Effects of short-chain fructo-oligosaccharides on the microbial and biochemical profile of different segments of the gastro-intestinal tract in horses

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INTRODUCTION

Fructo-oligosaccharides (scFOS) are prebiotic ingredients that stimulate selectively the growth and activity of one or a limited number of bacterial species already present in the colon (Gibson et al., 1995). As the whole digestive tract of horses is colonized by non-negligible concentrations of bacteria (Kern et al., 1974, deFombelle et al., 2003), the objective of the study was to evaluate the effects of scFOS on these populations and their fermentation-related parameters throughout the whole digestive tract.

MATERIAL & METHODS

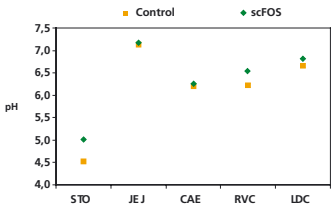
6 untrained gelding ponies (average BW 374kg) were housed in individual free stalls with artificial bedding. They were fed a diet of concentrate pellets (1.06kg of DM/horse/day; UAR hippo 122, Evialis, France) and straw (2kg/horse/day). Ponies were randomly allotted into two groups, which received the same basal diet. One group was supplemented with 1% scFOS (Profeed, Beghin-Meiji) incorporated in the concentrate pellets. Ponies were adapted to their diet 21 days prior to measurements. pH and lactate concentrations were measured in each digestive compartment as well as microbial populations through classic culture methods.

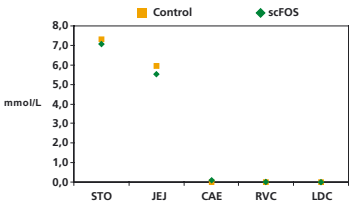
RESULTS

Dietary scFOS supplementation induced changes mainly in the stomach and in the right ventral colon:

- Higher Total Anaerobes, Streptococci and Lactate-utilizers in the stomach ($p<0.05$)
- Lower microbial concentrations in the Right Ventral Colon ($p<0.05$)
- Higher digestive contents pH ($p<0.05$)
- No difference on lactate concentrations

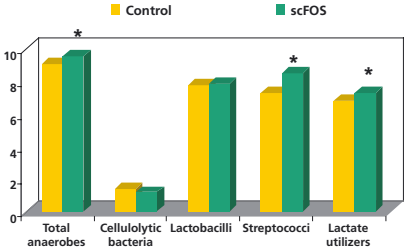
ScFOS increased digestive pH but did not affect lactate concentrations



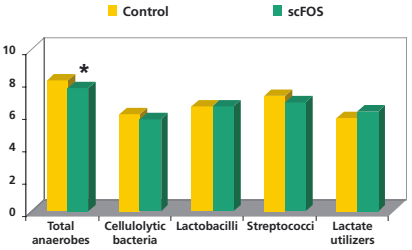


STO: Stomach, JEJ: Jejunum, CAE: Caecum, RVC: Right Ventral Colon, LDC: Left Dorsal Colon.

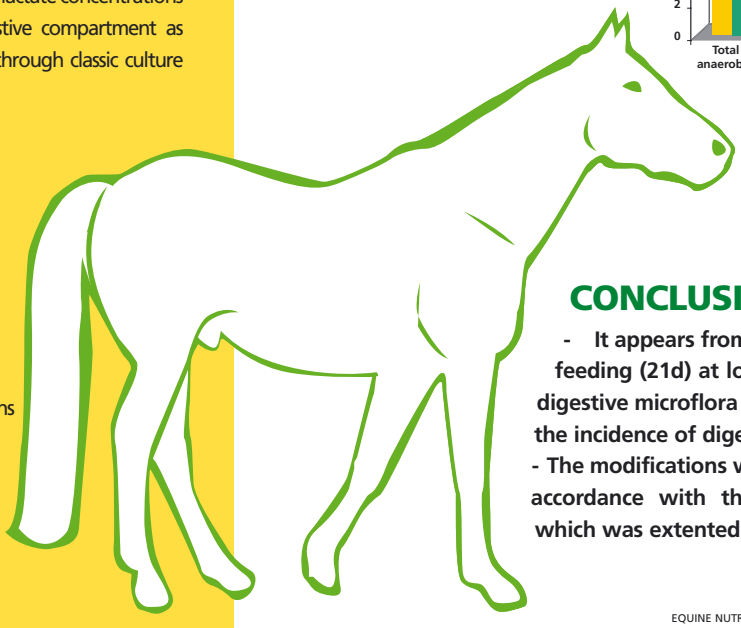
ScFOS increased Streptococci & lactate-utilising bacteria in the stomach



ScFOS decreased microbial populations in the right ventral colon



**: The difference with the control diet is significant ($p<0.05$)*



CONCLUSIONS

- It appears from our results that long term scFOS feeding (21d) at low level (30g/day) could alter the digestive microflora of horses and may help to reduce the incidence of digestive troubles
- The modifications we observed in the stomach are in accordance with the updated definition of scFOS which was extented to the gastro-intestinal tract

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