**Effect of inulin supplementation in the** **lactation period on the performance of piglets**

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**Introduction**

Weaning is a stressful period for piglets that increases the risks of infection, negatively affecting zootechnical performances. Dietary strategies can strengthen intestinal health and hence decrease the use of antibiotics, but they are usually focused on the period from weaning onwards. Another strategy, gaining more and more attention, is the modulation of the digestive tract and the colonization of the microbiota in the pre-weaning period . Inulin has been applied in pig nutrition during the post-weaning period to improve health status and performances through modulation of the intestinal microbiota ecology (Mair et al., 2010), which selectively stimulates beneficial *Bifidobacteria* and *Lactobacilli* in piglet (Oli et al. 1998), and increasing concentrations of short-chain fatty acid (SCFA) when it is fermented by microorganisms in the large intestine (Gibson et al. 2004). In the current study, the aim was to determine the effects of different concentrations of inulin ingestion from the first postnatal day until weaning on the growth performance, and to evaluate if these effects continue in the post-weaning period.

**Material and methods**

The experiment was run in the pre-weaning phase at the Walloon Agricultural Research Center (Gembloux, Belgium), and in the post-weaning phase, piglets were reared in the facilities of Gembloux Agro-Bio Tech (Gembloux, Belgium) (Ethical protocol 1640). Seventy two new-born piglets (Large White×Piétrain, birth weight:1.30±0.014 kg) originating from 12 litters with 6 piglets per litter (3 males and 3 females) were included in this study. Litters were randomly assigned to 1 of 3 dietary treatments (i) Control solution (distilled water; CON), (ii) 20% inulin solution (20% IN) , (iii) 30% inulin solution (30% IN) . The solution was administered by oral ingestion: 2.5 ml per day during the 1st week, 5 ml per day during the 2nd week, 7.5 ml per day during the 3rd week and 10 ml per day during the 4th week. From d14 onwards, creep feed devoid of inulin was provided. Forty-eight piglets were weaned on d28 and were housed in pairs (1 male and 1 female siblings per pen) into 24 pens. A weaning diet without inulin was provided which was formulated to meet or exceed the NRC(2012) recommendations for growth. Feed and water were consumed *ad libitum* throughout the whole experimental period. No antibiotics were given to the sows or piglets in this study. The individual piglet body weight (BW) and feed intake per pen were recorded weekly. On d28, two piglets per litter and on d49, 1 piglet per pen (8 piglets per treatment, with an equal amount per gender)were euthanized by isoflurane and exsanguination. The pH of the digesta in the cecum and colon was determined as an indicator of intestinal fermentation. All data were subjected to analysis of variance using IBM procedures of SPSS software, and significant differences among treatment means were determined by Duncan’s multiple range test.

**Results and discussion**

From 2nd week, BW of piglets from the 20% IN group was significantly higher than that of piglets from the CON and 30% IN group (P<0.05), while the 30% IN group did never differ from the CON group. This dose-dependent effect was unexpected especially as most studies show no impact on BW (Tako et al. 2008; Barszcz et al. 2016).The improved growth might be related to the early administration of inulin. No difference on feed intake was observed during the post-weaning period (data not shown).

****At weaning (d28), no effect of the treatment was observed on the pH in the cecum or colon. On d49, however, a significantly lower pH was noted in the colon of both the 20% IN and the 30% IN groups compared to the CON group. It remains to be investigated if the inulin treatment in the lactation period modulated the microbiota composition, modifying the short chain fatty acid production, resulting in an altered colonic pH on d49. The effect on the intestinal health is another focus of future analyses.

**a**

 

**c**

**b**

**Figure 1**: Effect of inulin on body weight (means ± SEM, n=20-24) from 0 to 7 weeks of age (a) and on the pH value (means± SEM, n=8) of intestinal contents in piglets of 28 days (b) and 49 days (c) of age.

Means indicated with\* or with a different superscript letter are significantly different (P< 0.05).

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