

Role of Feed Additives in Poultry

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Introduction:

Feed additives are minor components of the animal ration and are used for improving the quality/digestibility of feed and the nutritive and aesthetic quality of food or improving animal performance and health. Some of the most commonly used feed additives in animal rations includes pro- and prebiotics, antioxidants, antibiotic growth promoters, and coloring agents. Overall, these different ingredients are aimed at enhancing digestibility or availability of bound nutrients (e.g., enzymes), improving animal gut health (e.g., pro/prebiotics) and food product quality (e.g., antioxidants), reducing nutrient loss (e.g., phosphorus, nitrogen), and promoting environmental protection.

An additive is a substance that is added to a basic feed, usually in small quantities, for the purpose of fortifying it with certain nutrients, stimulants or medicines other than as a direct source of nutrient. In general, the term “feed additive” refers to a non-nutritive product that affects utilisation of the feed or productive performance of the animal.



Additives That Enhance Feed Intake

Antioxidants

- Antioxidants are compounds that prevent oxidative rancidity of polyunsaturated fats. Rancidity once develops, may cause destruction of fat-soluble vitamins A, D and E and many B complex vitamins.
- Breakdown products of rancidity may react with lysine and thus affects the protein value of the ration. Eg. Ethoxyquin or BHT, (butylated hydroxytoluene) act as antioxidant in feed.

Flavouring Agent

- Flavouring agents are feed additives that are supposed to increase palatability and feed intake. There is need for flavouring agents when highly unpalatable medicants are being mixed, during attacks of diseases, when animals are under stress, and when a less palatable feedstuff is being fed either as such or being incorporated in the ration.

Additives That Enhance the Colour

- Additives that enhance the colour or quality of the marketed product
- Poultry man will often enhance the yellow colour by adding xanthophylls into broiler feed.
- Among various additives, arsanilic acid, sodium arsanilate and roxarsone are also added for the purpose.

Grit

- Poultry do not have teeth to grind any hard grain, most grinding takes place in the thick muscled gizzard.
- The more thoroughly feed is ground, the more surface area is created for digestion and subsequent absorption. Hence, when hard, coarse or fibrous feeds are fed to poultry, grit is sometimes added to supply additional surface for grinding within gizzard.
- The value of grit become less, when mash or finely ground feeds are fed. Oyster shells, coquina shells and limestone are used as grit.

Buffers and Neutralisers

- During maximum production stage ruminants are given high doses of concentrate

feeds for meeting demands for extra energy and protein requirement of the animal.

- The condition on the other hand lowers the pH of the rumen. Since many of the rumen microbes cannot tolerate low pH environment, the normally heterogeneous balanced population of microbes become skewed, favouring the acidophilic (acid-loving) bacteria.
- The condition often leads to acidosis and thereby upsets normal digestion.
- The addition of feed buffers and neutralisers, such as carbonates, bicarbonates, hydroxides, oxides, salts of VFA, phosphate salts, ammonium chloride and sodium sulphate have been shown to have beneficial effects.

Chelates

- Organic chelates of mineral elements, which are cyclic compounds, are the most important factors controlling absorption of a number of mineral elements.

Chelates may be of naturally occurring substances such as chlorophyll, cytochromes, haemoglobin, vitamin B12, some amino acids, etc., or may be of synthetic substances like ethylene diamine tetracetic acid (EDTA.)

Additives That Promote Growth and Production

Antibiotics

- These are substances which are produced by living organisms (mould, bacteria or green plants) and which in small concentration have bacteriostatic or bactericidal properties.
- They were originally developed for medical and veterinary purposes to control specific pathogenic organisms.
- Later it was discovered that certain antibiotics could increase the rate of growth of young pigs and chicks when included in their diet in small amounts.
- Soon after this report a wide range of antibiotics have been tested and the following have been shown to have growth promoting properties: penicillin, oxytetracycline (Terramycin), chlortetracycline, bacitracin, streptomycin, tyrothricin, gramicidin, neomycin, erythromycin and flavomycin.
- Increased weight gain is most evident during the period of rapid growth and then decreases.
- Differences between control and treated animals are greater when the diet is slightly

deficient or marginal in protein, B-vitamins or certain mineral elements.

Probiotics

- It is defined as a live microbial feed supplement, which beneficially affects the host animals by improving its intestinal microbial balance. The probiotic preparation is generally composed of organisms of lactobacilli and/or streptococci species, few many contain yeast caltones.
- They benefit the host by:
 1. Having a direct antagonistic effect against specific group of undesirable or harmful organism through production of antibacterial compounds, elementary or minimising their competition of nutrients.
 2. Altering the pattern of microbial metabolism in the gastro intentional tract.
 3. Boosting of immunity.
 4. Neutralisation of enterotoxins formed by pathogenic organism.
- Thus, resulting in improved feed efficiency and increased growth rate,

Additives That Affect the Health Status of Livestock

- **Antibloat compounds:** Surfactants such as poloxalene is used as a preventive for pasture bloat, several other products have been shown to be highly effective to prevent bloat are also available in the market.
- **Antifungal additives:**
 - (i) Mould inhibitors are added to feed liable to be contaminated with various types of fungi such as *Aspergillus flavus*, *Penicillium cyclopium* etc.
 - (ii) Before adding commercial inhibitors, all feedstuff should be dried below 10 percent moisture. Propionic, acetic acid and sodium propionate are added in high moisture grain to inhibit mould growth.
 - (iii) Antifungals such as Nystatin and copper sulphate preparations are also in use to concentrate feeds to prevent moulds.
- **Anticoccidials:** Various brands of anticoccidials are now available in the country to prevent the growth of coccidia which are protozoa and live inside the cells of the intestinal lining of livestock.
- **Anthelmintics:** Under some practical feeding conditions anthelmintics have also been used. The compounds act by reducing parasitic infections.

- **Anticaking agents:** Anticaking agents are anhydrous substance that can pick up moisture without themselves becoming wet. They are added to dry mixes to prevent the particles clumping together and so keep the product free flowing.

They are either anhydrous salts or substance that hold water by surface adhesion yet themselves remain free flowing: Salt or longchain fatty acids.

A. Calcium phosphate

B. Potassium and sodium ferricyanide

C. Magnesium oxide

D. Salts silicic acid – Al, Mg, Ca, Salt.

- Sodium aluminium silicate
- Sodium calcium aluminium silicate
- Calcium aluminium silicate

Conclusion

Each of these feed additives has their specific benefits. So Further research is needed to not only identify new hope for poultry feeds additives but also need to recognize that how combinations of these additives can be used to improve the efficiency of poultry production. Systematic approach is required to explain the efficacy and mode of action for each of type and dose of additives. Approvement of various feed additives for use is important. After that they should be utilized as directed with inclusion levels and duration of feeding. They should also be specific for the age of birds being fed. Non antibiotic growth promoters such as organic acids and probiotics should be used. Safety should be in mind to reduce the feed industry's impact on the environment.