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Utilization of Shatavari meal in poultry feed: an overview

Abstract

Over the past few years, one of the most promising approaches has been the exploration of the power of the nature i.e. herbs, shrubs and trees. Shatavari (*Asparagus racemosus*) is a woody climber and the roots are finger-like and clustered. Shatavari contains steroid saponins. The present review reflects on the few studies undertaken on shatavari meal to modulate growth and immunity in chicken. However, there is a need for comprehensive studies in different species of poultry validating its dose and mode of action in poultry.

Keywords: Shatavari, poultry, feed, growth, immunity

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Introduction

In the recent past, efforts have been made to counteract the adverse effects of various levels of stress and augment the production potential in poultry by using herbs possessing therapeutic potential. Number of herbal medicines has been studied on poultry species such as the herbal growth promoters which optimize hepatic functions of the birds. Efforts have been made to study the effect of dietary supplementation of Shatavari *(Asparagus racemosus)* root powder in the diet of broiler chicks to augment the growth of broilers.[1,2] Shatavari (*Asparagus racemosus*) also known as the "Queen of herbs" is a woody climber growing 1-2 m in height and the roots are finger-like and clustered. The leaves are like pine needles, small and uniform and the inflorescence has tiny white flowers in small spikes. The genus *Asparagus* includes about 300 species around the world. The genus is considered to be medicinally important because of the presence of steroidal saponins and sapogenins in various parts of the plant. Out of the 22 species of *Asparagus* recorded in India, *Asparagus racemosus* is the one most commonly used in traditional medicine. This plant belongs to Liliaceae family, common at low altitudes in shade and in tropical climates throughout India, Asia, Australia and Africa. Shatavari has been mentioned in Ayurvedic texts like the Charak Samhita, Susruta Samhita and Astanga Samgraha.[3,4] Shatavari possesses nutritive, antistress, adaptogenic, immunomodulatory, galactogogue, anabolic and performance enhancing properties and are used in various medicinal preparations.[5-9] According to recent chemical investigations, shatavari contains four steroid saponins: Shatavarins 1 to 4. Shatavarin 1 is the major glycoside of sarsasapogenin, the sugar moieties being 3 glucose and 1 rhamnose. Shatavari 4 is structurally related to shatavarin 1 and contains 2 glucose and 1 rhamnose. Overall Shatavari is a soothing tonic, alternative demulcent, refrigerant. It nourishes and rejuvenates the tissue, promotes vitality and strength. It is bitter, emollient, cooling, nervine, appetizer and astringent. It is used for diseases of blood and nervous disorders as well as general debility.

Discussion

Properties

Shatavari has been mentioned in Ayurvedic texts like the Charak Samhita and Susruta Samhita, and Astanga Samgraha.[3,4]

Kashyap Samhita has evidently stated that Shatavari promotes maternal health and noted its meticulous use as a galactagogue (enhances breast milk secretion in lactating mothers). Ayurveda has called Shatavari the Queen of herbs and is the primary herb recommended for female health. They exhibit immuno-modulatory activities. The root of *Asparagus racemosus* (commonly called 'Satavar') possesses antidiarrhoeal, anti-ulcerative, anti-spasmodic, aphrodisiac, galactogogue and other properties and has therefore gained its importance in Ayurveda, Siddha and Unani systems of medicine.[10]

Asparagus root possesses aphrodisiac, demulcent, general tonic, diuretic, anti-inflammatory, antiseptic, anti-oxidant and antispasmodic properties. Regular use of asparagus root treats infertility, impotence, leucorrhea, menopause syndromes, hyperacidity and certain infectious diseases such as herpes and syphilis. It is also useful in treatment of epilepsy, kidney disorders, chronic fevers, excessive heat, stomach ulcers and liver cancer, increases milk secretion in nursing mothers and regulates sexual behaviors.

These roots find use in various medicinal preparations.[8,9] The stem is woody, climbing, whitish grey or brown colored with small spines. The plant flowers during February–March leaving a mild fragrance in its surrounding and by the end of April, fruits can be seen with attractive red berries. *Asparagus racemosus* is a plant used in traditional Indian medicine.[11]

The root powder of *Asparagus racemosus* is used as herbal feed additive/supplement in poultry feed. Shatavari augments the appetite and stimulates the liver. The root is used to prepare medicine.

Chemical constituents of Shatavari

The major active constituents of *Asparagus racemosus* are steroidal saponins named as shatavarin I and shatavarin IV which are present in the roots. Shatavarins are the glycoside of sarsasapogenin which are generally occurring in two types of skeletons furostanols and spirostanols rhamnose. 8-methoxy- 5, 6, 4'-trihydroxyisoflavone, a new isoflavone was isolated by roots of *Asparagus racemosus*. A noval oligospirostanosid 1,3-*O*-[*α*-L-3-rhamnopyronosyl-(1→2)-*α*-L–rhamnopyronosyl(1→4)-*O*-β-D glycopyranosyl] 25(*S*)-5β Spirostan-3β-ol also known as immunoside was isolated and it was biologically evaluated as an immunomodulatory agent.[12] Chemical structure

of steroidal saponines of *Asparagus racemosus* has antioxidant compound named Racemofuran, together with known compounds asparagamine A, and racemosol.[13] Three steroidal saponins namely Racemosides A, B and C were isolated from the methanolic extract of fruit of *Asparagus racemosus*.[14] Isolation and structural clarification of Asparinins, Asparosides, Curillins, Curillorides and shavatarins was performed along with isolation of a new steroidal saponin shatavarin V from *Asparagus racemosus* powdered roots. Five steroidal saponins VI-X together with five known saponins Shatavarin I, Shatavarin IV, Shatavarin V, Schidegerasaponin D5 Immunside were isolated from *Asparagus racemosus* roots.[15]

Body weight

It had been reported that supplementation of Shatavari powder @ 10 kg/ton and Aswagandha powder @ 5 kg/ton to basal diet showed significantly (P<0.05) higher body weight.[2] Herbal feed additive prepared from whole plants of Ashwagandha [*Withania somnifera*], Shatavari [*Asparagus racemosus*] and Kapikachhu [*Mucuna pruriens*] (50:25:25) and mixed as powder to basal diet @ 2% resulted in significant higher (P<0.05) body weight at 6th week in the treated group as compared to control group.[16] It had been observed that there was significantly (P<0.01) higher live body weight in 0.5%, 1% and 1.5% *Asparagus racemosus* root powder supplemented groups as compared to control broilers.[17]

Body weight gain

There was significantly (P<0.05) higher body weight gain in 0.25% and 0.5% *Asparagus racemosus* (Shatavari) root powder supplemented groups as compared to control groups in broilers.[18] It was observed that there was observed significantly (P<0.05) higher body weight gain in 0.5% and 1% *Asparagus racemosus* (Shatavari) root powder supplemented groups as compared to control in broilers.[19] Further, it had been observed significantly (P<0.05) higher body weight gain in 0.5% and 1% *Asparagus racemosus* (Shatavari) root powder supplemented groups as compared to control in broilers.[20] It had been reported that supplementations of Shatavari powder @ 10 kg/ton and Aswagandha powder @ 5 kg/ton to basal diet showed significantly (P<0.05) higher body weight gain.[2]

Feed consumption

It was reported that the cumulative feed consumption at sixth week of age was better in 0.5% and 1% *Asparagus racemosus* (Shatavari) root powder supplemented groups as compared to control in broilers.[19] It was observed that the average feed consumption of 0% (control) and 0.25% *Asparagus racemosus* (Shatavari) root powder supplemented group was higher as compared to 0.5% shatavari supplemented group in broilers.[18] It had been indicated that feed consumption was significantly (P<0.05) higher in 1.5% Shatavari root powder supplemented group as compared to other groups of broiler birds.[21]

Feed conversion ratio

It had been reported that feed conversion ratio was significantly (P<0.05) lower in Shatavari root powder as compared to control group in broilers.[21] It was noted that supplementation of Shatavari root powder at 0.5%, 1% and 1.5% resulted in better feed conversion efficiency.[17] It was reported that herbal feed additive prepared from whole plants of Ashwagandha, Shatavari and Kapikachhu and mixed as powder to basal diet @ 2% resulted in better feed conversion ratio at 6th week as compared to control group.[16]

Immunocompetence traits

It was noted the immuno-modulatory effects of *Asparagus racemosus* extract treated feed which resulted in significant (P<0.01) higher humoral and cell mediated immune responses of the birds compared to control group.[22] It was reported that the broilers treated with *Asparagus racemosus* alone as well as in different combinations with *Sida cordifoliawas* and *Levamisole* starting from 28th day of age for 2 weeks had higher antibody production than normal due to more stimuli to the immune system.[23]

Biochemical attributes

It was reported blood glucose, calcium, and phosphorus were significantly (P<0.05) higher in Shatavari supplemented groups as compared to control group and highest in 1.5% Shatavari powder in broilers. Blood urea nitrogen and creatinine was found significantly (P<0.05) lower in Shatavari supplemented groups as compared to control.[21] It had been reported that supplementation of Shatavari root powder at 0.5%, 1% and 1.5% level resulted in significantly (P<0.01) higher Hb, total serum protein, albumin and globulin value in chicken as compared to control.[17] It had been reported that the Shatavari powder and vitamin E was added to the basal diet@ 0% and 0 mg/kg feed, 1% and 0 mg/kg feed, 1.5% and 0 mg/kg feed, 0% and 200 mg/kg feed, 1% and 200 mg/kg feed, 1.5% and 200 mg/kg feed. There was a significant (P<0.05) increase in hematological parameters like total erythrocyte counts, hemoglobin, packed cell volume, mean corpuscular volume, mean corpuscular Hb and mean corpuscular Hb concentration in Shatavari and vitamin E treated groups than control group. Total serum protein, albumin, globin were significantly (P<0.05) higher and cholesterol, alanine aminotransferase and aspartate aminotransferase were significantly (P<0.05) lower in shatavari and vitamin E treated groups than control group.[24]

Carcass characteristics

It had been reported that there was a significantly (P<0.05) higher percentage of dressing yield in 0.25% and 0.5% *Asparagus racemosus* (Shatavari) root powder supplemented groups as compared to control in broilers.[18] Further, it had been reported that the powder of Shatavari and vitamin E was added to the basal diet@ 0% and 0 mg/kg feed, 1% and 0 mg/kg feed, 1.5% and 0 mg/kg feed, 0% and 200 mg/kg feed, 1% and 200 mg/kg feed, 1.5% and 200 mg/kg feed. Carcass quality and organ weight was significantly (P<0.05) higher in treatment groups as compared to control, observed highest in Shatavari 1.5% and 200 mg/kg feed vitamin- E group of broiler chickens. Therefore, it was concluded that supplementation of Shatavari 1.5% and 200 mg/kg feed vitamin- E was observed more beneficial to remove cold stress and improve growth performance, carcass quality and organ weight of broiler birds.[24]

Conclusion

Studies have been undertaken to assess the effect of Shatavari root meal on the growth, immunity, blood biochemical attributes and carcass quality characteristics of broilers. However, detail studies are necessary to assess the efficacy of Shatavari root meal at various levels at various levels on the productive performance and immunity of different varieties of chicken.

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Conflicts of interest

Author declares that there is no conflict of interest.

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