

UDDER FORMATION EXPERIMENT

Kleisiari, M.

Agamemnonos 4, 40200 Elassona, Greece; E-mai: mdbouzoukis@yahoo.com

The aim of this experiment is to see if different protein level in feeding sows during pregnancy has any influence on their milk production capacity. In practice as an index of milk production capacity of sows is the weight of suckled lot of piglets at 21 days after parturition.

At farrowing, one group of sows that received a deficient diet (11% protein level) during all gestation period can be compared with smaller groups of sows that received corrected diet (13% protein level) for different terms before parturition. After parturition, all sows in the experiment received a correct diet (16% protein level). In this way it is possible to appreciate effects of different terms of a low and of the normal protein level during pregnancy on the mean of bodyweight of piglets at the age three weeks and on the suckling capacity of sows.

I decided to use the same recommended diet for both lots of sows in order to avoid influence of a new nutritional difference between the corrected and the uncorrected feeding. Normally, I used a correct diet to give the opportunity to the different feeding during pregnancy to show its effect in the best possible way. At the same time this movement could allow to the sows with uncorrected feeding to react to a good feeding during lactation since 21 days of a new diet is enough a long term to show its effect. According to this point of view, all sows receiving the same diet for the same length of time must react in the same way.

Suckling capacity is indicated by the weight of the litter at the age of 3 weeks. The number of suckling piglets could influence the milk production capacity of sows having in mind that a greater number of piglets stimulate producing milk by more frequent sucking. On the other hand the mean weight of piglets in the suckling lots helps, more or less, to understand how the number of piglets is buffered by their individual weight.

In table 1 the number of sows per groups of increasing length of corrected protein level feeding, each time ten days more, and their suckling capacity are presented. Data concerning the milk production of sows are preceded by data indicating the number of piglets in each group at 21 days of age and the medium weight of piglets at that time. These indices are presented because each of them can influence or express, in some limits, the milk production ability of sows. A larger number of piglets stimulate milk secretion by more frequent sucking. Heavier piglets is due to higher sucked milk. Litter total weight combines merits of both these two indices in one synthetic index giving the opportunity to estimate better the suckling capacity of sows.

Table 1. Sows suckling capacity related to the type of feeding during pregnancy

| Days of different feeding | Type of feeding | Mean number of sows in groups | Mean number of piglets in lots | Mean body weight of piglets | Mean suckling capacity of sows | Standard deviation of suckling capacity | V % |
|---------------------------|-----------------|-------------------------------|--------------------------------|-----------------------------|--------------------------------|---|------|
| 10 | C | 8 | 9.6 | 3.22 | 31.65 | 5.42 | 17.2 |
| | D | 8 | 9.4 | 3.29 | 30.96 | 6.78 | 21.9 |
| 20 | C | 6 | 10.5 | 3.19 | 33.50 | 6.89 | 20.6 |
| | D | 6 | 9.7 | 3.14 | 30.50 | 6.80 | 22.7 |
| 30 | C | 4 | 8,5 | 3.91 | 33.25 | 2.38 | 7.2 |
| | D | 4 | 9.2 | 2.91 | 26.75 | 5.00 | 18.7 |
| 40 | C | 3 | 7.7 | 4.38 | 33.75 | 3.82 | 11.3 |
| | D | 3 | 6.7 | 4.33 | 29.00 | 3.38 | 11.7 |
| 50 | C | 3 | 8.7 | 4,25 | 37.00 | 3.17 | 8.6 |
| | D | 3 | 9.3 | 3.50 | 32.60 | 3.36 | 10.3 |
| 60 | C | 8 | 11.9 | 3.41 | 40.60 | 4.56 | 11.2 |
| | D | 8 | 11.1 | 3.19 | 35.40 | 4.22 | 11.9 |
| 70 | C | 8 | 10.2 | 3.84 | 39.12 | 4.25 | 10.7 |
| | D | 8 | 10.0 | 3.26 | 32.63 | 6.09 | 18.7 |
| 80 | C | 8 | 10.1 | 4.11 | 41.50 | 3.16 | 7.6 |
| | D | 8 | 9.2 | 3.78 | 34.80 | 6.01 | 17.3 |
| 90 | C | 4 | 9.5 | 3.79 | 36.00 | 1.15 | 3.2 |
| | D | 4 | 9.1 | 3.24 | 29.50 | 3.51 | 11.9 |
| 100 | C | 5 | 7.8 | 4.81 | 37.50 | 3.83 | 10.2 |
| | D | 5 | 7.8 | 4.00 | 31.20 | 3.27 | 10.5 |

In this experiment, I used the same running as I have already mentioned in a previous experiment which mounted in a commercial reproduction pig farm where pregnant sows received an 11% level of protein diet. When the test started half of the pregnant sows received a corrected feed of 13% level of protein meanwhile the other half was fed further on the former diet. From this moment on, all sows that farrowed were fed on the same diet containing 16% of protein. Piglets were weighted 21 days after birth and the weight of the lot of suckling piglets was used as index for the milk production capacity of sows.

In order to judge how the protein level of diet during pregnancy acts on the udder formation for lactation the mean weight of piglet body weight were compared. Piglets were the progeny of two lots of sows with the same interval of time from the parturition and after in one of them feeding was corrected for protein content. Means were compared using the Student's "t" test.

Table 2. Significance of difference between suckling capacity of sows

| Different feeding days | Type of feeding during pregnancy | | | | | | Difference of means | D F | Calculated "t" | Tabulated "t" for 5% | Significance of difference. |
|------------------------|----------------------------------|-------------------|----------------|-----------------|-------------------|----------------|---------------------|-----|----------------|----------------------|-----------------------------|
| | Corrected (C) | | | Uncorrected (D) | | | | | | | |
| | No. of sows | Suckling capacity | s ² | No. of sows | Suckling capacity | s ² | | | | | |
| 10 | 8 | 31.6 | 29.4 | 8 | 31.0 | 46.0 | 0.65 | 14 | 0.01 | 2.14 | – |
| 20 | 6 | 33.5 | 47.5 | 6 | 30.5 | 46.3 | 3.00 | 10 | 0.69 | 2.23 | – |
| 30 | 4 | 33.2 | 5.7 | 4 | 26.8 | 25.0 | 6.50 | 6 | 2.03 | 2.45 | – |
| 40 | 3 | 33.8 | 14.6 | 3 | 29.0 | 11.4 | 4.80 | 4 | 1.33 | 3.91 | – |
| 50 | 3 | 37.0 | 10.0 | 3 | 32.6 | 11.3 | 4.40 | 4 | 1.35 | 3.91 | – |
| 60 | 8 | 40.6 | 20.8 | 8 | 35.4 | 17.8 | 5.20 | 14 | 2.22 | 2.14 | + |
| 70 | 8 | 39.1 | 18.1 | 8 | 32.6 | 37.1 | 6.50 | 14 | 2.31 | 2.14 | + |
| 80 | 8 | 41.5 | 10.0 | 8 | 34.8 | 36.1 | 6.70 | 14 | 2.67 | 2.14 | + |
| 90 | 4 | 36.0 | 1.3 | 4 | 29.5 | 12.3 | 6.50 | 6 | 3.05 | 2.45 | + |
| 100 | 5 | 37.5 | 14.7 | 5 | 31.2 | 10.7 | 6.30 | 8 | 2.59 | 2.31 | + |

The table, containing the Student's "t" test counting, shows that the content of protein in the pregnant sow diet has effect on the productivity of the lactating sows. Probably a lower than 13% of protein content in the diet of pregnant sows do not permit a good formation of mammal tissue for lactation. It is interesting to notice that the proliferation process of mammal tissue requires more time than the fetus body mass increase. The recommended 13% of protein in pregnant sow diet has to be given to sows 60 days before parturition whilst for a normal growth of fetuses 30 days of this diet before birth seems to be enough. If that is true, I should find a significant difference between the mean suckling capacity of sows fed on corrected diet for 10 days and the one of sows fed on corrected diet for 60 days. In this case Student's "t" test shows:

$$\sigma^2 = \frac{8 \times 29.4 + 8 \times 20.8}{8 + 8 - 2} = \frac{235.2 + 166.4}{14} = 26.69 \quad \sigma = \sqrt{26.69} = 5.166$$

$$\hat{\sigma} = 5.166 \times \sqrt{\frac{1}{8} + \frac{1}{8}} = 2.583 \quad t = \frac{9}{2.583} = 3.48$$

So the value of "t" for 14 degrees of freedom is higher than 2.145 the value of "t" which indicates a probably significant level of difference. Really this value exceeds the 1% level of probability for a significant difference.

This not the case of the difference between suckling capacity of sows fed on corrected diet for 10 days and for 50 days. In this case:

$$\sigma^2 = \frac{8 \times 29.4 + 3 \times 10.0}{8 + 3 - 2} = \frac{235.2 + 30.0}{9} = \frac{265.2}{9} = 29.47 \quad \sigma = \sqrt{29.47} = 5.43$$

$$\hat{\sigma} = 5.43 \times \sqrt{\frac{1}{8} + \frac{1}{3}} = 5.43 \times 0.67 = 4.11 \quad t = \frac{5.4}{4.11} = 1.31$$

For 9 degrees of freedom this value of “*t*” shows that the difference of the two means is not significant. There is no doubt that the proliferation of mammal tissue for the next lactation requires at least 60 days of good feeding.

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