

# Effect of Supplementation of Animal Fat on Economics in Production of Pigs

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**Abstract**—The experiment was conducted to assess the effect of supplementation of maize in Large White Yorkshire (LWY) pigs on cost of production. Twenty weaned piglets were randomly divided into two groups and were allotted to the two dietary treatments, T1 (control ration as per NRC, 2012) and T2 (control ration supplemented with animal fat at five per cent) and maintained for 70 days. There was no significant difference between these groups in weight gain, feed cost and cost of feed per kg weight gain, but T2 treatment recorded significantly lower feed intake than that of T1 treatment. Though the cost of feed per kg weight gain showed no significant difference, numerically the cost of fat supplemented feed (T2 group) was lower by Rs. 0.96 (Table 3), which comes about Rs. 80.00 per pig more profit to the pig farmer. This study could be concluded that supplementation of animal fat at five per cent to the diet of LWY pigs enhanced growth efficiency compared to control group leading to increased profit.

**Keywords:** Animal fat, Pigs, Cost of production.

## 1. INTRODUCTION

Animal husbandry is an important sub-sector of agriculture in India. Piggery directly influences the socio-economic status of the rural poor, more particularly the tribal population of the country as it acts as live insurance coverage for the downtrodden and socially weaker sections of the society. There are tremendous opportunities to use pig as a medium of poverty reduction in our country.

Pork is an important source of high quality animal protein. Mutton, beef, chicken and fish alone cannot meet the animal protein requirements of the growing human population as per the ICMR (2009) recommendations of 10.8 kg meat/year. In this context, the fast growing multiparous pig having high feed conversion efficiency is one of the best choices to fill up the large gap between animal protein requirement and availability in India.

In swine rearing, feed alone accounts more than 75 per cent of cost of production. Maize is major ingredient which provides energy and occupies 30 to 70 per cent in any of the pig ration. Due to variable composition, reducing availability and

increasing price of maize, alternative sources of energy have to be considered, for example, the addition of animal fat.

Animal fat is a byproduct of meat industry and can be included as a source of dietary fat in swine ration. India produces 0.14 million MT of tallow and 0.02 million MT of lard per year (FAO, 2010). The use of fat as an energy source (7680 to 8205 kcal of metabolizable energy /kg) for pigs has been shown to increase digestibility of nutrients and (or) improve growth rate and also reduces dustiness of feeds, thereby increases palatability and decrease the cost of production (Cho and Kim, 2012). This work was carried out in growing Large White Yorkshire piglets to calculate the cost of production.

## 2. MATERIALS AND METHODS

Twenty weaned female Large White Yorkshire piglets were randomly divided into two groups with five replicates in each group. Each replicate with two piglets was housed in a single pen. All piglets were housed in the same shed and were maintained under identical management conditions throughout the experimental period of 70 days. Clean drinking water was provided *ad libitum* in all the pens throughout the experimental period.

The animals were fed with standard grower ration containing 18 per cent CP and 3265 kcal ME/kg up to 50 kg body weight and finisher ration with 16 per cent CP and 3265 kcal ME /kg from 50 kg body weight as per NRC (2012). The two groups of piglets were randomly allotted to the two dietary treatments, T1 (control ration as per NRC, local) and T2 (control ration supplemented with animal fat at five per cent). Ingredient and chemical composition of pig grower and finisher ration were given in the Table 1 and 2. The animal fat is a mixture of mainly beef fat (tallow), pig fat (lard) and little of poultry fat, obtained from rendering plant of Meat Technology Unit, College of Veterinary and Animal Sciences, Mannuthy, freshly as and when the feed was prepared.

**Table 1: Ingredient composition of pig grower and finisher rations, %**

| Ingredients                         | Experimental grower rations <sup>1</sup> |           | Experimental finisher rations <sup>1</sup> |           |
|-------------------------------------|--|-----------|--|-----------|
|                                     | T1                                       | T2        | T1   | T2        |
| Yellow maize                        | 70                                       | 70        | 74   | 74        |
| Wheat bran                          | 1.5                                      | 1.5       | 3.6  | 3.6       |
| Soyabean meal                       | 26.25                                    | 26.2<br>5 | 20.5                                       | 20.5      |
| Animal fat                          | 0  | 5         | 0  | 5         |
| Salt                                | 0.5                                      | 0.5       | 0.5  | 0.5       |
| Dicalcium phosphate                 | 0.9                                      | 0.9       | 0.65                                       | 0.65      |
| Calcite                             | 0.85                                     | 0.85      | 0.75                                       | 0.75      |
| Total                               | 100                                      | 105       | 100  | 105       |
| Nicomix AB2D3K 1, g                 | 25                                       | 25        | 25   | 25        |
| Nicomix BE 2, g                     | 25                                       | 25        | 25   | 25        |
| Zinc Oxide <sup>3</sup> , g         | 45                                       | 45        | 30   | 30        |
| Oxylock antioxidant 4, g            | 10                                       | 10        | 10   | 10        |
| Cost per kg feed <sup>5</sup> , Rs. | 18.05                                    | 19.3<br>7 | 17.23                                      | 18.3<br>0 |

<sup>1</sup>Nicomix A, B<sub>2</sub>, D<sub>3</sub>, K (Nicholas Piramal India Ltd, Mumbai) containing Vitamin A- 82,500 IU, Vitamin B<sub>2</sub>-50 mg, Vitamin D<sub>3</sub>-12,000 IU and Vitamin K-10 mg per gram.

<sup>2</sup>Nicomix BE (Nicholas Piramal India Ltd, Mumbai) containing Vitamin B<sub>1</sub>-4 mg, Vitamin B<sub>6</sub>-8 mg, Vitamin B<sub>12</sub>-40 mg, Niacin-60 mg, Calcium pantothenate- 40 mg and Vitamin E-40 mg per gram.

<sup>3</sup>Zinc oxide (Nice Chemicals Pvt. Ltd., Kochi) containing 81.38% of Zn.

<sup>4</sup>Oxylock antioxidant (Vetline Ltd., Indore) contains Ethoxyquin, Butylated HydroxyToluene (BHT), Chelators and Surfactant.

**Table 2: Chemical composition\* of grower and finisher rations**

| Parameters               | Treatments (grower ration) <sup>1</sup> |                    | Treatments (finisher ration) <sup>1</sup> |                    |
|--------------------------|---|--------------------|---|--------------------|
|                          | T1                                      | T2                 | T1  | T2                 |
| Dry matter, %            | 89.20±0.12                              | 89.10±0.13         | 89.11±0.12                                | 89.10±0.06         |
| Crude protein, %         | 18.25±0.11                              | 17.88±0.17         | 16.39±0.10                                | 15.76±0.12         |
| Ether extract, %         | 3.10±0.05                               | 7.75±0.06          | 3.28±0.06                                 | 8.05±0.04          |
| Crude fibre, %           | 3.72±0.11                               | 3.41±0.07          | 3.73±0.07                                 | 3.52±0.13          |
| Total ash, %             | 5.64±0.17                               | 5.45±0.24          | 5.54±0.15                                 | 5.23±0.10          |
| Nitrogen free extract, % | 69.29±0.16                              | 65.51±0.31         | 71.06±0.20                                | 67.44±0.12         |
| Acid insoluble ash, %    | 1.10±0.02                               | 1.05±0.05          | 1.04±0.06                                 | 0.93±0.06          |
| GE, kcal/kg              | 4132.18<br>± 22.92                      | 4436.27<br>± 10.62 | 4165.18<br>± 22.24                        | 4390.61<br>± 31.34 |
| Calcium, %               | 0.59±0.01                               | 0.58±0.006         | 0.62±0.02                                 | 0.60±0.007         |
| Phosphorus, %            | 0.58±0.01                               | 0.64±0.06          | 0.55±0.02                                 | 0.54±0.02          |

|                |            |            |            |            |
|----------------|------------|------------|------------|------------|
| Magnesium, %   | 0.14±0.006 | 0.14±0.004 | 0.13±0.008 | 0.13±0.01  |
| Manganese, ppm | 16.78±0.38 | 15.92±0.25 | 16.59±0.45 | 15.91±0.01 |
| Copper, ppm    | 6.35±0.08  | 6.30±0.10  | 6.15±0.15  | 6.10±0.20  |
| Zinc, ppm      | 71.52±1.29 | 65.56±0.91 | 71.39±1.36 | 67.45±2.18 |

\* On DM basis;

<sup>1</sup> Mean of four values with SE

Weighed quantities of feed were offered twice a day at 9.00 am and 3.00 pm. The feed intake was measured daily after collecting the leftover feed if any and body weight of the individual animals were measured fortnightly in the morning hours before feeding. Cost of production per kg gain was calculated based on body weight gain, total feed intake and feed cost to arrive at the economics of production. The cost of ingredients used for the study was as per the rate contract fixed by the College of Veterinary and Animal Sciences, Mannuthy for the year 2011-2012. Data collected on various parameters were statistically analyzed by Completely Randomized Design (CRD) method and means were compared by Duncan Multiple Range Test (DMRT) using Statistical Package for Social Studies (SPSS, 2008) 17.0.1V software.

### 3. RESULTS AND DISCUSSION

Data on total feed intake, body weight gain, cost per kg feed and cost of feed per kg body weight gain of pigs maintained on the two dietary treatments are presented in Table 3. The average weight gain, total feed intake and feed conversion efficiency of these pigs during growing stage were 27.10, 27.73 kg; 64.45, 61.43 kg; and 2.37, 2.22, respectively for the two treatments. Cost per kg feed for two grower rations was Rs. 18.05 and 19.37 and cost of feed per kg body weight gain of pigs maintained on the two dietary treatments was Rs. 42.84 and 42.93, respectively during grower the stage. There was no significant difference between these two groups in weight gain, feed cost and cost of feed per kg weight gain, but T2 treatment recorded significantly lower feed intake than that of T1 treatment.

The average weight gain, total feed intake and feed conversion efficiency of these pigs during finisher stage were 29.81, 30.24 kg; 94.83, 87.18 kg; and 3.18, 2.89, respectively for two treatments. Cost per kg feed for two finisher rations was Rs. 17.23 and 18.30, and cost of feed per kg body weight gain of pigs maintained on the two dietary treatments was Rs. 54.78 and 52.93, respectively during finisher stage. There was no significant difference between these groups in weight gain and feed cost. However, fat supplementation significantly ( $P < 0.05$ ) reduced the feed intake in T2 group.

**Table 3: Cost of production of LWY pigs maintained on the two experimental rations**

| Parameters                           | T1             | T2            |
|--------------------------------------|----------------|---------------|
| <b>Grower period</b>                 |                |               |
| Total weight gain, kg                | 27.1±0.89      | 27.73±0.82    |
| Total feed intake, kg                | 64.45±3.50b    | 61.43±1.88a   |
| Cost per kg feed, Rs.                | 18.05          | 19.37         |
| Total feed cost, Rs.                 | 1163.32±63.22  | 1189.86±36.36 |
| Cost of feed per kg weight gain, Rs. | 42.84±1.17     | 42.93±0.74    |
| <b>Finisher period</b>               |                |               |
| Total weight gain, kg                | 29.81±0.72     | 30.24±1.11    |
| Total feed intake, kg                | 94.83±3.27b    | 87.18±1.42a   |
| Cost per kg feed, Rs.                | 17.23          | 18.30         |
| Total feed cost, Rs.                 | 1633.92±56.35  | 1595.40±25.96 |
| Cost of feed per kg weight gain, Rs. | 54.78±0.97b    | 52.93±1.24a   |
| <b>Overall period</b>                |                |               |
| Total weight gain, kg                | 56.91±1.48     | 57.97±1.88    |
| Total feed intake, kg                | 159.28±6.54b   | 148.61±3.12a  |
| Cost per kg feed, Rs.                | 17.56          | 18.74         |
| Total feed cost, Rs.                 | 2797.24±115.53 | 2785.25±59.07 |
| Cost of feed per kg weight gain, Rs. | 49.09±0.89     | 48.13±0.80    |

<sup>1</sup>Mean of 5 observations with SE;

a, b- Means with different superscripts within the same row differ significantly (P<0.05).

The final weight gain, total feed intake and overall feed conversion efficiency for two treatment groups during grower and finisher period were 56.91, 57.97 kg; 159.28, 148.61 kg; and 2.80, 2.57, respectively. Overall cost per kg feed for the two rations was Rs. 17.56 and 18.74 and the cost of feed per kg body weight gain of pigs maintained on the two dietary treatments was Rs.49.09 and 48.13, respectively.

The cost of T2 ration was high due to supplementation of animal fat at five per cent over and above the ration. Higher energy in the T2 ration (305 and 225 kcal more in grower and finisher ration, respectively (Table 2) reduced the total feed intake but maintained similar body weight, so could yield better feed conversion efficiency compared to control group.

This is in agreement with the findings of Cera *et al.* (1989) and Apple *et al.* (2008).

#### 4. CONCLUSION

The result of this study revealed that supplementation of animal fat at five per cent level over and above the normal energy requirement did not affect significantly their growth performance and were comparable with control group fed on diet without animal fat supplementation. Though the cost of feed per kg weight gain showed no significant difference, numerically the cost of fat supplemented feed (T2 group) was lower by Rs. 0.96 (Table 3), which comes about Rs. 80.00 per pig more profit to the pig farmer. This study could be concluded that supplementation of animal fat at five per cent to the diet of LWY pigs enhanced growth efficiency compared to control group leading to increased profit.

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