

INFLUENCE OF FEEDING LEVEL ON FSH AND LH SECRETION PATTERNS DURING LACTATION ON THE DEVELOPMENT OF THE UTERUS AND FOLLICLES AFTER WEANING IN SOWS

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Introduction

Numerous papers in the literature confirm the influence of nutrition on features of reproduction in pigs. Lactation is a very sensitive time in the reproductive cycle. During this period the uterus and ovaries have to regenerate. This process requires about 3 weeks. A few exogenous influences stimulate regeneration of the reproductive organs, others delay the process. A short regeneration period without disturbances promotes short weaning to oestrus intervals. Follicular development is the main prerequisite for ensuring the onset of oestrus in weaned sows.

The objective of the experiment was to investigate the natural response at various times after weaning result from different nutrition involving various energy intake levels over a 3 week lactation period.

Material and Methods

- 14 primiparous sows were included in two experiments and divided into two groups. The difference between the two was the feed ration:
- Group 1: 8 sows were given an ad libitum ration with an energy concentration of 14.6 MJ/kg dry matter
- Group 2: 6 sows were fed a ration set at 70 % of the feed level of the AL-sows
- In RE-sows, the feed ration was calculated using the mean feed intake of the AL-sows on the previous day. The duration of lactation was 21 days generally.
- Insertion of an intravenous catheter occurred on day 6/7 post partum (PP)
- Sampling of blood on days 12, 15 and 18 pp. every 15 minutes starting at 7.00 am for 11 hours
- Analyses for FSH and LH by RIA
- Daily ultrasonography of the ovaries between day 8 and 20/21 pp on a few animals per group; to monitor follicular growth 5 sows were slaughtered at 24 hours and 9 sows were slaughtered 7 days after weaning.
- Uterine and follicular development was registered at these times.
- All sows were slaughtered either 24 hours or 7 days after weaning
- After slaughter, the genital organs (ovaries and uterus) were removed from the carcass. The ovaries, follicles and uteri were examined

Results

The mean daily feed intake during lactation was 3.9 kg in AL- and 2.7 kg in RE-sows.

The rearing performance of ad libitum fed sows was significantly higher than that of restricted fed sows.

In comparison to the ad libitum ration, the development of the uterus and ovaries in weaned sows was delayed by the restricted nutrition. The following results were observed:

- Sows fed ad libitum: uterine weight was 399 g 24 hours after weaning, 7 days after weaning it was 478 g.
- Sows with restricted feeding: uterine weight was 335 g 24 hours after weaning and 7 days after weaning it was 392 g.

In sows following ad libitum feeding the weight of both ovaries was higher than in sows that only received the restricted feed. Follicular growth on the ovaries was also reduced by restricted feeding.

The following results could be observed. The diameter of the follicles in lactating AL-sows had increased. The correlation was $r = 0.83$. The diameter of the follicles in lactating RE-sows had decreased. The correlation was $r = -0.42$.

Conclusion

AL-sows: 24 hours after weaning numerous follicles with a 3-5 mm diameter were registered in all sows. 7 days after weaning the average ovulation rate was 15.4 follicles. In 4 of 5 sows ovulation was complete.

RE-sows: 24 hours after weaning only small follicles could be registered (diameter 1 - 2 mm) in all sows. 7 days after weaning the average ovulation rate was 13.8 follicles. During this time ovulation was also completed in all sows, but mostly only a short time previously

The results show that in sows with a short lactation period energy intake is very important for the development of uterine and follicular growth.

The effects on endocrinology FSH concentrations were similar in AL- and RE-sows on day 12 pp but higher in AL-sows on days 15 and 18 pp. The difference is significant. The variance in FSH secretion patterns.

A clear effect of nutrition level during lactation on FSH-secretion patterns can be seen here.

On day 15 pp the FSH secretion patterns were almost concurring in AL- and RE-sows. A differentiation began on day 15 pp. On day 18 there was a difference between the animals of both groups. With the progression of lactation an increased activity of the pituitary and a subsequent increase in the FSH concentration can be observed in the blood.

LH concentrations were significantly higher in AL- than RE-sows at all three bleeding intervalls. This applies to mean LH, Basal-LH number of pulses and LH pulse magnitude.

The variance in FSH secretion patterns can be observed.

In comparison to FSH the effect of nutrition level during lactation on LH is not so high. The mean concentration of LH is between 1.5 to 2.0 ng/ml. The difference is not significant.

- Generally high nutritional intakes during lactation influenced features of reproduction positively.
- AL-sows achieved a significantly higher rearing performance than RE-sows.
- Development of the uterus and ovaries after weaning was delayed by restricted nutrition.
- The results demonstrate that lactating primiparous sows fed ad libitum had both higher LH and FSH concentrations during lactation than sows fed a restricted diet. An association to simultaneously observed differences in follicular growth is assumed.