Absorption of volatile fatty acids after intake of a maltitol-rich diet in the non-anaesthetized pig. A Rérat, P Vaissade, P Vaugelade, A Giusi-Périer *(INRA, Station de Physiologie de la Nutrition, 78352, Jouy-en-Josas Cedex, France)*

Introduction

In a former experiment (Rérat *et al*, 1987) it was shown that maltitol (4-α-D, glucopyranosyl-D sorbitol) infused into the pig duodenum was well hydrolysed in the small intestine, but the sorbitol moiety was poorly absorbed. Large amounts of unabsorbed sorbitol residues may thus reach the hindgut, in which they are liable to be at the origin of various microbial metabolites. A new experiment was designed to determine the amount and composition of the volatile fatty acid (VFA) mixture appearing in the portal blood following the intake of semisynthetic well balanced diets, containing a high level (50%) of either maltose (S Nat) or maltitol (S Hyd) syrups. Five Large White castrated male pigs (MBW : 61.2 ± 1.7 kg) were fitted under anaesthesia with an electromagnetic flow probe around the portal vein and permanent cannulas in the portal vein and the carotid artery. Using this system, it was possible to study the quantitative appearance in the portal blood of nutrients and metabolites from the enzymatic and microbial hydrolyses in the fore -and hindgut. The 2 experimental diets (S Nat *vs* S Hyd) were fed to each animal (2 meals/d) in a sequential manner, *ie* one for 8–9 d after surgery, the other during the following 7 d, the diet sequence being reversed from one animal to the next. At the end of the feeding period of each diet, each animal was fasted for 18 h and given a last meal (800 g) of the diet to which it had been accustomed formerly. During a period of 12 h after that meal, blood samples were taken at short time-intervals (30–60 min) for glucose, sorbitol, VFA, D and L-lactic acids and amino nitrogen determinations, and portal blood flow was continuously recorded. The "absorption" coefficients (12 h) of glucose and amino nitrogen were not significantly different between the 2 diets. Sorbitol amount appearing within 12 h in the portal blood after S Hyd intake was 44 g ("absorption coefficient": 25%). The amounts of VFA appearing in the portal blood within 12 h were 2.7-fold greater ($P < 0.05$) after the maltitol-rich diet (S Hyd: 808 mmol) than after the maltose-rich diet (S Nat: 300 mmol), this difference being due to the increase in absorbed amounts of propionate (S Hyd 402 *vs* S Nat 56 mmol, $P < 0.05$) butyrate (S Hyd 63 *vs* S Nat 17 mmol, $P < 0.05$), isovalerate (S Hyd 17 *vs* S Nat 5 mmol, $P < 0.01$) and acetate (S Hyd 298 *vs* S Nat 219 mmol, NS). The amounts of D- and L-lactic acids were not different (S Nat: 25.3 g/12h; S Hyd: 33.2 g/12 h; NS), D-lactic acid representing only 5–6% of the total. The additional VFA amount appearing in the portal blood after maltitol intake represented less than one-third of the unabsorbed sorbitol.

Reference

Rérat A, Vaugelade P, Vaissade P (1987) *Bull Acad Nat Méd* 171, 183-187