

## Aloe vera: A Review on Use as a Natural Feed Additive in Poultry

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**ABSTRACT:** Use of medicinal herbs like Aloe vera, Tulsi, Neem, Ashwagandha etc. as natural growth promoters are increasing in poultry. Out of all these, Aloe vera is well-known herbal plant used in poultry. Aloe vera is rich source of vitamins, minerals, enzymes and polysaccharides. Aloe vera have antimicrobial, antifungal, antiviral, immunomodulating, anti-inflammatory and antioxidant or sedative properties. A complex mixture of bioactive compounds present in them is known for their appetizing effects, since they increase the palatability of the feed and stimulate endogenous digestive enzymes. Additionally, it has a pronounced impact on the gut microflora. Medicinal plants, containing active ingredients to promote growth, weight gain and immune-stimulant in poultry. These potentials of aloe vera drives used as feed additives in poultry to improve weight gain, feed efficiency, feed intake and improve the serum biochemical parameters.

**Keywords:** Aloe vera, Feed additive, Performance, Composition, Poultry.

### INTRODUCTION

Due to restriction on use of antibiotics in poultry production, researchers have been focusing on plant based new class of feed additives in poultry. Many countries have seen a rise in the consumption and demand for medicinal herbs due to their easy availability at low cost, affordable and ability to enhance bird performance (Lewis *et al.*, 2003). In addition, scientists and researchers worldwide are working to prevent fatal diseases in poultry by using medicinal plants. The active ingredients present in medicinal herbs have properties that promote growth, increase weight and boost the immune system. Thus, medicinal plants Aloe vera, Neem, Shatavari, Ashwagandha, Tulsi, Giloy etc. are using in poultry feed as natural growth promoters. With numerous properties, *Aloe varies* among the most well-known medicinal herbs belongs family *Liliaceae* have been introducing in poultry. Aloe vera is a succulent, stem less herb with more than 70 biologically active chemicals. Leaf is important part of Aloe vera which is composed of latex and gel. Aloe vera have antibacterial, antiseptic, anti-inflammatory and immune-modulating properties (Boudreau and Beland 2006; Madan *et al.*, 2008; Radha and Laxmi Priya 2015). Aloe vera contains shows anti-inflammatory activities due to presence of sterols which have potential to inhibit the inflation. Previously in many researches anti-oxidant and anti-cancer effects of aloe vera has also been demonstrated (El-Shemy *et al.*, 2010; Nwaoguikpe *et al.*, 2010; Mascolo *et al.*, 2004; Yadav *et al.*, 2017).  
Mali *et al.*,

Major ingredients of *Aloe vera* include anthraquinones, saccharides, vitamins, enzymes, and low-molecular-weight compounds (Choi and Chung 2003) due to which *Aloe vera* have been wound-healing, anti-viral, anti-fungal, anti-tumor, anti-diabetic, and anti-oxidant effects (Christaki and Florou-Paneri 2010). In another findings of Hegggers *et al.* (1979) proven the aloe have antibacterial property. Due to this it modifies the intestinal microflora of broilers which might be influence on nutrient utilization and improve growth performance of birds.

**Table 1: Chemical Composition of Aloe vera.**

Sr. No.	Parameter	Value
1.	Moisture content (%)	99.00
2.	Sugars (%)	0.17
3.	Lipids (%)	0.04
4.	Protein (%)	0.07
5.	Phenolic compounds (%)	0.01
6.	Polysaccharides	0.55
7.	Minerals	0.16

(Liu *et al.*, 2013).

*Aloe vera* is a succulent, delicate plant that composed of lot of water (99–99.5%) and solid concentrations range (0.5–1%). Fat- and water-soluble vitamins, minerals, simple/complex polysaccharides, organic acids, enzymes and phenolic compounds are active ingredients in *Aloe vera* (Hamman, 2008). Mannose, glucuronic acid, inorganic steroids have identified from aloe vera and also analyzed polysaccharides including galactogalacturan, arabinan, galactan,

glucogalactomannan and galactoglucoarabinomannan. Polysaccharides present in aloe vera can enhance cellular and humoral immunity researched by Duet *et al.* (2011). It is also loaded with micro and macro minerals including Ca, Fe, Mg, Cu and Cl. Also contains Phosphorous, Potassium, Sodium and Zinc (Sayyora and Bakhodirovich 2020). These potentials of aloe vera drives used as feed additives in poultry to improve weight gain, feed efficiency, feed intake and improve the serum biochemical parameters. Considering all these benefits of aloe vera in this review paper, we will discuss the effect of use of aloe vera as feed additives in poultry.

## **EFFECT OF ALOE VERA ON GROWTH PERFORMANCE OF BROILERS**

### *A. Body weight and Weight Gain*

Several researchers have been studied efficacy of aloe vera on the growth performance of broilers. In earlier study Mehala and Moorthy (2008) found that broilers fed Aloe vera (0.1 % and 0.2 %) and Curcuma longa powder (0.1 % and 0.2 %) in alone or combination had no significant change in body weight gain and feed conversion ratio. Silalahi *et al.* (2009) observed that non-significant effects of dry and fresh Aloe vera barbadense gels on weight gain. Aloe vera received groups showed increased body weight and weekly weight gain of broilers (Olupona *et al.*, 2010; Mmereole, 2011). Odo *et al.* (2010) found that in comparison to the control group, broiler diet with AV leaves increased body weight. Yim *et al.* (2011) added aloe vera powder (0.1 %, 0.3 %, and 0.5 %) to the feed of these broilers. Result discovered that aloe vera powder did not significantly differ the body weight gain. Hassan *et al.* (2012) examined that broiler supplemented 1.8ml/liter aloe vera gained the higher body weight. Alemi *et al.* (2012) noted that birds treated with 0.75 per cent and 1 per cent aloe vera gel powder showed enhanced body weight and feed efficiency. Hassan beigy-Lakeh *et al.* (2012) discovered that highest body weight growth with better FCR in aloe vera gel offered group. Doley *et al.* (2014) examined that broiler chicks' feed combination of aloe vera powder with yeast had a beneficial impact on their growth performance of broiler chickens. Fallah (2015); Nghonjuyi *et al.* (2015) pointed out improved body weight and weight gain on addition of aloe vera in form of gel or powder in feed of broilers. Islam *et al.* (2017) found that significantly ( $P < 0.05$ ) higher live weight of broilers on administration of 15 ml/L aloe vera aqueous extract in drinking water. Furthermore, Bernard *et al.* (2016); Nalge *et al.* (2017) concluded that administration of aloe vera extract with drinking water, improved broiler performance without hurting overall health status of the birds. Online *et al.* (2017); Jamir *et al.* (2019); Quaye *et al.* (2023) realised in their separate studies that administration of aloe vera did not influence performance of broilers in terms of body weight. Gohel *et al.* (2019) found that addition of Tulsi and Aloe vera @ 0.5% in the diet of broiler chickens improved feed conversion ratio and return over feed cost and profit per bird. Aloe vera offered @0.1-1.0%

positively enhanced body weight of birds observed by Ebrahim *et al.* (2020). Similar findings obtained by Bolu *et al.* (2013) aloe vera gel given birds had higher body weight gain and FCE. The overall gain of koekoek chickens greatly improved with aloe vera was observed by Sakadzo and Rindirai (2020). These improvement in gain might be due to aloe vera extract have antimicrobial activity and composed of nutrients which have added to nutritional composition of chicken diets which ultimately contribute to body weight gain and feed consumption efficiency. Use of aloe vera in poultry production as a natural feed additives alternative to antibiotics reviewed by Jalal *et al.* (2019). They concluded that aloe vera had positive impact on growth performance of broiler, intestinal microflora and helps to improve immune system of birds.

## **FEED CONSUMPTION AND FEED EFFICIENCY**

According to Durrani *et al.* (2008); Silalahi *et al.* (2009) better ( $P < 0.05$ ) feed conversion ratio on inclusion of Aloe gel in broilers ration. Dietary feeding of aloe vera in broilers had positive effect on the feed efficiency noted by Mansoub (2010). The improved intestinal health and gut microflora could improve absorption of nutrients and utilization subsequently high growth performance and good feed conversion ratio (Patel and Sharma 2013). Amaechi and Iheantu (2014) observed that significantly better feed conversion ratio in aloe vera powder treated group as compared to antibiotic Enramycin treated and the control group. Singh *et al.* (2015) noticed that feeding 1.0 and 1.5% whole leaf aloe vera powder significantly ( $P < 0.05$ ) lower in 1.0 and 1.5% the FCR. No significance effects on carcass parameters. Yadav *et al.* (2017) found that supplementation of aloe vera leaves powder (0.5%) had non-significant on feed conversion ratio. Positive effects of aloe vera on performance of birds might have been due to antimicrobial, anti-inflammatory and antioxidant qualities. (Cui *et al.*, 2017). Akram *et al.* (2019) noted that feed intake and FCR were increased in broiler at 21 and 35 days of age on addition of aloe vera extract. Inclusion of aloe vera gel in broiler water at different levels significantly ( $P < 0.05$ ) improved feed conversion ratio in broiler (Singh *et al.*, 2017; Amber *et al.*, 2020). Likewise, Ashar *et al.* (2022) found that feeding of Aloe vera powder was no significant effect on weekly feed intake and feed conversion ratio in broiler birds. Additionally, Supplementation of aloe vera did not differ feed intake in broiler birds (Shokraneh *et al.*, 2016; Tanwar *et al.*, 2022; Quaye *et al.*, 2023).

## **EFFECT ON CARCASS TRAITS AND ORGAN WEIGHT**

Higher dressing percentage were observed in *Aloe vera* gel treated group compared to the control (Darabighane *et al.*, 2011). In other findings of Eevuri and Putturu (2013) observed that increased liver, spleen, gible weight and dressing percentage in broilers on inclusion of aloe vera. However, reduced fat accumulation was observed. Salarya *et al.* (2014) studied the results of carcass characteristics in response to treatments

(control) and the inclusion of 0.2 and 0.4% of *Aloe vera* and the inclusion of 0.2 and 0.4% licorice extracts in drinking water. The results revealed that the highest thigh weights were obtained by 0.4% licorice extracts ( $P < 0.05$ ) which did not significantly differ with 0.4% of *Aloe vera* at 21 days of age. Mohamed *et al.* (2017) noticed that for 42 days diets supplemented with aloe vera leaf powder at 0, 1.5, 2.0 and 2.5% had no significant effects on internal organ weights and carcass traits. Padvani (2019) found that supplementation of Aloe vera @ 0.5, 1.0 and 1.5% had no-significant difference in dressing percentage, breast weight, giblet weight and thigh weight. Jamir *et al.* (2019) observed that broiler fed with Aloe vera at 1.0, 1.5 and 2.0% no significant differences in carcass yield. Arif *et al.* (2021) noted that combination of aloe vera powder (0.25%) + Clove powder (0.25%) significantly improved body weight and FCR. Furthermore, significantly ( $P < 0.05$ ) highest breast yield and carcass weight in aloe vera and clove powder fed group.

### EFFECT ON HAEMATOLOGICAL AND SERUM BIOCHEMICAL PARAMETERS

Aloe vera has exhibited the hypoglycaemic and hypolipidemic effects (Lim *et al.*, 2003; Joseph and Raj (2010). Previously studied Chandrakar (2011) found that lower levels of total cholesterol, ALT, ALP, and AST in aloe vera powder supplemented group. Also, no significant differences in Albumin, Globulin, Total protein, triglycerides, GGT, BUN and Urea. According to Razik *et al.* (2012); Eevuri and Putturu (2013) supplementation of aloe vera reduces blood cholesterol, triglycerides, low density lipoprotein whereas, increases high density lipoprotein in broiler chicks. Mahdavi *et al.* (2012) observed that broiler fed ration with aloe vera gel powder significantly increases total WBCs, RBCs, and haemoglobin concentration. Taraneh *et al.* (2016) examined those reduced levels of uric acid, glucose, cholesterol, triglycerides and low-density lipoprotein (LDL) in broiler offered 3% aloe vera gel with drinking water. Tariq *et al.* (2014) noted that serum albumin, globulin, albumin-globulin ratio, serum protein and triglycerides were influenced by supplementation of aloe vera powder alone and in combination with a clove powder in broiler birds. Sinha *et al.* (2017) observed that 7 gms administration of Aloe vera significantly decreased AST and ALT in all periods. Onyeji *et al.* (2021) found that birds received 10, 20 and 30% aqueous aloe vera leaf extract significant increase in serum creatinine, ureal levels whereas, reduced protein and albumin level. Quaye *et al.* (2023) showed that aloe vera treated group had higher values for haemoglobin, red blood cell counts and mean corpuscular.

### CONCLUSIONS

It could be concluded that addition of aloe vera at various level in broiler ration has improve the growth performance of broilers in terms of gain in body weight, feed efficiency. Also, it has observed positive impact carcass traits as well as on serum blood lipid profile in poultry. Use of aloe vera might be a safe alternative to antibiotics without any detrimental effect on poultry.

### FUTURE SCOPE

Aloe vera could supplement in different forms (extract, powder or gel) at different levels in poultry ration. Being an herbal feed additive, it is best alternative to antibiotics as growth promoters and also improve immune system in poultry.

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