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Effects of pre- and postnatal exposure to garlic and aniseed flavour on pre- and postweaning feed intake in pigs☆

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Abstract

The low nutrient intake shortly after weaning is a major cause of post-weaning problems. Feed intake after weaning is strongly related to feed intake during lactation. Feed intake during lactation, however, varies considerably between litters. We hypothesised that prenatal and postnatal exposure to certain flavours would increase the intake of feed containing the same flavours pre- and postweaning. Multiparous sows did ($n=17$) or did not ($n=14$) receive 50 g garlic granulate/powder and 25 g aniseed as daily additive to their diet during the last month of gestation and during lactation. From day 14 of lactation, litters were submitted to intermittent suckling: 12 h separation form the sow each day. During lactation, all litters had 40 g garlic and 20 g aniseed per kg added to their creep feed. After weaning, half of the litters had no additive in their diet. Piglets were weaned at 4 weeks (13 litters) or at 6 weeks (18 litters). At 6 weeks of lactation, litters of which the dam received the flavour in her diet, had a higher feed intake (309±43 vs 233±35 g/p/d) than litters of dams without the flavour, although the difference was not significant. Sow diet had no effect on postweaning feed intake, but postweaning piglet diet did. Late (week 6) weaned litters receiving the flavoured feed had a higher feed intake from 3 to 10 days after weaning (833±38 vs 687±58 g/p/d). Weight gain during the first 10 days after weaning was not affected by sow or pig diets. Feed intake and weight gain shortly after weaning were strongly related to feed intake during lactation (overall $R=0.64$, $P<0.05$ and $R=0.77$, $P<0.05$). We conclude that early experience with flavours increases later acceptance and improves adaptation to post weaning conditions.

Keywords: Weaning; Feed intake; Flavour; Preference

1. Introduction

Piglets that are weaned at 3 to 4 weeks of age are insufficiently accustomed to the intake of solid feed. Weaning therefore results in a critical period of underfeeding; some piglets refrain from eating for over 50 h (Bruininx et al., 2002). The low nutrient intake during the first days after weaning is a major contribution to the impaired intestinal function and integrity generally observed after weaning (McCracken et al., 1995; Spreeuwenberg et al., 2001). A higher intake of creep feed during lactation is related to a higher feed intake and growth after weaning (Bruininx et al., 2002; Kuller et al., 2004). Feed intake pre- and postweaning might be stimulated by offering a diet that contains flavours that piglets are acquainted with. In

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other species exposure to certain flavours prenatally (Hepper, 1988; Mennella et al., 2001), or during lactation (Bilko et al., 1994; Mennella et al., 2001), enhances the acceptance of these flavours in later life. We hypothesised that exposure to flavours during late gestation and during lactation, would increase the intake of feed containing the same flavours during lactation and after weaning.

2. Materials and methods

2.1. Animals and housing

The experiment was conducted at the research facility of Wageningen University, The Netherlands. The Animal Care and Use Committee of Wageningen University approved the experiment. Thirty-one multiparous York × Dutch Landrace sows (parity three to nine) and their litters were used. During gestation, sows were individually housed in large pens (2.15 m × 2.25 m), and a few days before the expected day of farrowing, sows were placed in farrowing crates (2.15 m × 1.00 m) within their pen. Farrowing pens were provided with wood shavings and had floor heating. Lights were on between 0800 and 2000.

The sows farrowed in five batches. Litter size was standardized within 2 days after farrowing by cross fostering within each batch and within treatment, resulting in an average litter size of 12.1 ± 0.3 piglets. Within 3 days of farrowing, the piglets received an intramuscular iron injection (Prevan 200, Eurovet Animal Health, Bladel, The Netherlands). Males were not castrated. In every batch, day 0 was designated as the day on which most litters were born. Litters were born from 5 days before to 1 day (0.6 day on average) after day 0.

All piglets were offered a creep feed ad libitum from day 7 of lactation until 10 days after weaning, containing 11.44 MJ NE/kg, 178 g/kg CP, and 19% (as-fed) milk products (Speen Select, Rijnvallei, The Netherlands). Piglets had ad libitum access to drinking water. Sows were fed an increasing amount of feed after farrowing until reaching the maximal allowance (at d 11) of 1% body weight + 0.5 kg per piglet.

2.2. Treatments

Starting at day 14 sows and piglets were subjected to an intermittent suckling regime (IS): sows and piglets were separated from 0800 to 2000 every day. During separation, sows were moved to a unit where auditory contact with the piglets was not possible. The IS regime is meant to stimulate the motivation of piglets to forage during lactation. The IS regime is also designed to induce oestrus and mate sows during lactation, so that the time of weaning can be postponed. Sows that did not show heat spontaneously were treated with PG600 at day 28 to induce oestrus, and showed heat around d 35. Both groups of sows (spontaneous and PG600) were weaned 1 week after oestrus. This resulted in litters being weaned at 4 weeks of lactation (13 litters), or at 6 weeks of lactation (18 litters).

During gestation, sows were assigned to one of two treatments according to body weight and parity. Sows in the ADD treatment ($n = 17$) received a feed additive on a daily basis during the last month of gestation and during entire lactation. The additive consisted of 25 g garlic powder, 25 g garlic granulate, and 25 g aniseeds. The additive was distributed over the feed and manually mixed with the pellets. Sows in the NOADD treatment ($n = 14$) received the regular diet without the additive. During lactation, creep feed of all litters was supplemented with 20 g garlic powder, 20 g garlic granulate, and 20 g aniseeds per kg. After weaning, litters were not mixed and 50% of the litters received the same supplement as before weaning whereas the other litters did not receive the supplement. Litters from ADD and NOADD sows were distributed equally over the post-weaning treatments.

2.3. Measurements

Piglets were weighed at birth and subsequently every week of lactation, at weaning, 3 days and 10 days after weaning. Creep feed refusals were weighed on the same days to estimate feed intake per litter. Feed intake and

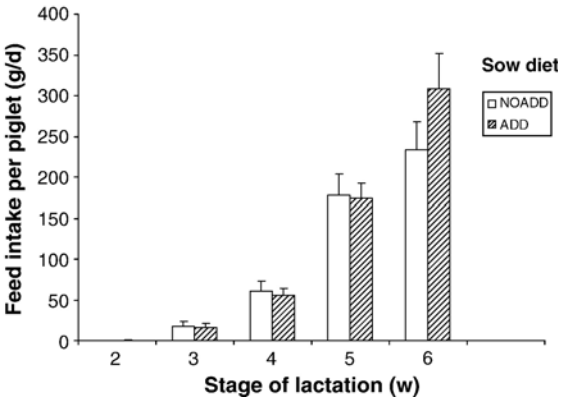

Fig. 1. Effect of garlic/aniseed addition to sow diet (NOADD vs ADD) on feed intake of piglets during different weeks of lactation. Of the 31 litters at the start of lactation, 13 were weaned after week 4 of lactation.