat compared with man. The influence of parameters such as adaptation time to the diet, level of protein and fibre in the diet and particle size of the fibre on its fermentability have been studied as well as the effect of processing.

Prolongation of the adaptation period decreased faecal dry weight, due to a decreased excretion of protein and fat, while the fermentation of the fibre was practically unchanged. A protein level of less than 5% in the diet reduced fermentability of the fibre, but a protein level higher than 10% did not increase the fermentation of the fibre further. The fermentability was not affected by the level of fibre or by the particle size. Certain chemical bonds in the fibre were obviously resistant to bacterial enzymes, and an increasing amount of soluble fibre partly increased the availability to bacterial enzymes. The presence of lignin was of less importance.

Extrusion cooking of refined wheat flour with mild conditions and popping of wholegrain wheat flour with severe conditions tended to increase the fermentation of the fibre. This increased fermentability could be related to the increase in the proportion of soluble fibre after processing.

The faecal recovery of fibre components from refined wheat flour (easily fermented) was nearly complete after antibiotic treatment. This strongly supports that dietary fibre degradation in the rat intestinal tract occurs almost exclusively by fermentation.

The dietary fibre contents of various bulk laxatives on the Swedish market were quite different. The laxatives however caused a similar increase in faecal dry weight per gram ingested fibre.

Bran, apple, cabbage, carrot and guar gum were fermented to a similar extent in man and rat. A good correlation in faecal bulking capacity between rat and man was also seen.

Key words

Dietary fibre fermentation; adaptation, protein level, fibre level, particle size, cereals, processing, bulk laxatives

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