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Popular Article

Nutritional management of stress in poultry

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Introduction

Any deviation from optimum state could be referred as stress. Every living being has to pass through one or other type of stresses in life. Most of the farm animals including poultry suffer from various types of stresses like adverse environment, managerial, diseases, nutritional deficiencies, transportation etc. There is various factors lead to varieties of stresses affecting the welfare of Poultry and the thermal stress is the major environmental stress. Every livestock has a thermo neutral zone where the animal/bird performs optimum. For broiler the ideal temperature is 10-22 0c and for layer 10-30 0c. Birds being endotherm regulate their body temperature close to set point by controlling either heat production or heat loss independently of the ambient temperature within the zone of neutrality. When the environmental temperature goes beyond the critical temperature it is called as heat stress in a tropical country like India. When the temperature is coupled with humid condition is the most adverse stressful and detrimental condition for poultry.

Poultry stress refers to the physiological, behavioral, and immunological responses of birds to challenging factors or conditions that exceed their coping abilities. These stressors encompass environmental, nutritional, social, and production-related triggers, impacting the birds' overall well-being and performance.

Impacts of Stress on Poultry

Stress can lead to negative physiological and behavioural impacts, such as reduced growth rates, compromised immune functions, altered metabolic processes, increased aggression, cannibalistic behaviour, and poor reproductive performance, affecting the overall health and productivity of poultry. There will be low feed intake, growth rate depressed,



uneconomical FCR in broiler, drop in egg production in layers, reduces the shell and internal quality of eggs, egg size and hatchability reduced and more severe cases lead to heavy mortality.

Effective Stress Management Strategies

- **Environmental Management:** Providing optimal housing conditions, appropriate ventilation and effective lighting to minimize environmental stressors.
- **Nutritional Interventions:** Ensuring a balanced diet with essential nutrients, incorporating adaptogenic substances to bolster stress resilience and immune function.
- **Health Management:** Implementing biosecurity measures, vaccination programs, and disease control strategies to mitigate disease-related stress and promote overall health.
- **Behavioural Enrichment:** Offering environmental stimuli and enrichment, such as perches, and objects for pecking, to reduce behavioural stress and encourage natural behaviours.
- **Genetic Selection:** Breeding for stress-resilient traits and behaviours through selective breeding and genetic improvement programs.
- **Social Structure Optimization:** Managing flock size and composition to reduce social stressors, promote positive social interactions, and minimize stress-related behaviours.
- **Stress Monitoring:** Regular assessments of flock behaviour, production parameters, and health indicators to detect and address stress factors promptly, ensuring proactive stress management.
- Different managerial practices like building site, construction of house, ventilation, fans, foggers, fan pad system and sprinkling *etc.* can be done to reduce the load of heat to the birds.

Nutritional Management of Stress

Nutritional management plays a pivotal role in addressing and mitigating stress in poultry. By understanding the impact of nutrition on stress resilience, immune function, and overall well-being, poultry producers can implement effective feeding strategies to support the birds during challenging conditions. Effective nutritional management aims to address the physiological and metabolic demands of birds during stress. Nutrient balance, feed quality, and the incorporation of specific dietary components are integral to supporting stress resilience and minimizing the adverse impacts of stress on poultry well-being.

Birds maintained in hot environment reduce their feed consumption which is a part of their physiological adaptation to reduce heat from nutrient metabolism. Even though the growth



is slowed, the broiler can now cope with the heat to certain extent because of lessened need for heat dissipation. Prolonged hot weather and extreme condition, the birds are not able to adopt the situation, so following dietary modifications to be practised:

a) Time of Feeding and Withdrawing Feed

The birds are to be fed at the cool part of the day so that the feed consumption will be high. Heat produced due to digestion, absorption and metabolism of nutrients inside the body is known as metabolic heat. Metabolic heat production reaches its peak at about 3-5 hrs after feeding and increase of heat production is associated with 1-2⁰c rise in body temperature. Therefore, if the birds are fed early morning at about 5-6 AM then the peak heat load will be at 9-11 Am which is prior to the natural peak heat load of the environment/shed.

b) Adequate Cool Drinking Water

Panting is accompanied with the increase in water loss by lungs. Provide cool drinking water round the clock and the waterer should not be empty in anytime. Among all the nutritional managements, providing adequate and cool drinking water with sufficient electrolyte is extremely important to heat stressed birds.

c) Increase Energy Density of the Diet

Birds maintained in hot environment reduce their feed consumption. Therefore, the dietary nutrients especially energy content of the diet should be increased by addition of fat @ 5% or more. Addition of fat not only increased energy content of the feed but also improves the palatability, reduces heat increment and increases nutrients absorption by lowering the passage rate of feed in the gut. The concentration of other nutrients like minerals and vitamins are to be adjusted depending on the feed intake.

d) Balancing Amino Acids with Low Protein Diet

Increasing protein level with imbalanced amino acids is a very wrong approach in heat stressed poultry. Higher protein level with imbalanced amino acids leads to produce more heat increment in birds than low protein with balanced amino acids.(as protein contributes more metabolic heat than carbohydrate and fat). Therefore, the percentage of protein level should be lowered and the diets should be supplemented with lysine and methionine i.e. the ratio of lysine with other amino acids has to be proper. Diets with balanced amino acids tend to reduce fat deposition in abdomen.

e) Vitamins and Minerals

Due to high temperature, there is destruction of some vitamins like vitamin A, vitamin



E in the feed and there is decrease synthesis of vitamin C by the birds. Therefore, natural/synthetic antioxidants should be added to cope up with the destruction of vitamins. A good number of researchers have found that addition of vitamin C and vitamin E help as antistress during heat stress. Trace minerals like zinc and selenium help in increasing the immunity in the birds.

Conclusion

Stress leads to decrease growth, feed intake, FCR, immunity and overall performance in poultry birds. Various nutritional amelioration protects the birds from various stressors and gives economic benefit to the poultry farmers

