

EXPERIMENT ON β -CAROTENE EFFECT ON SOW FERTILITY

Maria N. Kleisiari - Marcel Paraschivescu

AGRONOMICAL SCIENCES AND VETERINARY MEDICINE UNIVERSITY BUCHAREST

Introduction

In order to see if β -carotene, in any form, influences sow fertility, the present experiment was carried out. The experiment hypothesis considered that consistent doses of β -carotene added to the diets containing recommended doses of vitamin A can increase sow fertility if the pigment is transformed into vitamin A or acts by itself in this direction.

Material and methods

To have as high as possible homogeneity in the experimental and control groups, sows of the same breed (Large White) and with only one former farrow were used. Also in the experiment were included sows giving birth to an equal number of piglets, the latter being similar to the herd average. One group of sows was formed out of 30 heads to have a better accuracy of the statistical data.

The sows received 4 kg of feed per day containing 30000 IU of vitamin A per kg of feed. After weaning the sows were fed 2,5 kg of feed per day containing 7500 IU vitamin A per kg of feed. Thus the sows in control group received per head and per day 40000 IU vitamin A when lactating and 38 750 IU after weaning. The first experimental group received the same diet and the same amount of feed as the control group. In addition the sows of this group received 400 mg of β -carotene per day 5 days before weaning and 30 days after. The second experimental group was submitted to the same treatment but in addition the sows of this group received 200 mg β -carotene daily for the other 38 next days. All the sows were fed individually along all the experiment in order to control the quantity of the ingested feed and β -carotene. On the day of weaning the sows were not fed. Restrictions concerning the age and the prolificacy of sows made necessary to form the groups step. The first phenomenon registered in the experiment was coming in heat after estrus. First heat after weaning appeared within 6-7 days. However we have to notice a high variation. It was necessary to have 9 extractions of sows till the experimental and the control groups were formed. Six (6) sows were excluded or lost during the experiment.

Some sows were not detected in heat at the first cycle. Adding β -carotene in the diet didn't help estrus to appear. If we deduce 6.4 days, the mean interval for estrus appearance of the first cycle from 25.7 days, the mean interval for estrus appearance of the second cycle, we obtain 39.3 days, a close value to the mean length of estrus cycle in swine (23 days). Since 300% of sows exhibited heat in the first 35 days after weaning, feeding is not involved in delayed mating. In case we accept that feeble heat intensity caused the delayed mating, it is very clear that β -carotene didn't help heat intensity.

The conception rate (pregnant sows) after the first mating including both estrus cycles, but no return in heat sows, is very high. We may say the vitamin A content of the diet used in control group feeding is satisfactory for a good fertilization of sows. Data concerning prolificacy are presented and statistically analyzed in table 3. As it can be seen in the table, β -carotene supplement didn't influence the sow prolificacy or sows can't use it, as vitamin A precursor. At the same time the coefficient of variation was rather high in all three groups of sows denoting the presence of some uncontrolled factors action. The number of live born piglets after the first mating of sows is presented in table 2.

Conclusion

Under our experimental conditions, neither short term nor long term β -carotene administration had effect in improving litter size of sows or variability of the piglets born. At the end of this experiment it is seen that no reproduction index was significantly modified. And the second conclusion is that pigs, seem to be unable to transform β -carotene into vitamin A.

References

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Table 3. - Prolificacy at the first mating after weaning in experimental and control groups

Statistics	Groups in experiment			Total sows
	3 st	2 nd	Control	
Number of sows (n)	29	28	26	83
Total number of born piglets (Σx)	338	323	302	963
Mean number of born piglets (\bar{x})	33.66	33.46	33.62	33.58
Difference of means Significance of differences	$\bar{x}_3 - \bar{x}_c = 0.04$ $t = 0.05$ no significance	$\bar{x}_2 - \bar{x}_c = -0.32$ $t = 0.16$ no significance		

Table 2. - Number of live born piglets after the first mating of sows in experiment

Statistics	Groups in experiment			Total sows
	3 st	2 nd	Control	
Number of parturient sows (n)	29	28	26	83
Number of live piglets born (Σx)	305	286	272	863
Mean number of live piglets (\bar{x})	30.52	30.23	30.46	30.40
Differences of means Significance of differences	$\bar{x}_3 - \bar{x}_c = 0.06$ $t = 0.092$ no significance	$\bar{x}_2 - \bar{x}_c = -0.25$ $t = 0.397$ no significance		