



Comparative Study Regarding The Growth Hormone (GH) and Adrenocorticotrophic Hormone (ACTH) Effects on Milk Production in Sows

KEYWORDS

GH, ACTH, milk production, sows, piglets

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ABSTRACT In this study were performed investigations about the GH and ACTH implications in initiation and development of milk production in sows, and its relation with the milk production. In order to emphasize the impact of the GH and the ACTH on the involved tissues in lactopoiesis, we have chosen to evaluate the effects of Norditropin (containing GH) and Cortrosyn (containing ACTH) in sows. Were performed experimental investigations of GH through serially administration in sows, from 10 days and 3th day before farrowing and 4 days and 10 days after farrowing and ACTH, through serially administration, beginning with the first day after farrowing to 2 week after farrowing. Milk production was monitored through the piglets weight. After the treatment with Norditropin and Cortrosyn, the average weight of the piglets raised in comparison with the control group and also regarding the milk production, it was recorded a constant elevation of the main milk constitutions, especially of the lactose.

INTRODUCTION

Experimental studies from this paper, try to highlight the implications of GH (Norditropin) and ACTH (Cortrosyn) on the secretory function of the mammary gland in sow (Dojana, 2013).

In accordance with the general anabolic role of GH and the implications of ACTH in various metabolic processes, and also the implications of these hormones in maintaining and stimulating the milk production in other species (Chilliard 1988), the results of this study try also to highlight the effects on the synthesis of the main milk constituents - carbohydrates, lipids and proteins.

Evaluation of the Norditropin and Cortrosyn effects on milk production in sows was done by establishing the weighted gain (individual and group) in piglets from sows, from the two experimental groups.

MATERIALS AND METHODS

The investigations were performed on 25 sows, forming three groups: G1 – control group (5 sows), G2 - consisting of ten sows receiving Norditropin; G3 group - consisting of ten sows receiving Cortrosyn.

Sows from the two experimental groups were selected so, that all calved on the same day and all have the same number of births. In previous calving, the sows from the experimental groups (G2 and G3), were farrowed the same number of piglets.

In order to study the hormonal effects on the quantitative and qualitative expression of the mammary gland function, Norditropin was administered intramuscularly in dose of 0.04 IU/kg, 10 and 3 days before farrowing, and then the 4th and the 10th day after birth.

Cortrosyn was administered intramuscularly in dose of 1 mg, every other day, from the first day after farrowing, until day 15 of lactation (Nueleanu, 2008).

On the day of birth, each piglet was weighed separately and after, was calculated the weight of each group at farrow. Piglets from experimental groups were weighed on days 3, 7, 14, and 21 after birth, and then calculating, finally, the group weight at weaning and average daily gain/piglet. At 21 days after birth, all piglets were weaned.

Also, for this purpose have been performed investigations

regarding the correlation of the main constituents of milk, after GH and ACTH administration. The milk samples were taken at 14 days after calving.

The results were statistically processed, obtaining the average and the standard error of the average ($X \pm Sx$). For statistical signification assignment, the differences between groups were compared through Student Test.

RESULTS

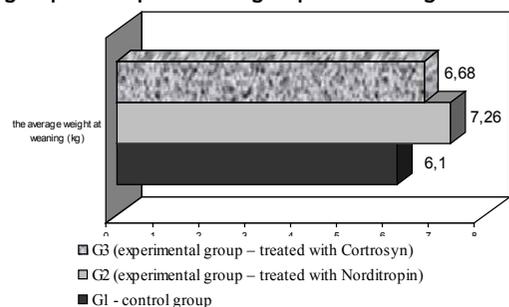
The milk production in sows from the experimental groups was monitored (after the treatment with Norditropin and Cortrosyn), through the piglets weight.

After weighing all the piglets from the two experimental groups and from the control batch, and by calculating the average weight in piglets groups at farrow and at weaning and the average daily gain/piglet, are found some changes which are listed below (Codreanu, 2001).

Analyzing primary data, presented in Figure 1, shows that the average weight of piglets at weaning, derived from group of sows treated with Norditropin (group G2), recorded a highly significantly average (7.26 kg) than that of piglets derived from control group sows (6,1 kg).

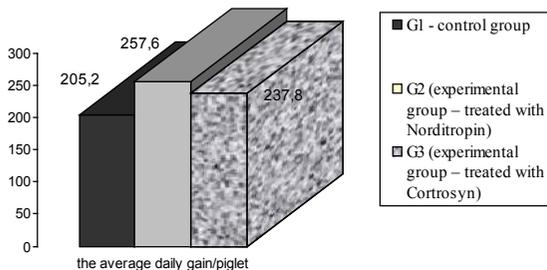
The average weight of piglets derived from sows group treated with Cortrosyn, (6.68 kg) is slightly lower than the group G2 (Norditropin group), but significantly higher statistically ($P < 0.05$) compared to control group (6,1 kg). Indirect determination of GH and ACTH effect on the milk secretion (by following the dynamics of body weight piglets) in sows, is expressed in Figure 1.

Figure 1. The average weight in piglets from control group and experimental groups at weaning



The average daily gain of piglets derived from sows treated with Norditropin (Fig. 2) was 257.6 g/day, and 237.8 g/day for those derived from sows treated with Cortrosyn. In both cases, there is a significant increase ($P<0.05$) in average daily gain of piglets from the experimental groups compared with those from the control group (Hausmann, 2000).

Figure 2. The average of the daily gain/piglet, from control group and experimental groups



By analyzing the results obtained after the determination of the main milk constituents in sows from experimental groups, were recorded differences, obviously consistent in comparison with the results obtained in other studies (Chilliard, 1988, Etherton, 1998).

Thus, the GH and ACTH effects on the synthesis of the main milk constituents (lactose, lipids, proteins), it was found that these hormones, are inducing a marked and constant increasing of the major constituent of milk, in particular lactose (Table 1). Also the results presented in Table 1, showed that in the milk of sows treated with Norditropin, was a highly significant increase of lactose ($P<0.01$) in comparison with the control group (6.83 g/100 g milk). Also, a significant increasing ($P<0.05$) in milk lactose compared with values obtained in the control group, was registered in the case of sows treated with Cortrosyn (5.64 g/100 g milk).

Table 1. The average values of the main milk constituents in sows from the experimental and control groups

Specification	Lactose (%)	Lipids (%)	Protein (%)
G1 (Control group)	4.74±1.2	8.20±1.6	5.72±1.4
G2 (Experimental group – treated with Norditropin)	6.83***±1.5	9.26**±1.8	6.26**±1.5
G3 (Experimental group – treated with Cortrosyn)	5.64**±1.4	8.88*±1.7	6.16*±1.4

* $P>0,05$ – insignificant differences, ** $P<0,05$ - significant differences, *** $P<0,01$ - highly significant differences

Increasing in average values of milk lipids, were recorded in both experimental groups, obtaining an average value/group of 9.26 g lipids /100 g milk in sows treated with Norditropin ($P<0.05$) and an average value/group of 8.88 g lipids /100 g milk ($P>0.05$) in Cortrosyn case, in comparison with the control group (8.20 g lipids /100 g milk).

CONCLUSIONS

The main purpose of this study was to investigate the GH and ACTH effects on milk production (indirectly by establishing the weighted gain in piglets) and on milk composition.

The average weight at weaning in piglets that from sows treated with Norditropin, was highly significant ($P>0.01$) compared to the average body weight in piglets from the control group and significantly higher ($P>0.05$) to those from sows treated with Cortrosyn.

The milk production in sows treated with Norditropin and Cortrosyn is by this way indirectly determined, observing an increase of the daily gain in all piglets from those sows. The average daily gain in piglets from the two experimental groups, was significantly higher ($P<0.05$) in both groups, compared with average daily gain recorded in piglets from the control group.

The comparative analyzing of the obtained results, reveals that the lactose, lipids and protein mean values of the milk from treated sows with GH, registered a significant increase ($P<0.05$) of the investigated milk parameters, changes with higher significance ($P<0.01$) in case of lactose. Cortrosyn treatment induced an obvious and constant increase of the main milk constituents, with statistic significance in case of lactose ($P<0.05$) and insignificant in case of lipids and protein.

Comparing the results of treatment with GH (Norditropin) and ACTH (Cortrosyn) in lactating sows, it can be concluded that the GH administration induce an obvious increasing of the average body weight at weaning in piglet and of the daily gain/piglet, compared with piglets from sows treated with ACTH.

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