

**Compared effects of the viscosity of three guar gums on plasma blood glucose, insulin and triglycerides in the pig.** C Leclère <sup>1</sup>, C Dubois <sup>2</sup>, M Champ <sup>1</sup>, D Lairon <sup>2</sup> (<sup>1</sup> INRA, LTAN, BP 527, 44026 Nantes Cedex 03; <sup>2</sup> INSERM U-130, 18, Avenue Mozart, 13009 Marseille, France)

Dietary fibres are known to act favourably on some physiological responses. Mechanisms involved in these effects are not completely understood. In the case of soluble fibres, viscosity seems to be the main property responsible for the decrease in postprandial plasma glucose and insulin levels (Jenkins *et al*, 1978; Edwards *et al*, 1987). The present study was undertaken to determine the influence of 3 galactomannans with differing viscosities on blood glucose, insulin and triglyceride levels. These results were compared with those of an *in vitro*  $\alpha$ -amylolysis test. Four Large-White pigs were fed a fibre-free diet (FF) which simulated human food. Six percent guar gum of low ( $G_6$ ), medium ( $G_3$ ) or high ( $G_1$ ) viscosity was added to the FF diet. Pigs were previously equipped with a catheter in order to collect peripheral blood. Postprandial glucose and triglyceride levels were estimated enzymatically for 4.5 and 6.5 h respectively. Insulin concentration was determined by radioimmunoassay.

The FF diet postprandial glucose peak appeared to be significantly different only with  $G_1$

( $P < 0.05$ ), whereas after the first 45 min, the blood glucose responses were similar for all diets. The addition of guar gums to the diets decreased postprandial insulinemia. This effect increased with the viscosity of the fibre added. Thus,  $G_1$  and  $G_3$  insulin postprandial peaks were significantly lower than the FF peak ( $P < 0.05$ ), while at the same time  $G_6$  decreased insulin level but not significantly. As a consequence, the next plasma insulin drop-off decreased with high viscosity guar gum. The area under the insulin postprandial curve was significantly reduced by  $G_1$  compared to FF and  $G_6$  diets but not with the  $G_3$  diet. These results were well correlated with the *in vitro* amylolysis results. Postprandial triglyceridemia was not affected in the presence of the low viscosity guar gum, but was significantly decreased by adding the medium and high viscosity gums to the diet. In conclusion, increasing viscosity of guar gums reduced the amplitude of variation in the parameters studied, particularly in the case of insulin. Metabolic effects of guar gums were related to their viscosity. In this case, the delay induced in starch degradation may be the result of modifications in gastric emptying or starch hydrolysis by the endogenous  $\alpha$ -amylases.

#### References

- Jenkins DJA *et al* (1978) *Br Med J* 1, 1392-1394  
Edwards CA *et al* (1987) *Am J Clin Nutr* 46, 72-77