

Long-term exposure to a high concentration sucrose solution reduces weight gain and changes the preference and appetite for sweet to protein solutions in piglets

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There is a general concern about the negative impact of a long-term consumption of caloric drinks in kids. Adult rats become obese when they are exposed to a concentrate sucrose solution as a supplement to their diet⁽¹⁾. However, it may differ when the animal is still growing. Growing pigs were used in the present study as a model for humans due to anatomical and functional features⁽²⁾, as well as their innate sweet preference and growth potential. The aim was to assess the effect of a long-term sucrose solution exposure on the body weight gain and on the preference and appetite of piglets for sweet over protein solutions.

A total of 36 post-weaned piglets (42 days old) were distributed according to body weight (BW) into 12 pens (3 piglets/pen) and fed with a commercial weaning diet. The preference of piglets for protein (animal plasma 20 g/l) or sweet (sucrose 20 g/l) solutions was assessed by using a choice test before (initial, day 14 post-weaning) and after (final, day 26 post-weaning) an *ad libitum* supply of water (control) or 160 g/l sucrose solution for 12 consecutive days. A one-bottle test was performed thereafter by offering the same protein/sweet solutions on alternate days as a measure of their appetite. Pig performance and solution intake were also monitored. Data was analyzed with ANOVA, and preference values were compared to the neutral value of 50% by using a Student's *t*-test.

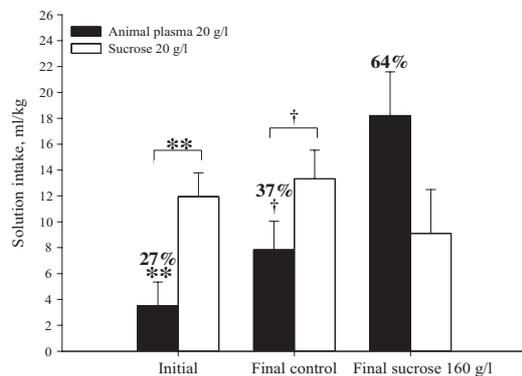


Figure 1. Choice test.

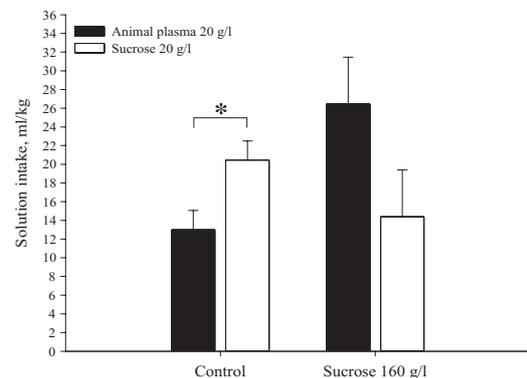


Figure 2. One-bottle test.

Piglets innately had a higher 20 g/l sucrose intake (claspers, † $P < 0.1$, ** $P < 0.01$, Figure 1) and preferred (numbers on top of the bars, † $P < 0.1$, ** $P < 0.01$) sucrose solution in the initial choice test. A higher ($P < 0.05$) 160 g/l sucrose solution intake (1292 ml/day) in comparison with water intake (762 ml/day) was observed during the exposure period. Low feed intake and weight gain ($P < 0.01$) were observed for piglets with access to sucrose (202 g BW gain/day) than control piglets (325 g BW gain/day). After solution exposure, sweet over protein preference was maintained in control piglets, and a higher appetite ($P < 0.05$, Figure 2) for the sweet solution was observed in these animals. On the other hand, piglets with access to 160 g/l sucrose showed a preference for the protein solution (64%; $P = 0.21$) and a clear reduction on the appetite for sweet solution ($P = 0.12$). These results show that a long-term exposure to a high concentration sucrose solution depress feed intake and growth rate and also increase the desire for protein in weaning piglets.

1. Ackroff K & Sclafani A (1988) *Physiol Behav* 44, 181–187.
2. Roura E, Humphrey B, Klasing K *et al.* (2011) *Flavour Fragr J* 26, 282–285.