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Animal Reproduction Science 91 (2006) 353–358

ANIMAL REPRODUCTION SCIENCE

www.elsevier.com/locate/anireprosci

Short communication

Supplementation of dextrose to the diet during the weaning to estrus interval affects subsequent variation in within-litter piglet birth weight

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Received 5 November 2004; received in revised form 15 March 2005; accepted 18 April 2005
Available online 20 June 2005

Abstract

Effects of supplementation of dextrose to the diet of sows during the weaning-to-estrus interval (WEI) on subsequent litter size and within-litter variation were investigated. After weaning, 223 sows (first to fifth parity) were fed 3.5 kg/d. Half of the sows additionally received 150 g of dextrose per day as topdressing on the feed. WEI and estrus duration were determined as well as subsequent pregnancy rate and litter size. Piglets were weighed individually at birth and at weaning (day 26.4; S.D.: 2.5). Supplementation of dextrose to the diet during the WEI did not affect WEI (106 h), pregnancy rate (88.2%), farrowing rate (84.2%), subsequent litter size (total born: 13.70), or birth weight (1599 g). The within-litter variation in birth weight was lower in sows on the dextrose treatment (CV: 17.5% versus 21.2% for the dextrose and control group, respectively, $P = 0.03$). From this experiment, we concluded that addition of dextrose during the weaning to estrus interval did not increase litter size, but seems to affect the uniformity in birth weight of the litter.

Keywords: Birth weight; Dextrose; Sows; Within-litter variation

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doi:10.1016/j.anireprosci.2005.04.009

1. Introduction

Van den Brand et al. (2001a) demonstrated in primiparous sows a higher percentage of sows coming into estrus within 9 days after weaning when they were fed a starch and dextrose-rich diet during the weaning to estrus interval (WEI) than after feeding a fat-rich diet. Pregnancy rate after insemination was also higher in sows fed the starch and dextrose-rich diet (100% versus 83%). Because the diets were only fed during the follicular phase, it can be suggested that the carbohydrate-rich diet stimulates the follicle quality or oocyte quality, may be due to the higher plasma insulin (Van den Brand et al., 1998, 2000; Ziecik et al., 2002) or IGF-1 levels (Van den Brand et al., 2001b). At the other hand, it can also be suggested that fat-rich diets depress follicle quality or oocyte quality. Van den Brand et al. (2000) also found larger follicle diameters in sows fed an insulin-stimulating diet during and after lactation. The latter results were, although not significantly, confirmed by Ziecik et al. (2002).

Whether dietary manipulation can affect within-sow variation of follicle size or embryo size is unclear. Xie et al. (1990) demonstrated that later-maturing oocytes subsequently became the less-developed embryos, suggesting that follicle or oocyte development is reflected in embryo development. Van der Lende et al. (1990) demonstrated that within-litter variation in embryo weight on day 35 of pregnancy largely represent within-litter variation in piglet birth weight.

Based on the results mentioned above the question remained whether starch and/or dextrose-rich diets, fed during the follicular phase, can affect within-litter variation at birth. The aim of the experiment was to investigate whether addition of dextrose during the WEI affect subsequent estrus and litter characteristics, with emphasis on within-litter variation.

2. Materials and methods

2.1. Animals and treatments

On a commercial farm 223 first–fifth parity sows (Yorkshire × Dutch Landrace) were used (January till August 2003). In the farrowing stable sows were divided by parity (parity 1 or parity 2–5), and within each parity randomly assigned to one of two nutritional treatments post-weaning. On the morning of weaning sows were not fed. Thereafter, all sows were fed 3.5 kg/d of a sow feed containing 9.4 MJ NE/kg, 156 g/kg CP, 6.8 g/kg digestible lysine. Fifty percent of the sows additionally received 150 g dextrose per day (two times 75 g) as a topdressing on the feed. Dextrose was used instead of other sugars, because dextrose consists of two glucose molecules that are immediately available for metabolism. Other sugars first need to be converted into glucose. Furthermore, in a previous experiment (Van den Brand et al., 1998), it was demonstrated that dextrose had a more pronounced effect on plasma glucose and insulin concentrations than when only starch was fed. The level of dextrose used was based on Van den Brand et al. (2001a). Sows were fed individually. The dextrose was fed until the end of estrus. During the WEI, sows had limited access to water (two times a day 1 h). During pregnancy, sows were fed a commercial feed (9.1 MJ NE/kg,