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Popular Article

Cost-Effective Feeding of Poultry for Enhanced Profitability

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Introduction

To enhance the scientific understanding of utilizing low-cost, locally available agro-industrial by-products in poultry feed, it's crucial to reduce the feed cost, which accounts for 60 to 70 percent of the total production cost. Any effort to lower feed expenses can significantly cut down the overall production cost. Poultry, being monogastric animals, lack fiber-degrading enzymes necessary for breaking down complex carbohydrates such as cellulose, hemicelluloses, and lignin. Since complex carbohydrates are major components of fibrous by-products, it's essential to find methods to improve the utilization of these fibrous materials. This improvement would allow the incorporation of these materials into poultry feed without adversely affecting the birds' health and productivity. There is an opportunity to utilize locally available materials for economically producing broilers, backyard poultry, and Japanese quails. Therefore, evaluating these by-products for economical poultry feeding in Indian conditions is crucial to produce more meat and eggs at a lower cost.

Considering the rising demand for eggs and meat in the coming years, cost-effective poultry rearing is advantageous for marginal farmers. The ever-increasing demand for conventional feed ingredients for poultry feeding has significantly raised production costs. Incorporating these ingredients into poultry feed has made production much more expensive. Utilizing locally available feed resources, inexpensive by-products can help reduce feed costs, thereby lowering the overall cost of meat and egg production and making these products more affordable in rural India.

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Traditional sources of vitamins and proteins used in poultry rations, such as fish meal, meat and bone meal, soybean meal, and groundnut cake, are becoming increasingly expensive in developing countries. The supply of these feed ingredients is insufficient due to the rising cost of raw materials and the growing competition with humans for the same food items. Therefore, the search for alternative feed sources is crucial to reducing feed costs (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 experiencing substantial demand for poultry feed due to its position as the world's third-largest producer of poultry meat and eggs. The country's annual poultry feed production was 27 million metric tons in 2022, reflecting the industry's significant scale. This demand is driven by the increasing production of over 4.78 million tons of chicken and 129.6 billion eggs annually. The growth trends in the poultry sector, with an annual average growth rate of 8% for poultry meat and 7.45% for egg production from 2014-15 to 2021-22, have further escalated the demand for feed. As the Indian poultry market size reached INR 2,099.2 billion in 2023, it is projected to grow at a compound annual growth rate (CAGR) of 8.9% from 2024 to 2032, indicating a continuing rise in feed demand to support this expansion.

Current scenario of poultry feed demand in India:

India's poultry feed production stands at 28.91 million metric tons, with the industry growing by 7-8% annually. The broiler industry, considered the main driver of feed industry development in India, benefits significantly from the presence of integrators (who account for 70% of the total industry) and a shorter production cycle. This has led to feed-based efficiencies and rationalization within the industry, with 90% of the broiler sector using compound feed. 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. The production of feedstuffs fluctuates significantly due to frequent monsoon failures, low productivity, pests, weeds, environmental concerns, cost efficiency issues, sustainability challenges, and a declining area under cultivation. Additionally, farmers are often encouraged to shift towards the production of cash and commodity crops. These factors have contributed to a decreasing trend in the production of poultry feed ingredients in recent years, while demand continues to rise, leading to higher feed ingredient costs (Chandrasekaran, 2014).



Alternative feed resources available for poultry:

A wide range of alternative feedstuffs are available for feeding in all three poultry production systems.

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. Combinations of maize with other cereals especially pearl millet, finger millet and sorghum cereals at 25 to 33 percent level are encouraged in the development of poultry industry. 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. Recently newer energy sources like variety of biofortified maize available in market, it may meet out the limiting amino acids of actual maize grain.

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 reducing the cost of protein source. However, there are certain limitations in using mustard cake (glucosinolates, tannins, and erucic acid etc.), sunflower cake (high fibre), safflower cake (high fibre, low availability), niger cake (export and cost competitiveness) and ground nut cake (aflatoxin, fibre).

Constraints and opportunities:

The cost of poultry feed is significantly influenced by the availability and prudent utilization of feedstuffs, ensuring a precise supply of nutrients, and enhancing nutrient utilization from available resources. Maize and soybean meal are primary components that dictate the cost of poultry feed. However, due to the scarcity and high prices of these ingredients, there is a growing need to utilize locally available feed ingredients in India through least-cost, efficient feed mixing strategies. Unfortunately, only a limited number of raw materials are currently used in poultry feed formulation. This limitation is due to a lack of reliable data on the nutritive quality, feeding value, and safe or efficient inclusion levels of various locally available feed ingredients (FAO, 2011). 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).

To derive a balanced diet with feed supplements and additives:

The goal of feed formulation is to create a balanced diet that supplies the bird with the necessary amounts of biologically available nutrients. Besides energy and protein, these formulations include supplements to provide essential minerals, vitamins, and specific amino acids. These supplements are crucial for the bird's health and performance and must be added to all diets. Although feed supplements and additives are used in small quantities, it is essential that they are mixed thoroughly with the main ingredients to ensure even distribution (NRC, 1994).

Defining nutrient requirements:

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. 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.

Future need

Given the rapid growth of the poultry sector in our country and the high demand for essential poultry feed ingredients like maize and soybean meal, it is crucial to identify and utilize new feed resources, ensuring their quality and availability. Systematic assessment and documentation of feeding values, including the nutritive content, nutrient availability, and safe inclusion levels of alternative and novel feed resources, should be conducted at both regional and national levels. Additionally, identifying and mitigating incriminating factors and developing detoxification processes for these new feed resources should be a focus of research efforts. However, significant challenges remain, such as inadequate storage, cold chain, transportation, and processing facilities. High feed costs lead to increased production costs, which in turn raise prices.

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Moreover, the lack of quality standards heightens vulnerability to disease outbreaks, posing further risks to the poultry industry.

Conclusion

Poultry integrators have limited control over feed prices and broiler market prices, so they focus on enhancing productivity through various strategies. These include experimenting with feed mixes, reducing mortality rates through better farm management and medication, and continuously improving operational parameters such as hatchability, average daily weight gain, and minimizing selection gaps. Unconventional feed sources, which are locally available and inexpensive, can be included at maximum safe levels to benefit the birds. Least-cost feed formulation with balanced protein content ensures proper nutrient intake, leading to improved production outcomes.

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