

COST-EFFECTIVE FEEDING OF POULTRY

**G. Thirumalaisamy¹, J. Muralidharan², S. Senthilkumar³, R. Hema Sayee⁴
and M. Priyadharsini⁴**

¹Ph.D. Scholar, ICAR – National Dairy Research Institute, Karnal, India

²Professor, PGRIAS, Kattupakkam, ³Assistant Professor, ³B.V.Sc., &A.H. Student,
Veterinary College and Research Institute, Namakkal, Tamil Nadu – 637 002 (TANUVAS)

Abstract: The present situation in feeding of poultry is more economical than feeding to other livestock. Using unconventional (low cost) feed ingredients available locally, to formulate the least-cost feed formulation were found to be reduction in the cost of poultry feeds. Using these feed ingredients in feed formulation requires more supplementation of nutrients *viz.*, amino acids, toxin binders, micro nutrients, etc. A significant share of broiler and layer firms were found using amino acids in quantities above the recommended levels with negligible production and negative profitability effects, demonstrating a clear dearth of managerial skill to obtain and utilize information on poultry nutrition. Although several experiments found to be reduces the feed cost and increasing the production performance in the field condition. However the usage of unconventional feed ingredients level is minimum it may be due to presence of anti nutritional factors and digestibility of feed ingredients lower than the conventional one. The shortage of high cost /conventional feed ingredients especially energy and protein feeding stuffs, so utilization of agricultural by products may make a substantial contribution towards better and more economic feeding poultry. This paper deals with reducing the feed cost by using low cost feed ingredients ultimately improve the feed quality and increasing the production performance.

Keywords: Poultry, unconventional feed ingredients, least cost feed.

Introduction

There is need to improve the scientific knowledge for utilizing low cost locally available agro-industrial by-products in poultry feed in order to reduce the feed cost. As feed constitutes 60 to 70 per cent of the total cost of production, any attempt to reduce the feed cost may lead to a significant reduction in the total cost of production. Poultry being the monogastric animal lack fibre degrading enzyme for breakdown of complex carbohydrates like cellulose, hemicellulose and lignin. Since, the complex carbohydrate is a major component of fibrous by-products, there is need to find ways and means for improvement in the utilization of these fibrous materials so as to incorporate these materials in the poultry feed without any adverse effect on their health and production. There is an opportunity to utilize locally available materials for economic production of broilers, backyard poultry and

Japanese quails. Hence, it was felt to evaluate these by-products for economic feeding of poultry to produce more meat and egg with less cost in Indian conditions.

Considering the demand for egg and meat in the coming years, low cost poultry rearing is a boon for marginal farmers. There is ever increasing demand for conventional feed ingredients for feeding of poultry. Incorporation of these feed ingredients in poultry feed has increased the cost of production enormously. Attempts to utilize locally available cheap by-products may benefit the end users in reducing the feed cost which in turn can reduce the total cost of production of meat and egg and making them easily available at cheaper cost in rural India. The traditional sources of vitamins and proteins used in poultry rations such as fish meal, meat and bone meal, soybean meal, groundnut cake etc. are becoming expensive in developing countries. The availability of such feed ingredients is not adequate because of the spiraling cost of raw materials and ever increasing competition with the human beings for the same food items. Hence, the search for alternative feed sources has become inevitable to reduce the feed cost (Swain *et al.*, 2014)

Current scenario in poultry production in India

India's poultry sector represents one of the biggest success stories of the country over the past decade. India is the second largest egg producer and third largest broiler-chicken producer in the world with production estimates of 65,000 million (2.8 million tonnes) eggs and 3 million tonnes of broiler meat per year. Nearly 20 million farmers are employed in poultry industry with around 1,000 hatcheries operating across India. While agricultural production has been rising at the rate around 2 per cent per annum over the past two to three decades, poultry production has been rising at the rate of around 8-10. The domestic market has displayed increasing buoyancy, owing to a growing rural market based on lower feed and poultry prices, growing disposable income and increased awareness of new technologies and mechanizations in the sector. Nevertheless, urban demand still accounts for 80 per cent of domestic consumption (GOI, 2014).

Current scenario of poultry feed demand in India

As an estimate, the current demand for poultry feed in India is around 22 million tonnes. Poultry feed accounts for 58 per cent of the total feed market in India. The consumption of poultry feed also increased to 8 per cent during 2012 - 13, as compared to 7 per cent during 2007 - 08. The boiler industry has been considered the strongest driver behind the development of feed industry in India, benefiting largely from the presence of integrators (70 per cent of total industry) and a shorter production cycle. This has brought in

feed based efficiencies and rationalization in the industry. 90 per cent of the broiler industry uses compound feed.

The use of the compound feed in the egg layer industry varies from 5 per cent to 25 per cent and is highly under utilised. Based in the current egg production total feed demand is about 11.6 million tonnes although the consumption is 23 million tonnes. In future the egg laying industry offers a promising potential for the growth of the feed industry. Considering the egg industry, the total feed demand is expected to be around five to six per cent. In the near term, significant opportunities exist in the egg industry for compound feed demand. With farms consolidating and growing in size longer term, egg layer farming will be integrated backward into feed millings (The poultry site, 2015).

Why the feed cost increasing now-a-days?

Feed is the major input and feed cost is the major constraint but a major mean for manipulating production cost and making enterprise profitable. A sizable quantity of cereals and edible oil seed meals are used in poultry ration, and thus compete with the human being directly. Hence availability of feed resources could be one of the major constraints in poultry production in future as the opportunity for the area expansion for cultivation is almost exhausted. Therefore more careful approaches to sustain the poultry industry in the competitive market should be the reduction of cost of production, production of safe and quality products to meet the consumer's demand and also to ensure the birds welfare to satisfy consumers.

Again production of feed stuffs fluctuates greatly due to frequent monsoon failure, low productivity, insects, weeds, environmental concerns, cost efficiency, sustainability, declining area under cultivation etc. Further the farmers are also encouraged for diversion towards production of cash and commodity crops. These factors contributes the production of poultry feed ingredients in decreasing trend in recent years and increasing demand so the cost of feed ingredients goes high (Chandrasekaran, 2014)

In the recent past, the feed industry experiences very tough on back of considerable increase in cost of feed ingredients (Maize and Soya meal) touching record highs and realizations suffering on back of oversupply in industry. For instance average production costs for a typical commercial broiler farm which was in the range of Rs. 55-60/kg in 2013 increased to more than Rs. 65 - 70/kg in 2015.

Alternative feed resources available for poultry

A wide range of alternative feedstuffs are available for feeding in all three poultry production systems. The greatest potential for efficiently utilizing these feedstuffs will be in traditional family poultry systems (scavenging and backyard) and the semi-commercial system. In the semi-commercial system, only part of the feed requirement is purchased from commercial compounders, so there is opportunity for on-farm mixing or dilution of purchased feeds with locally available, alternative feedstuffs. In low-input family poultry systems, locally available, alternative feedstuffs can be used to supplement the scavenging feed base (Kellems and Church, 2010).

Energy sources

The main energy source maize availability has been increasing at a slower rate but not at par with livestock and poultry sector growth in our country. To meet out the demand, the combinations of maize with other cereals especially pearl millet, finger millet and sorghum could be tried. Combinations of these cereals at 25 to 33 percent level are encouraged in the development of poultry industry (Wiseman, 2006). Utilization of different cereals and oilseed residue has also been proved to be good. More over these nutritious cereals can safely be used as a part or solely as dilutor of protein- mineral concentrate used in broiler ration during finishing stage. In addition broken rice, rice polish, de-oiled rice bran, maize grit, maize germ meal, maize germ cake, under sized wheat, dried distillery grain ghee residue, etc are available to replace maize. The edible oils and fats play a major contribution in replacing the maize as an energy source (Ravindran and Blair, 1991). Recently newer energy sources like variety of biofortified maize available in market, it may meet out the limiting amino acids of actual maize grain (Krishna *et al.*, 2014).

Protein sources

Soya bean meal is the main protein source of poultry feed and is used in several forms in India because of its high protein content and digestibility. Use of alternate protein sources may be reduces the cost of protein source. Inclusion of rape seed meal and sun flower seed meal each at 10 percent level replacing soya bean meal supported optimum growth and profit margin in broilers. Combinations of ground nut meal and niger meal in 75:25 ratio was fund to be suitable for economic egg production. However there are certain limitations in using mustered cake (glucosinoates, tannins, erucic acid, colour etc.), sunflower cake (high fibre), safflower cake (high fibre, low availability), niger cake (export and cost competitiveness) and ground nut cake (aflatoxin, fibre and cost). The other promising by products include guar

meal, cotton seed meal, sesame meal, rice gluten meal etc. could also be used in poultry production.

The use of fish meal has been restricted because of non availability of good quality fish meal and cost. The other animal protein feed stuffs like meat cum bone meal (42 to 55 % protein and 3 to 7 % P), meat meal (65 to 75% protein) and blood meal (78 to 82 %) also available for poultry feed. Even poultry slaughter house waste meal also could be used safely up to 5 per cent in diet replacing soya bean meal (Ravindran and Blair, 1992; 1993).

Constraints and opportunities

The cost of feed depends upon the availability of feed stuffs in required quantity and their judicious utilization besides precise nutrient supply and augmenting nutrient utilization from those available feed resources. Generally the availability and cost of maize and soya determines the cost of poultry feed. As there is scarcity in both maize and soya bean meal at reasonable price, there is a need to utilize locally available feed ingredients of one or more in least cost efficient feed mixing in India. However only a fewer number of raw materials are used in poultry feed formulation due to lack of reliable data on their nutritive quality, feeding value and safe or efficient levels on inclusion in various types of poultry feed (FAO, 2011).

The feed industry requires constant supply of any newer feed resource with consistent quality, to satisfy the consumers demand. The basic data base on maize, soya bean meal, ground nut extraction and fish meal have been evaluated with a fair degree of accuracy and reliability but data base is limited for other feed ingredients. The nutritive value, toxicants, amino acid value, safe inclusion level, metabolizable energy of various alternate to maize and soya bean meal either alone or with combinations are available only with the research institutes and not to the poultry nutritionists and farmers (FAO, 2004).

The cereal by products and oilseed residues are also not an exception in terms of non starch polysaccharides and anti nutritional factors. Low and variable content of metabolizable energy, high fibre and anti nutritional factors in the formulated diet may lead to poor conversion efficiency apart from retarded production in terms of egg and meat. The excretion of higher volume of undigested nutrients through excreta may sometimes lead to high ammonia production inside the house with other environmental concerns. Therefore more care should be taken to enhance the nutrient digestibility and availability in the gut of poultry (Balakrishnan, 2004).

Lowest feed cost does not produce maximum margin

It is important to make a distinction between reducing feed cost per bird and reducing feed cost per kilogram of live weight or carcass component(s). By reducing nutrient density of the feed, the feed cost per bird will usually fall but performance may be reduced. When corrected back to equal live weight, the move may actually result in an increased cost of production. The level of balanced protein in the feed will have a major influence upon margin achieved and profitability. However, balanced protein is only one of the two main components of the nutritional package and energy also needs to be considered. With regard to energy sources, it has become clear that growth of the biofuels industry has resulted in feed energy prices becoming more affected by oil prices than conventional commodities markets. With an increase in the use of cereals and feed fats for the biofuels sector, combined with firm oil prices, energy is likely to become expensive. It is of key importance to appreciate that modern broilers are responsive to amino acid and energy density and that margin over feed cost must be considered when determining an appropriate feeding strategy (The poultry site, 2007)

To derive a balanced diet with feed supplements and additives

The objective of feed formulation is to derive a balanced diet that will provide appropriate quantities of biologically available nutrients required by the bird. In addition to energy and protein, formulations contain supplements to provide minerals, vitamins and specific amino acids. These supplements must be added to all diets as they provide essential nutrients necessary for health and performance. Modern feed formulations also contain a diverse range of non-nutritive additives, which may not be essential but have an important bearing on performance and health. In many cases, the need for their inclusion is well understood: A major factor to be considered in selecting these additives is their efficacy. Feed supplements and additives are used in only small quantities, and it is particularly important that they are mixed carefully with the main ingredients so that they are evenly distributed (NRC, 1994).

Defining nutrient requirements

Defining nutrient needs is challenging because they are influenced by several factors and are subject to constant change. The factors influencing nutrient requirements are of two main types: bird related ones, such as genetics, sex, and type and stage of production; and external ones, such as thermal environment, stress and husbandry conditions. Precision in defining requirements requires accuracy in both areas. Great advances in the definition of nutrient

requirements for various classes of poultry have been made possible largely by the increasing uniformity of genotypes, housing and husbandry practices throughout the poultry industry.

Defining requirements for the ten essential amino acids has been made easier by acceptance of the *ideal protein* concept. As for other nutrients, the requirements for amino acids are influenced by various factors, including genetics, sex, physiological status, environment and health status. However, most changes in amino acid requirements do not lead to changes in the relative proportion of the different amino acids. Thus actual changes in amino acid requirements can be expressed in relation to a balanced protein or ideal protein. The ideal protein concept uses lysine as the reference amino acid, and the requirements for other essential amino acids are set as percentages (or ratios) of the lysine requirement. The advantage of this system is that once the lysine requirements for a variety of conditions are determined, the needs for all other essential amino acids can be calculated. This approach has now become accepted practice for setting the amino acid specifications of feed formulations in the poultry industry (Leeson and Summers, 2005).

Balanced Protein density: an economic decision

In general, lowering Balanced Protein level reduces feed cost per tonne but also reduces performance and profitability.

The balance protein concept is a practical application of the Ideal Amino Acid profile to supply broilers with correct minimum levels of essential and nonessential amino acids. The Ideal Amino Acid profile applies both minimum and maximum values to the individual amino acids to produce an exact profile, which is not always achievable in commercial broiler feed formulations in practice. Balanced Protein is a practical application of the Ideal Protein idea (The poultry site, 2015).

Future need

By considering the growth rate of poultry sector in our country and requirement of major poultry feed ingredients like maize and soya bean meal, more emphasis should be taken to identify more new feed resources with their quality and availability. Assessing data base on feeding values including nutritive value, availability of nutrients and safe level of inclusion of alternate and newer feed resources both at regional level and national level should be done systematically and should be made available to all the nutritionists and farming community. Identification of incriminating factors and their detoxification process should be done at all level of research for the effective utilization of the newer feed resources.

However, the key concern is the existing lack of storage, cold chain, transport and processing facilities. High feed costs also result in an increased cost of production which translates to higher prices. Other challenges include a lack of quality standards which result in high vulnerability to disease outbreaks.

Conclusion

Poultry integrators have limited control over feed prices and broiler realizations; and they continue to focus on improving productivity by experimenting with feed mixes, lower mortality rates through enhanced farm management and medication, and continuous efforts towards improving other operational parameters like hatchability, average daily weight gain and reducing selection gaps. These practices may be essential but they translate into compromising on quality. The need of the hour is therefore, specialized systems and upgrades and existing facilities to boost production, enhance quality and improve outputs. The unconventional feed sources are available locally and very cheaper one that may be included in maximum level without harmful to the birds. Whenever the demand of conventional feed ingredients may goes high, we can shift in to using the unconventional feed ingredients with out of harm's way inclusion level to increase the profit of production. The least cost feed formulation with balanced protein also helps proper nutrient intake and its turn over good output.

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