

From ban to opportunity, Aloe vera as an alternative to antibiotic growth promoters in broiler production

#EUBanantibiotic, #livestock, #broilerfeed, #chicken, #turkey, #aloevera, #growthpromoter, #freeantibioticbroiler, #amb-wellness, # broiler production, # Antimicrobial resistance, #chickenfeed, # poultry industry, # resistancepathogenicbacteria, # weightgainbirds, # broiler meat consumption



Antibiotic-free or reduced antibiotic use in broiler production.

On the 28th of January 2022, the European Union's new laws come into force, banning farmed animals from being routinely fed a diet of antibiotics – a move that World Animal Protection considers to be the most progressive in the world. The overuse of antibiotics is resulting in a global public health crisis, with as many as 3,500 human deaths worldwide from antimicrobial-resistant infections (superbugs) daily. The overuse of antibiotics is resulting in a global public health crisis, with as many as 3,500 human deaths worldwide from antimicrobial-resistant infections (superbugs) daily. The new regulations mean that only sick, individual animals (and not whole herds) may be administered antibiotics. It is now illegal to use antibiotics to compensate for low welfare practices. Across Europe, there are more than 300 million caged farmed animals, and 7.2 billion meat chickens are produced each year. Most of these animals suffer in factory farms where they are dosed with antibiotics in their feed or water. Around three-quarters of the world's antibiotics are used on farmed animals, especially on cruel factory farms. In contrast, animals living in high-welfare farms are healthier and more resilient to disease and are not reliant on antibiotics. As Europe is the world's biggest importer of food, these new regulations will also have implications globally, as the bloc will also reject imports of live animals or animal products where antibiotics have been used to promote the fast growth of animals. If your company is outside of Europe and export to some of the countries of the EU, requires by law to

comply with this new free antibiotic rule to not be banned from your importation. It is imperative the European Union fully implements and enforces the new rules for animal production within Europe, and with trade partners. Despite no clearly demonstrated relationship between animal production and specific adverse public health outcomes, there has been a progressively strong movement supporting the elimination of or stricter restrictions on the use of antibiotics in animal production. This concern results from the theoretical transfer of antibiotic resistance from animals used for food production to humans, potentially causing untreatable illnesses in people handling or consuming these products. People also worry that poultry treated with antibiotics could have residues in chicken, turkey, and table eggs. These concerns have been on the rise in the modern information age in which consumers seek more transparency in how food-producing animals are raised. It is important to note that legislation in many countries, such as in the United States and the European Union, requires extensive monitoring of meat products to ensure that antibiotic residues are not present in the food that reaches the marketplace.



Antimicrobial resistance and alternative products

‘Antimicrobial’ is a term used to describe medications that work against various microorganisms such as bacteria, viruses, fungi, and parasites. ‘Antimicrobial resistance’ is a broader term used to describe resistance to medications against bacteria and other microorganisms such as fungi, parasites, and viruses. Therefore, antibiotic resistance is a component of antimicrobial resistance, regularly used in scientific and popular literature to refer to the emergent and growing threat of diverse resistant microorganisms besides bacteria. Poultry production has contributed to global food security as an economical source of protein for all humanity. Although production has increased recently, there is still a shortage of biosecurity, likely due to infectious diseases and feed costs. Additionally, birds farmed under intensive and super-intensive systems

are susceptible to contagious diseases due to the spread of pathogens and invaders' emergence, which induces severe mortality and economic loss. Subsequently, common integrated approaches by applying antibiotic drugs, vaccines, and therapeutics must be used. However, chemotherapies are no longer allowed in many countries due to their environmental and hazardous impacts (e.g., the spread of antimicrobial-resistant bacteria, the weakening of birds' immunity, and human health safety concerns).

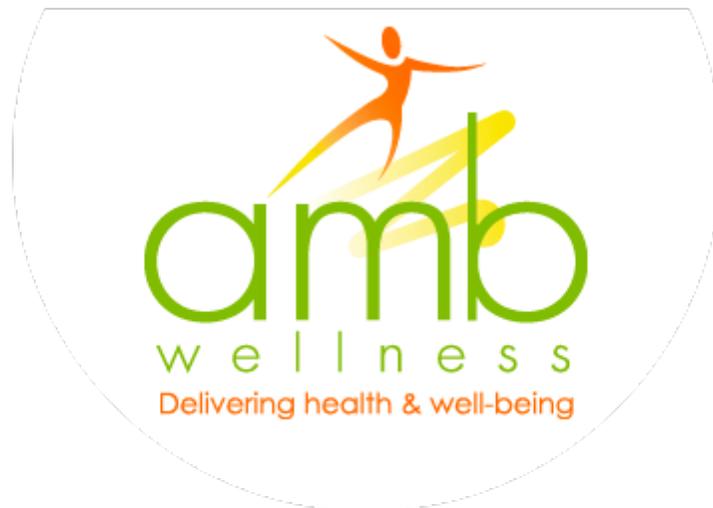


Alternative products – a thriving new industry: Aloe vera as additive feed.

There is rising interest in alternative products, which has created a thriving new industry and the availability of numerous products with various purported beneficial attributes that can be used in animals of all ages. Research and development of alternative products to reduce the need for and use of antibiotics in food animals have demonstrated some benefits. Although results vary, and further research is needed to maximize their benefits under different field conditions, alternative products are being used alone, or most commonly in combinations, by producers worldwide as part of comprehensive health management programs. Accordingly, safer alternative substances are highly recommended to control the infection of pathogens. Medicinal plant metabolites and their bioactive compounds have a broad therapeutic range to promote health, intestinal microflora, antioxidant effects, and immune system parameters in poultry. Phytogetic and herbals and their extracts and essential oils manifested appetite-stimulating, growth-promoting, and immunostimulatory activities in poultry production. A particular focus has been given to Aloe vera as a natural immunostimulant and antioxidant agent in poultry production. Aloe vera is a tropical plant belonging to the Liliaceae family and is well-known for its therapeutic and remedial properties associated with its content of bioactive components. It has abundant amounts of polysaccharides (e.g., acemannan), which act as immunomodulatory and antibacterial agents against harmful bacteria. Aloe vera gel is resistant to high acidity in birds' intestines, which guarantees its efficacy and influence. Aloe vera gel has an antibacterial effect to kill pathogenic microorganisms by breaking down their cell walls and weakening their activity and allowing the beneficial microorganisms to show its effect on the digestion of nutrients. Also, Aloe vera gel enhances the permeability of absorbed nutrients through the intestinal barriers.

Simply mix with drinking water aloe concentrate or mix aloe vera powder with chicken feed and boosts bird's immune system against major diseases such as Infectious bursal disease accordingly, the potential impact of Aloe vera gel on the immune system is attributed to the enhanced local intestinal immunity.

Further, Aloe vera gel has abundant amounts of polyphenols and natural antioxidants that scavenge the overproduction of free radicals that induce lipid peroxidation and immune cells damage. Additionally, the application of Aloe vera gel as feed additives enhanced the immunity of broilers and was suggested as a replacer for antibiotics. The most appropriate feed additive strategies are the oral administration through bird feed or Aloe vera gel included in drinking water, which markedly improves the performance. Aloe vera gel could be successfully added to broilers' drinking water with the possibility of enhancing growth performance, immunity, and resistance to pathogenic bacteria.



The broiler is an efficient feed converter into poultry meat in only 35 days, giving a quick return on investment that would allow 5-6 production cycles in a year. Broilers clearly dominate the world poultry consumption contributing about 70 % to the world poultry market. The frequent use of drugs as feed additives in poultry ration resulted in resistance to pathogenic microorganisms, affecting the feed efficiency and growth performance of poultry birds. Therefore, scientists have been giving their attention to medicinal plants (like aloe vera, neem, mulberry leaves, etc.) to achieve the targeted nutritional and health status of poultry. The consumption and demand for medicinal plants have been adopted in many countries because of their low cost. easy availability, ([check our Innovaloe brand Innovaloe ALOE VERA gel liquid concentrates and powder format](#)) affordability for a common farmer, good antimicrobial natured, reduced diseases associated risks, and diversified functions in improving performance, growth rate, feed efficiency, and weight gain in birds. From ban making an opportunity to use Aloe vera as an alternative to antibiotic growth promoters in broiler production antibiotics in the poultry industry has resulted in the demand for herbs as alternatives to antibiotics. Various research efforts have illustrated the nutritional value of Aloe vera in improving growth

performance and immune status and acting as an antibacterial and anticoccidial agent in poultry. Aloe extract mixed with drinking water makes the growth performance of chickens, Aloe extract created a positive effect on the growth of the chickens in body weight, feed consumption, feed conversion ratio, water consumption, and return on investment. Broilers given drinking water supplemented with the Aloe Vera extract don't affect the sensory evaluation of meat for its color, desirability, intensity, texture, tenderness, juiciness, and general acceptability. The final body weight, weight gain, daily weight gain, and feed conversion ratio were significantly improved in birds that received [drinking water with Aloe vera gel at 1.5%](#), and the blood total protein and albumin had higher values in birds that received drinking water with 1.5% Aloe vera gel, total blood cholesterol, triglycerides, and LDL levels were significantly decreased in the group of birds that received 1.5% Aloe vera gel in drinking water ($P \leq 0.05$). The HDL level was higher in birds that received drinking water with 1.5% Aloe vera gel than the control ($P \leq 0.05$). The total antioxidative capacity (TAC) and glutathione peroxidase (GPX) showed higher activity in the group of birds that received 1.5% Aloe vera gel while the level of malondialdehyde (MDA) was lower in birds that received drinking water with 1.5% Aloe vera gel than the control ($P \leq 0.05$). In summary, including Aloe vera gel in drinking water enhanced the growth rate, biochemical blood indices, and broilers' antioxidative capacity.

With the increasing demand for broiler meat consumption, efforts would be required to assure healthy food and better economic gains. Herbal products in past have been effectively used for the control and treatment of several ailments in poultry and human beings. Aloe vera, a medicinal plant, could be an effective substitute for coccidiostats because of its chemical nature and antimicrobial activities. Aloe gel has been used as an antibiotic, wound healing, anti-inflammatory anti coccidial, and anti-ulcer agent. It has been reported to be an effective tool in increasing the density of microvilli and enhancing the immunity of broilers. Aloe gel is one of the readily available from [AMB Wellness](#), one of the biggest aloe manufacturers worldwide, final weight and gains in weight were strongly influenced by the feed intake of the chicken. Some preliminary studies have also suggested that it may be a powerful antiviral agent and potent immune system enhancer. Aloe Vera is also rich in vitamins, minerals, and enzymes that promote overall good health in chickens. There are no side effects and Aloe Vera for chickens is safe to use. you can get several ALOE options: [Newcastle disease](#) in chickens, [gall sickness](#), parasites, diarrhea, dystocia, indigestion in poultry, typhoid, ticks, and lice in poultry, enhancing the growth rate, biochemical blood indices, and antioxidative capacity of broilers by Including Aloe vera Gel in drinking water.



Birds raised in intensive and super-intensive systems are more vulnerable to diseases, resulting in large mortality and financial losses. The adoption of well-accepted integrated strategies including the administration of antibiotics, vaccines, and other treatments, bacteria resistant to antibiotics, the decline in bird immunity, and security issues regarding people's health. Due to the emergence of microbial resistance and the presence of microbial residues in meat and eggs.



Antibiotic-free becomes a trend.

Antibiotic resistance is therefore a major public issue drawing attention from the health authorities, the food production and distribution chain, and the consumers. Several consumer associations, for instance, are asking for a prudent use of antibiotics, claiming their right to healthy and safe food, consumers are becoming concerned about the number of antibiotics used to raise chickens they are buying, Antibiotics were replaced by natural plant-based alternatives. EU banned the use of monensin sodium, salinomycin sodium, avilamycin, flavophospholipol, bacitracin, spiramycin, tyrosine, and virginiamycin, once more the ban was carried out against the expert scientific advice of SCAN citing fears of antibiotic resistance spread via the food chain and invoking the precautionary principle. Ban results in antibiotic resistance. As anticipated, the antibiotic feed additive bans have resulted in substantially lower levels of antibiotic resistance for the corresponding antibiotic on indicator bacteria isolated from raw meat products, antibiotic use will create antibiotic resistance, whether in animals or people. Finally, it has recently been reported that concentrations of various antibiotic feed additives and ionophore anticoccidials like those normally used in poultry rations had an inhibitory effect on the transfer of a multiresistant-conferring plasmid in *E. coli* in an in-vitro test system. Feed additive antibiotics

and ionophore anticoccidials may inhibit resistance transfer mechanisms within poultry and livestock. The EU banned the use of various antibiotic feed additives at levels labeled for growth promotion. The antibiotics used to treat food-producing animals belong to the various classes of antibiotics most frequently used in human medicine, this might have had a more adverse effect on the creation of antibiotic resistance in people than the use of antibiotic feed additives.



Answers may lie in plant extracts.

Confronted with these regulatory adjustments and the food chain pressure, the animal production sectors have no choice but to improve their health and nutrition approaches. Part of the answer may be found in the vegetal kingdom, with the several benefits of plants in animal feed. Feed additives based on plant extracts aim at improving the animal health and the qualities of its feed: added in small quantities to the raw materials, they preserve the animal health, improve the rations efficiency, reduce the production costs, enhance the product features, and reduce the environmental footprint. Today, several scientific research precisely define the plants and plant extracts feed additives benefits. Their compounds are now well characterized, and their ROI is measurable. Herbal therapy has historically been a useful therapeutic option in many parts of the world. However, little of this crucial ethnoveterinary information has been documented. In view of the rising cost of pharmaceuticals and their expanding significance in the future production of organic goods, herbal plants need to be recorded. Additionally, because herbs are naturally a broad spectrum, they offer a viable alternative when diseases develop resistance to antibiotics. Aloe vera is a stemless, succulent medicinal plant belonging to the Liliaceae family, Aloe vera extracts of Aloe vera (AV) as a growth promoter, immunostimulant and coccidiostat agent in broiler production, broiler birds (Cobb), chicks, broiler starter and finisher, diets supplemented as an alternative to antibiotic growth promoters. Polysaccharides, phenolic substances, vitamins, minerals, sugars, proteins, and saponins make up its gel and have unique pharmacological properties in various disorders. About 98% of the Aloe vera gel's ingredients are water. Aloe vera gel's solid component has an average pH of 4.55 and is made up of 0.56 % to 66% total solids from aloe vera compounds, there are more than 75 distinct active components in this substantial amount. Vitamin A, riboflavin, thiamine, pyridoxine, niacin,

vitamin E, choline, vitamin C, and folic acid are among the vitamins abundant in Aloe. Calcium, iron, copper, magnesium, chromium, potassium, manganese, sodium, phosphorus, and zinc are significant minerals extracted from Aloe vera. Aloe vera gel is mostly composed of cellulose, mannose-containing polysaccharides, and pectic polysaccharides. Other phytochemicals include enzymes, lectins, anthrones, polymannans, resins, sterols, acetylated acids, terpenoids, tannins, mannan compounds, and flavonoids. In the current review, we have detailed the effects of Aloe vera as an alternative to antibiotics on growth performance, antimicrobial and antiparasitic activities, and blood biochemical alternations in poultry. Aloe vera added to broiler feeds depends on several factors: a form of use, powder, gel, extract aqueous, polysaccharide extracted from the gel, dosage, genetics of broilers, ingredients of diet, and farm management.



Balancing the antioxidant status

Aloe vera is rich in natural antioxidants, such as tannins, polyphenols, and flavonoids that protect animals against free radicals, responsible for oxidative stress. The main benefits of aloe vera extract feed additives are to improve feed efficiency, especially starter feed, improve animal immunity by fighting against free radicals and regenerate the effect of vitamin E and overcome its lack of bioavailability. Aloe Vera extract supports and regenerates vitamin E and antioxidants enzymes, especially in young animals which have an important need for antioxidants but hardly assimilate vitamin E.

Improving meat quality

Aloe Vera extracts also seem to improve meat quality. They maintain PUFA, prevent meat rancidity, stabilize the red color, and improve meat retention, leading to a finished product more flavoring and is juicier. A comparative trial (done by Nor-Feed Sud) conducted with pigs showed that meat coming from the group of animals fed with a supplement of aloe vera extracts did not

show drip loss in the packaging after several days, keeping thus a fresher and tastier aspect for the consumers.



Growth Effects in Poultry from aloe vera water intake.

Effects of aloe vera extract in drinking water on broiler performance, in the poultry industry, birds are maintained in confinement systems and large flocks to achieve higher economic returns. In such a situation, birds are exposed to stress and inducing factors such as high population, vaccination, and temperature changes. The intestinal microflora is influenced, and sometimes imbalanced, by these factors, leading to deteriorated health conditions for chickens. Therefore, the imbalance in intestinal microflora may result in a weakened immune system and failure of growth performance in chickens. Additives, such as antibiotics, may assist in dealing with such problems. Feed is a major component, affecting net return from the poultry business, because 80% of the total expenditure in terms of cash is spent on feed purchases. Ensuring more net return and minimizing high expenditure on feed are the main challenges, for which many research strategies have been practiced such as introducing feed supplements and feed additives. Furthermore, long-term inclusion of antibiotics in animal and poultry diets can result in increased microorganism resistance to such groups in the human body. Thus, antibiotics are banned from being added to feed in the EU and some other countries. Improved growth-promoting effects in term of feed intake, weight gain, and feed efficiency of Aloe vera has the potential to be a growth promoter in broiler chicks, and its growth-stimulating effects are comparable to antibiotic growth promoters. Blended Aloe vera and terramycin in broiler treatment caused chickens to gain weight at a considerably greater rate. Aloe vera gel extract in drinking water is more effective in enhancing broiler performance than antibiotic growth promoters, without having a negative impact on the birds' general health status. Aloe vera supplementation in broilers reportedly reduced feed consumption, changes in feed taste, and increased appetite can be linked to increased feed intake in Aloe vera gel-supplemented birds, herbs can increase endogenous secretions and hunger, which in turn can enhance performance. Enhancing feed intake, endogenous digestive enzyme secretion, antioxidation status, and antibacterial properties are a few positive effects demonstrated by Aloe vera. Improved growth

effects have also been positively correlated with positive effects on intestinal histological features in broilers and other poultry species. Below, there are some doses proposed for [several scientific papers](#).



Aloe vera feed intake (%) *

- Dose: 0.5% leaf powder Increase Japanese quails.
- Dose: 2% Aloe vera extract Increase Broiler.
- Dose: 2.5 g/L powder Increase Broilers.
- Dose: 15% Aloe vera powder Increase Satpuda poultry.
- Dose: 1, 1.5, and 2 g/kg Aloe vera powder Increase Vanaraja birds.

Weight gain*

- Dose: 0.5% leaf powder Increase in Japanese quails.
- Dose: 600 mg aqueous Aloe vera Increase in Broilers.
- Dose: 1% Aloe vera powder Increase in Broilers.
- Dose: 6% Aloe vera powder Increase Naj in quails.
- Dose: 2% Aloe vera leaves extract Increase in Broiler.
- Dose: 1.5% water extract Increase in Broilers.
- Dose: 0.1, 0.2, and 0.3% leaf powder Increase in Broilers.
- Dose: 50 mg/L methanolic extract Increase in Broilers
- Dose: 5 mL and 10 mL/L gel Increase in Broilers
- Dose: 2.5 and 5 g/L gel Increase in Broilers
- Dose: 1.0, 1.5, and 2 g/kg Aloe vera powder Increase in Vanaraja birds
- Dose: 10% aqueous extract Increase in Broilers.
- Dose: 100, 200, and 300 mg/kg polysaccharides Increase in Broilers.
- Dose: 2 mL/L of water (leaf extract) Increase in Turkey poults.



Feed conversion ratio*

- Dose: 25 mL water extract Improve in Japanese quails.
- Dose: 1.5% water extract Increase in Broilers
- Dose: 15.0% Aloe vera powder Increase in Satpuda poultry.
- Dose: 15 mL/L gel Increase in Broilers.
- Dose: 0.5 and 7.5% extract Increase in Broilers.
- Dose: 1.5% gel in drinking water Increase in Broilers.
- Dose: 1 and 2% leaves extract Increase in Fayoumi chicks.
- Dose: 2.5 and 5 g/L Increase in Broilers
- Dose: 1 or 2% leaves extract Increase in Fayoumi chickens.

Immune response and antimicrobial activity*

- Dose: 1% in drinking water Increase response to sheep red blood cells, NDV and phytohemagglutinin-P injection in Broilers.
- Dose: 5 mL/L Aloe vera gel Increase antibody titer against ND in Broilers
- Dose: 1 or 2% leaves extract Increased hemagglutination inhibition titers in Fayoumi chicks
- Dose: 50, 100, or 150 mg/L Increased humoral responses against viral infections in Broiler
- Dose: 1% Aloe vera gel Improved antibody titers against sheep RBCs in Broilers
- Dose: 0.1% or 0.2% Aloe vera powder Improved antibody titer against NDV in Broilers
- Dose: 0.75% or 1% Aloe vera gel Reduced Coliform spp. and increased Lactobacilli spp. In Broilers
- Dose: 5 mL and 10 mL/L gel Reduced in fecal E. coli and Salmonella population in Broilers.

- Dose: 100 to 300 ppm extract Decreased aflatoxin B1 in egg yolk Laying in hens.
- Dose: 1.5, 2.0, and 2.5% Increased Lactobacillus count and decreased E. coli count Broilers
- Dose: 0.1% Aloe vera gel Reduced E. coli count in Broilers.
- Dose: 300 mg/kg ethanolic aqueous extract Increased antibody response against RBCs in Broilers



Antioxidant capacity*

- Dose: 1.5% water extract Increase TAC, GPx, and decrease MDA in Broilers.
- Dose: 2, 5, and 7 g/kg alcoholic extract Increase antioxidant status and decrease lipid peroxidation in Jabalpur color birds
- Dose: 300 ppm extract Decreased lipid peroxidation in egg yolk Laying in hens.

Hematology and blood biochemistry*

- Dose: 0.5% leaf powder Increase HDL in Japanese quails.
- Dose: 1.5% water extract Decrease triglycerides, total cholesterol, and LDL in Broilers.
Dose: 1, 1.5, and 2 g/kg Aloe vera powder No effect on cholesterol, RBC, WBC, PCV, or Hb in Vanaraja birds
- Dose: 10% aqueous extract Increase Hb, RBC in Broilers.
- Dose: 1.5% water extract Increase Protein and albumin in Broilers
- Dose: 1.5 or 3% aqueous solution of Aloe vera Decrease AST, ALT, and ALP in Broiler.
- Dose: 10% aqueous solution of Aloe vera Increase Hb in Broiler.
- Dose: 0.5% Aloe vera powder Increase WBCs in Broiler.

- Dose: 0.2% Aloe vera extract Increase in Broiler.
- Dose: 0.5% powder No significant effect on AST, ALT, Hb, total protein, albumin, globulin, or glucose in Broilers.
- Dose: 0.1 and 0.2% powder No effect on triglyceride, glucose, and cholesterol in Broilers.
- Dose: 2.5 and 5 g/L gel Heterophils, monocytes, eosinophils, lymphocytes in Broilers
Dose: 5 mL and 10 mL/L gel No effect on WBCs, RBCs, Hb, Hct in Broilers.



Anticoccidial effect*

- Dose: 2.5 and 5 g/L Reduction in cecal oocysts, lesion score, and intestinal damage in Broilers.
- Dose: 0.1, 0.3, and 0.5% powder Less fecal shedding compared to control in Broilers.
- Dose: 300 mg/kg ethanolic aqueous extract Lower mean lesion score in ceca in Broilers.
- Dose: 2.5% gel Smallest fecal oocyst shedding in Broilers.

Histological features*

- 2% Aloe vera gel Higher villus height and villus height to crypt depth ratio in Broiler.
- 10% Aloe vera aqueous extract Increased villus height in Broilers.
- 2.5 and 5g/L Aloe vera gel Restoration of intestinal villi under coccidial challenge in Broilers.
- 2 mL/L of water leaf extract Normal histology of ileum, spleen, liver, and breast muscle under E. coli challenge in Turkey poults.

Other uses of Aloe Vera as an additive in broiler chicken feed*.

- Dose: 50 ml/liter Aloe Vera shows relatively better results on growth performance parameters, immune response, and coccidiosis in broiler chicken.
- Dose: added to basal diet at 2.5% on microflora population, humoral and cellular immune response, and relative weight of lymphoid organs compared to the effects brought about by antibiotic.
- Dose: 2.5% of Aloe Vera in the water and 100 mg/ Kg of Vitamin E in the feed improve the immune response of your chickens and broilers.
- Dose: 2.5% in the feed resulted in a significant reduction in the number of E. coli colonies and a significant increase in the number of Lactobacillus colonies, antibiotic groups, humoral immunity, sheep red blood cells, and antibody titer.
- Dose: Mix equal parts of Aloe Vera and Yeast (0.50% of water content each) to obtain better feed and water absorption, and increased weight in the breast, thigh, and leg. This supplement may not increase the water and feed intake, however, there are studies that prove that adding Aloe Vera + Yeast into animal nutrition leads to better water absorption, making the meat bigger and healthier while retaining more nutrients as well.
- Dose: 2.5% Aloe Vera to the water of your chicken as a replacement for virginiamycin and other antibiotics.
- Dose: 30 mL/L Aloe vera gel administered Turkey poults growth metrics, such as weight increase and feed conversion efficiency.
- Dose: 1.5% garlic powder and 1.5% Aloe vera gel increase body weights, the highest feed consumption, and the lowest FCR in broilers.
- Dose: dietary supplement at a rate of 1.5% Aloe vera powder as an antibiotic growth promoter enramycin at enhancing broiler performance and lowering intestinal Salmonella and Escherichia coli species
- Dose: 2% Aloe vera gel increased body weight gain and feed intake that was more than the antibiotic group in a non-significant way (virginiamycin).
- Dose: 600 mg of Aloe vera gel in water extract broilers causes broilers' body weight to increase significantly in the third and sixth weeks. There might be several causes for the increase in the productive performance of chickens fed Aloe vera. First, anthraquinones and their derivatives, including isobarbaloin, aloe-emodin-9-anthrone, and anthrone-C-glycosides, are present in the phenolic components. These compounds function as potent antibacterial agents and enhance nutrition absorption from the colon. By breaking down carbohydrates and fats, biocatalysts like lipase and amylase found in plants can aid in digestion.



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