

Feeding of Sea Buckthorn Leaf Meal in Poultry: An Overview

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Abstract

The continuous impressive growth in poultry sector is due to the technological intervention and breakthrough in terms of scientific feeding, breeding, management and health care by use of non-conventional feed and fodder resources to reduce the feeding cost as well as alternate feed resources for poultry. Sea buckthorn leaf meal is one of them, which is extensively used as non-conventional feed resources especially in the North western Himalayan regions. Sea buckthorn (*Hippophae rhamnoides* L.), an ancient shrub belongs to the family Elaeagnaceae has recently gained worldwide attention and popularity mainly due to its nutritional and medicinal value as the leaves, berries, pulp and seed contains different kinds of essential nutrients and bioactive compounds including vitamin A, B₁, B₁₂, C, E, and K; flavonoids, tocoferols, lycopene, carotenoids, and phytosterols. The sea buckthorn leaf meal is rich with various types of potent growth promoters, antioxidants, and antibacterial, antiviral and immuno-modulation properties. Dietary supplementation of sea buckthorn leaf meal leads to improving quality and quantity of egg production performances, immune-modulation, and longevity, health performance, breeding performances, while improving the growth rate, carcass quality, immunity, health status and longevity in broiler birds.

Keywords: Chabro; FCR; HHEP; Immuno-modulation; NCFR; SBTLM

Introduction

The India is a land of Biodiversity. The economy of India is mostly depends upon agriculture and allied sectors viz. livestock, poultry, fisheries and crops that together form an integral part of farming systems of our country. Livestock and poultry are the major components of agriculture in most of the developing countries that play an important role in their economy. Poultry is one of the fastest growing segments of the agricultural sector in India

with around 8-10 percent growth rate per annum [7]. India is the second largest egg producer and third largest broiler producer in the world with production estimates of 65,000 million (2.8 million tons) eggs and 3.0 million tons of broiler meat per year. The market is estimated to be worth about INR 90,000 crore [6].

The impressive growth in poultry industry is the result of technological breakthrough in feeding, breeding, management and health care [18]. The World Health Organization estimated that ap-

proximately 80% of the earth's inhabitants rely on traditional medicines for their primary health care needs as well as to improve the productive and reproductive performances of poultry. Herbal non-conventional feed resources (NCFR) may serve as safer alternatives as growth promoters due to their suitability and preference, lower cost of production, improved feed efficiency, fast growth, reduced mortality, reduced risk of diseases, minimum health hazards and environmental friendliness [23]. Feed alone contributes around 60 to 70 percent of total cost of rearing of poultry. Therefore, the production economy as well as economic traits can be improved mainly by minimizing the feed cost by herbal feed supplementation [20]. The leaves of SBT are very nutritious and can be fed to the animals after value addition. As protein is the most expensive nutrient, by introducing new protein source in breeder and their post hatch diet, we can certainly decrease the cost of production [1]. SBTLM is a Non Conventional Feed Resources (NCFR), also known as 'Golden Bush' or "Cold desert gold, having high potential as a bio-resource for land reclamation, reducing soil erosion, medicinal and nutritional properties in the leaves and fruits. In India fruit of sea buckthorn is also known as 'Leh berries' or 'miracle fruits' [5,24].

Discussion

Properties

In ancient Greece, feeding of leaves of Sea buckthorn with horse fodder resulted in more weight gain and shiny hair, and thus the Latin name 'Hippo' means Horse and 'Phaos' means Gloss or flare *i.e.* 'Hippophae' meaning shining horse is an ancient plant with modern virtues, due to its nutritional and medicinal value. All parts of Sea buckthorn e.g. berries, leaves, and seed or pulp oils contain many bioactive compounds [25]. They are a rich source of natural antioxidants such as ascorbic acid, tocopherols, carotenoids, flavonoids [12,13,29], while they contain proteins, vitamins (especially vitamin C), minerals, lipids (mainly unsaturated fatty acids), sugars, organic acids and phytosterols. Livestock and human studies suggest that sea buckthorn may have various beneficial effects: cardioprotective, antiatherogenic, antioxidant, anti-cancer, immune-modulatory, anti-bacterial, antiviral, wound healing and anti-inflammatory [4,9,10,17]. Several studies showed that the leaves and fruit residues of SBT could be used to feed poultry and livestock without accumulation of toxins and the feed also had a stimulating effect on growth and performance of poultry birds and livestock [3,11,14,19]. Therefore, it would be worthwhile to per-

form more scientific research on this medicinal plant and to promote its large scale utilization for livestock and poultry health, production and welfare.

Body weight gain

Studies showed that the leaves and fruit residues of sea buckthorn could be used to feed poultry and livestock without the accumulation of toxins, and that the feed also had a stimulating effect on growth and performance of poultry and livestock [15,28].

Dietary supplementation of SBTLM in breeder diet as well as post hatch diet on resulted in significantly higher ($P < 0.05$) body weight and body weight gain in post hatch chicks in 0.5%SBTLM supplemented group as compared to control group or basal diet group [2] during entire study period. It was also observed that supplementation of 0.5%SBTLM in breeder and post hatch diet resulted in a synergistic effect pertaining to body weight of coloured breeder as the interaction effect was better [21].

Immuno-competence traits

Addition of SBT leaf powder at 0.5% and 1.0% level in poultry feed was found to be safe for coloured breeder chabro birds on the basis of growth response, biochemical and the gross and histopathological studies. Response to 1%SRBC (log₂ titre) and cell mediated immune response to PHA-P (foot web index) were apparently better in both SBTLM supplemented groups as compared to control group. Moreover, it had immune stimulatory potential resulting in proliferation of lymphoid tissues in various lymphoid organs [26].

Egg production

The addition of 0.5% and 1.0% SBTLM in basal diet leads to improvement in hen house egg production either in weekly interval or during various fortnight intervals. It was also observed that basal diet+1.0%SBTLM supplemented group had significantly better ($P < 0.05$) response in phase wise average hen house egg production as compared to basal diet+0.5%SBTLM group, while it was lowest in control group [22,23].

Feed conversion ratio (FCR)

Dietary supplementation of SBTLM in breeder birds has beneficial effect in terms of feed conversion ratio. The weekly FCR on egg weight basis and egg dozen basis were significantly better (P

< 0.05) in basal diet+1.0%SBTLM supplemented breeder bird's group during 4-8 weeks, 8-12 weeks and 0-12 weeks (overall) as compared to control group. The FCR in post hatch chicks up to the 8 weeks of age (slaughter age) in both dietary supplemented group were significantly ($P < 0.05$) better than control group or basal diet supplemented group.

Internal and external egg quality parameters

The shape index, shell thickness and Haugh units were significantly higher ($P < 0.05$) whereas the egg weight were apparently better in both dietary SBTLM supplemented groups as compared to control group throughout the experimentation [27].

Fertility and hatchability of egg

During the entire experimental period, percent fertility and percent hatchability were comparatively better in both dietary SBTLM supplemented group as compared to the control group throughout the experimental period.

Carcass traits

There is no significant differences were recorded in slaughter traits, cut-up parts and development of digestive organs except the percent dressing, eviscerated weight, heart weight and wing weight were significantly higher ($P < 0.05$) in BP+0.5%SBTLM supplemented group as compared to control group.

Economics

Cost of feed consumed per kg egg production (Rs.) was significantly lower ($P < 0.05$) in basal diet+1.0%SBTLM supplemented group as compared to control group during phases of 4-8 weeks, 8-12 weeks and overall (0-12 weeks) experimental feeding.

Conclusion

The Sea buckthorn leaf contains high crude protein and possess many bioactive substances notably lipids, fatty acids, vitamins, flavonoids, tannins, phenols, progesterin, amino acids, minerals like calcium and phosphorus along with coumarin, triterpenes, steroids, amyriin, organic acids, unsaturated essential fatty acids and possesses growth promoter, immune-modulator, anti-coagulant, anti-spasmodic, anti-pyretic, anti-oxidant and many more other beneficial properties. Therefore, supplementation of sea buckthorn leaf meal in chicken may result in immuno-modulation, optimization of growth and production traits in poultry. Sea buckthorn is excellent source of NCFR for poultry birds and it is a good feed opportunity

to improve food security and socio-economic status of farmer as well as to improve poultry health, production and welfare. Dietary supplementation Sea buckthorn leaf meal will be helpful in improving the socio-economic status of the farming community as well as improving, growth, health, production performance, economic traits and immunity of the birds.

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Conflict of Interest

Author declares no conflict of interest.

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