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DETERMINATION OF TRUE METABOLIZABLE ENERGY VALUE OF GHEE RESIDUE AS AN INGREDIENT IN JAPANESE QUAIL FEEDING

S.Umamaheshwari[1] and S.T.Selvan[2]

[1,2]Post Graduate Research Institute in Animal Sciences, TANUVAS, Kattupakkam-603 203, Tamil Nadu.

Abstract

The present study was conducted to determine the True Metabolizable Energy (TME) value of Ghee Residue (GR) in order to be utilized as an alternate high energy feedstuff in Japanese quail feeding. The study was carried out in 12 adult male Japanese quails which were divided into two groups as control and treatment groups with each group consisting of six males. All the males were housed in individual cages and starved for 24 hours to eliminate the feed taken before the metabolic bioassay. After this, the treatment group was force-fed with known quantity (20 g) of ghee residue and control group was further starved to collect the endogenous losses. After 24 hours, excreta from treatment group and endogenous losses from the control group were collected individually to determine the TME value of ghee residue. The estimated GE and TME values of ghee residue using metabolic bioassay were 5783 kcal/kg and 4800 kcal/kg, respectively.

Keywords: TME, ghee residue, Japanese quails.

I. INTRODUCTION

Among the diversified poultry, Japanese quail is the main contributor and the meat is a "gourmet's delight" due to its good quality animal protein. It is highly adaptable to extreme climatic changes; their resistance to numerous common diseases makes them suitable for rearing in large numbers in a relatively small space. By feeding concentrates to achieve higher weight gain in shorter period of time, poultry industry competes with human and other livestock for feed ingredients. The current demand for poultry feed in India is estimated to be 21 to 23 mmt. It is expected to increase from 29 (2020) to 39 mmt (2025) at the current rate of about 6% of poultry production. The Indian poultry feed industry is expected to grow further by 7 to 8 % in next few years. Feed is the major input cost accounting for 60 to 70%, hence more emphasis should be given to this aspect.

Poultry farmers are often facing a deep crisis due to an uncertain increase in the price of essential feed ingredients such as maize, fish meal, soya meal etc., thus resulting in severe erosion of the farmer's economic viability. While this may be partly due to inadequate production of these commodities, the need for a focused effort to augment the production of maize, soya etc., as well as that of alternative feed ingredients cannot be over-emphasized. Hence, judicious use of ingredients, utilizing the industrial by-products/wastes to reduce the cost of production on one side and maximizing the nutrient utilization in poultry on the other side is the need of the hour.

According to Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture (2014-15) reports, the total milk production in India was around 1, 46, 314, 000 metric tonnes. The total milk produced in Tamil Nadu is 71, 32, 000 tonnes during 2014-15 and is among the top 10 milk producing state accounting for about 5.5% of total milk production. About 30 to 33 per cent of total milk

produced in India is being utilized for ghee preparation (Dairy India, 2007) and the average yield of ghee residue is calculated as one-tenth of ghee produced (Varma and Narender Raju, 2008). According to Indian dairy market report and forecast, the growth of Indian ghee market is poised to grow at 14% during 2016-2017.

Ghee residue, the charred light to dark brown residue is a by-product of ghee industry and is obtained on the cloth strainer after the ghee is filtered and is available at nominal cost throughout the year. Hence, this study has been proposed to determine the TME value of ghee residue in order to be utilized as an alternate high energy source in Japanese quail ration.

II. MATERIALS AND METHODS

The True Metabolizable Energy (TME) value of ghee residue used in the current biological experiment was estimated by metabolic bioassay as per the method of Sibbald (1976).

Twelve numbers of adult quail males were procured and grouped into two groups as control and treatment groups with each group consisted of six males. All the males were housed in individual cages and starved for 24 hours to eliminate the feed taken before the metabolic bioassay. After this, the treatment group was force-fed with known quantity of about 20 grams of ghee residue and control group was further starved to collect the endogenous losses.

After 24 hours, excreta from treatment group and endogenous losses from the control group were collected individually. Gross energy of ghee residue, excreta and endogenous products were estimated in adiabatic bomb calorimeter. The true metabolizable energy was calculated by the following formulae:

$$\text{True metabolizable energy (Kcal/g)} = \frac{(Gef \times X) - (Yef - Yec)}{X}$$

Where,

Gef = Gross energy of ghee residue (kcal/g)

X = Weight of ghee residue (% DM)

Yef = Gross energy voided in the excreta (kcal/g) by treatment group

Yec = Gross energy voided in the excreta (kcal/g) by control group.

III. RESULTS AND DISCUSSION

The estimated GE and TME values of ghee residue (Table 1) using metabolic bioassay were 5783 kcal/kg and 4800 kcal/kg, respectively

The estimated GE value (5783) is lower than the values (7279 and 6426) reported by Loganathan (2012) and Rao *et al*. (1997) respectively and it is higher than the value (5682) reported by Arumugam *et al.* (1989).The estimated TME value (4800) is lower than the value (5839) reported by Loganathan (2012).and higher than the value (3940.96) reported by Arumugam *et al.* (1989).

Table 1: Energy value (Kcal/kg) of ghee residue (Mean ±SE) (n=6)

Type of energy (Kcal/kg)	Ghee residue
Gross Energy	5783±3.04
Metabolisable Energy	4800±243.72

IV. CONCLUSION

The estimated ME value of ghee residue is much higher than that of maize, a major feed ingredient in poultry. Hence, the ghee residue may be conveniently utilized as an alternate source of high energy feed ingredient in Japanese quail ration.

V. ACKNOWLEDGEMENT

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