

NUTRIOSE® FB 06 in rats : effects on SCFA production, pH and weight of the caecal content

I. CRISTIANI¹, L. DEREMAUX¹, D. WILS¹, M.H. SANIEZ¹
¹- ROQUETTE Frères, Toxicology and Nutrition Department, 62080 LESTREM CEDEX, France

INTRODUCTION

NUTRIOSE® FB 06 is a wheat starch-based food dextrin with a high content of soluble fibres. These fibres are not digested in the small intestine but fermented in the colon. This fermentation leads to the production of short-chain fatty acids (SCFA), which have beneficial effects on health. The aim of this *in vivo* study was to determine the SCFA production in the caecum and the pH and weight of the caecal content.

MATERIALS AND METHODS

Animals

- ➔ 24 male Fischer 344 rats
- ➔ Age : 5 weeks
- ➔ Weight ≈ 150 g

Methodology

- ➔ 4 groups of 6 rats : control, 2.5 %, 5 % and 10 % of NUTRIOSE® FB 06 in the diet
- ➔ 14-day experiment
- ➔ studied parameters : SCFA, pH and weight of the caecal content

RESULTS AND DISCUSSION

Table I : caecal SCFA amounts following a 14-day diet supplemented with NUTRIOSE® FB 06

	Total SCFA (mg/caecum)	Acetate (mg/caecum)	Propionate (mg/caecum)	Butyrate (mg/caecum)
Control Group	36,04 ± 4,32	17,19 ± 1,65	2,20 ± 0,60	16,70 ± 3,00
Group with 2.5 % NUTRIOSE® FB 06	38,63 ± 7,02	17,88 ± 4,42	3,40 ± 0,80 *	17,40 ± 2,80
Group with 5.0 % NUTRIOSE® FB 06	51,10 ± 8,04 **	24,45 ± 4,72 **	4,20 ± 1,50 **	22,50 ± 3,70 *
Group with 10 % NUTRIOSE® FB 06	62,39 ± 3,16 ***	32,36 ± 3,42 ***	5,50 ± 0,80 ***	24,60 ± 2,60 ***

* : statistically significant at 0.05 threshold
 ** : statistically significant at 0.01 threshold
 *** : statistically significant at 0.001 threshold

Table I shows that SCFA production by caecal bacteria increases with the dose of NUTRIOSE® FB 06. The increase is significant from the 2,5 % dose for propionate and from the 5 % dose for acetate and butyrate. Acetate is the most produced SCFA.

Table II : pH and weight of the caecal content

	pH of the caecal content	Weight of the caecal content (g)
Control Group	6,58 ± 0,13	4,70 ± 0,53
Group with 2.5 % NUTRIOSE® FB 06	6,58 ± 0,13	4,90 ± 0,56
Group with 5.0 % NUTRIOSE® FB 06	6,39 ± 0,19	6,55 ± 0,68 *
Group with 10 % NUTRIOSE® FB 06	6,01 ± 0,18 *	8,09 ± 1,08 *

* : statistically significant at 0.001 threshold

Table II shows that the pH decreases as the dose of NUTRIOSE® FB 06 increases. The decrease in pH is significant with 10 % of NUTRIOSE® FB 06. We also observe an increase in the weight of the caecal content with the dose of NUTRIOSE® FB 06. This increase is significant from the 5 % dose.

CONCLUSION

SCFA production increases with the dose of NUTRIOSE® FB 06. The consequence is a decrease in pH. The most produced SCFA is acetate, which is currently observed when complex carbohydrates are fermented. Butyrate production is increased, which is interesting since this SCFA is an important factor in cell growth and differentiation. With regard to propionate production, it appears from this experiment that NUTRIOSE® FB 06 is very efficient because propionate is statistically increased for each dose of NUTRIOSE® FB 06. This may be interesting for lipid metabolism.

By an enhanced SCFA production, a decrease in pH and an increase in the weight of the caecal content, this study confirms the fibre status of NUTRIOSE® FB 06 and more particularly an effect on the caecal microflora.

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