



Medicinal Plants and Their Applications in Poultry Production: A Review

Alagbe John Olujimi

Department of Animal Nutrition and Biochemistry, Sumitra Research Institute, Gujarat

Corresponding Author: Alagbe John Olujimi dralagbe@outlook.com

ARTICLE INFO

Keywords : Antimicrobial, Antibiotics, Food safety, Poultry, Production, Phytochemicals

Received : 21 February

Revised : 23 March

Accepted: 23 April

©2025 Olujimi: This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International.



ABSTRACT

The presence of phytochemicals cannot be separated from medicinal plants, this is because they are active compounds that makes them performs pharmacological or therapeutic activities in the body of animals. These compounds includes, flavonoids, phenols, tannins, terpenoids, alkaloids and saponins which has anti-inflammatory, antioxidant, anti-helminthic, anti-diabetic, anti-cancer, antifungal, antiviral, cytotoxic, immune-stimulatory properties amongst others. Phytochemicals are natural compounds, chemical free, non-toxic, effective and eco-friendly. Their concentrations in plants can be influenced by the age of plant, specie, geographical location, processing methods and parts of plants used. However, it is wrong to assume that dietary supplementation of medicinal plants cannot be harmful to animals especially when administered above the optimum level. Therefore, the essence of this review is to identify some of the medicinal plants that have been used to feed animals and to also identify their optimum levels. This will further help to address the increasing cases of antimicrobial resistance that has become a global threats and will also help to promote poultry production and food safety

INTRODUCTION

Banning the use of antibiotics in poultry production is a crucial and urgent public concern because its overuse or misuse have led to the emergence of antimicrobial resistant bacteria (Jan and Ester, 2020; Mojca, 2020b). Therefore, the use of herbal supplements or phytogenics is one of the solutions to promoting animal production, health and even eliminating the need for antibiotics (Daniel et al., 2023; Musa et al., 2020). Phytogenics are plant-derived preparations, including herbs, spices, and fruits, as well as preparations like essential oils or oleoresins, containing highly active secondary plant metabolites with a wide variety of activities that can potentially substitute feed antibiotics (Mojca, 2020a). They can contain thousands of active constituents (phytochemicals) that are non-toxic, chemical residue free, eco-friendly and has no withdrawal period (John, 2024a; Musa et al., 2020). Phytochemicals can be found in the leaves, stem bark, roots, buds, flowers and seeds of herbal plant at various concentrations (Ojediran et al., 2024a). Ojediran et al. (2024b); John (2024b), reported that factors such as age of plants, part of plants used, storage, method of extraction, specie and geographical location could influence the concentrations of phytochemicals in herbal plants.

LITERATURE RIVIEW

Phytochemicals such as, flavonoids, tannins, phenols, saponins, terpenoids, alkaloids have been reported to have medicinal and pharmacological importance like, anti-inflammatory, antifungal, antiviral, antioxidant, cytotoxic (Choi et al., 2013; Klavina et al., 2015), immune-modulatory (Adeoye-Isijola et al., 2018), gastro-protective, anti-cancer (Subavathy and Thilaga, 2015), anti-diabetic, anti-diarrhea (Manilal et al., 2011), anti-helminthic, antibacterial, hepato-protective, anti-malarial (Wadood et al., 2013), anti-hypertensive (Aworinde et al., 2016), antimicrobial (Sharma, 2012; Bazie et al., 2014), anti-tumor, neuro-protective (Alagbe et al., 2022), cardio-protective and anti-spasmodic properties (Gawali and Jadhav, 2011). Ethno medically, extracts from herbal plants can be traditionally used in the treatment of weakness, dizziness, pyrexia, nausea, gastro-intestinal disorders, malaria, sores, sexually transmitted infection, diabetes, ulcer, snake bite, blood sugar level, pile, worm, metabolic disorder and internal heat (Shanmugapriya et al., 2012; Karthika and Paulsamy, 2014).

METHODOLOGY

Phytogenic feed additives show a wide range of potential benefits such as, increased enzymatic activity in the intestinal tract, improved nutrient utilization, scavenging the activities of free radicals, inhibiting the activities of pathogenic organisms in the gut, oxidative stress prevention, amongst other all aimed at targeting the enhancement of performance of birds (Shittu et al., 2024). In view of the abundant potential in herbal plants and the need to promote performance, sustainability, welfare and food safety in poultry production, this review is a compendium of different medicinal plant extracts as well as their optimum level from different researchers.

RESULT AND DISCUSSION

Table 1. Application and Optimum Levels of Some Phytochemicals in Poultry Production

Medicinal plants	Optimum dietary inclusion level	Specie/effect on birds	References
Grape seed extract	0.01 to 0.02 %	Pekin ducks: growth stimulator, gastro-protective, hypolipidemic properties	Ao and Kim (2000)
Tea extract granule	80 mg/kg	Broilers: Gastro-protective, Immune-stimulator	Chi et al. (2000)
<i>Yucca schidigera</i> extract	180 mg/kg	Broilers: Growth promoter	Chi et al. (2000)
Moringa leaf powder	4 %	Pekin ducks: Gastro-protective	Mazharul et al. (2024)
<i>Daniellia oliveri</i> leaf extract	40 mL per litre of water	Broilers: appetite stimulator, gastro-protective, hepato-protective, antimicrobial properties	Olafadehan et al. (2020)
<i>Piliostigma thonningii</i> leaf extract	80 mL per litre of water	Broilers: growth promotion, hepato-protective, immune-modulator	Alagbe et al. (2020)
<i>Rauvolfia vomitoria</i> root extract	60 mL per litre of water	Broilers: growth promotion, antimicrobial	Alagbe (2021)
Ginger and garlic powder	14g/kg diet	Broilers: growth promotion, gastro-protective	Oleforuh et al. (2014)
<i>Sida acuta</i> leaf extract	30 mL per litre of water	Broilers: immune modulator, gastro-protective, appetite stimulator, growth promoter	Shittu et al. (2021); Oluwafemi et al. (2021)
Snot apple powder	3 % per kg diet	Broilers: prevents oxidative stress	Jimoh et al. (2025)
<i>Balanites aegyptiaca</i> stem bark	20 mL per litre	Broilers: Cardio-protective, Immune stimulator	Musa et al. (2021)
			Musa et al. (2021)
<i>Alchornea cordifolia</i> stem bark	10 mL per litre	Broilers: Gastro-protective and hepato-protective	
<i>Aristolochia indica</i> leaf powder	40 g/kg diet	Broilers: growth promoter	Adewale et al. (2021); Alagbe et al. (2024)
Coconut shell extract	20 mL per litre	Broilers: Immune modulator	John (2024)
Essential oils			
<i>Thymus vulgaris</i> essential oil	180 mg/kg	Broilers: Growth promoter and hepato-protective	Takeli et al. (2010)

<i>Zingiber officinale</i> essential oil	120 mg/kg	Broilers: Gastro-protective	Takeli et al. (2010); Oluwafemi et al. (2021)
<i>Syzygium aromaticum</i> essential oil	120 mg/kg	Broilers: Immune-modulator	Takeli et al. (2010)
<i>Allium sativum</i> oil	0.3 mL per kg diet	Broilers: Growth promoter	Oluwafemi et al. (2021)
<i>Helianthus annus</i> oil	800 mg/kg diet	Broilers: Growth promoter, hepato-protective	Agubosi et al. (2022)
<i>Cymbopogon citratus</i> oil	400 mg/kg	Broilers: Growth promoter	John et al. (2020)
Papaya essential oil	10 mL per kg diet	Broilers: Gastro-protective, Immune modulator	Daniel et al. (2023); John et al. (2024)

CONCLUSIONS AND RECOMMENDATIONS

Medicinal plants has numerous advantages when supplemented in the diet of birds, the presence of phytochemicals makes them alternative to antibiotics. To achieve a sustainable production, promote food safety and prevents the incidence of antimicrobial resistance the use of medicinal plants needs to be seriously explored. Determining their optimal level before usage will increase its efficacy and prevents toxicity incidence in birds.

FURTHER STUDY

This research still has a delay, so it is necessary to conduct further research on the topic of Medicinal Plants and Their Applications in Poultry Production: A Review to improve this research and add insights for readers

REFERENCES

- Adeoye-Isijola M.O., Olajuyibo, O.O., Jonathan S.G and Coopoosamy R.M. (2018). Bioactive Compounds in Ethanol Extracts of *Lentinus squarrosulus*. Mont- A Nigerian Medicinal Macrofungus. African Journal of Traditional and Complement Alternative Medicine, 15 (2): 42-50.
- Adewale, A.O., Alagbe, J.O., Adeoye, Adekemi. O. (2021). Dietary Supplementation of *Rauvolfia Vomitoria* Root Extract as A Phytogetic Feed Additive in Growing Rabbit Diets: Haematology and serum biochemical indices. International Journal of Orange Technologies, 3(3): 1-12.
- Agubosi, O.C.P., Wika, B.K and Alagbe, J.O. (2022). Effect of dietary inclusion of Sunflower (*Helianthus annus*) oil on the growth performance of broiler finisher chickens. European Journal of Modern Medicine and Practice, 2(5): 1-10.
- Alagbe Olujimi John, Daniel Nnadozie Anuore, Shittu Muritala Daniel, Emiola Adewale, Akande Taiwo and Adegoke Adegbite Emmanuel (2023). Impact of dietary supplementation of *Carica papaya* essential oil on the blood chemistry of broiler chickens. Science Letters, 11(3): 105 - 110.
- Alagbe, J.O. (2020). Effect of dietary supplementation of *Cymbopogon Citratus*

- oil on The Performance and Carcass characteristics of broiler chicks. *European Journal of Biotechnology and Bioscience*. 8(4): 39-45.
- Alagbe, J.O. (2024). Effect of coconut shell extract on the growth performance and some haemato-biochemical parameters of broiler chicken. *Brazilian Journal of Science*, 3(6): 82-95.
- Alagbe, J.O. (2024). Growth performance, haemato-biochemical indices of broiler chicken fed *Aristolochia indica* as a phyto-genic feed additive. *Cerrado: Agricultural and Biological Research*, 1(1), 42-53.
- Alagbe, J.O. (2024). Growth performance, haemato-biochemical indices of broiler chicken fed *Aristolochia indica* as a phyto-genic feed additive. *Cerrado: Agricultural and Biological Research*, 1(1), 42-53.
- Alagbe, Olujimi John, Oluchi, C. Precious Agubosi., Rufus, Adebisi Oluwafemi., Taiwo, Oladoye Akande., Adegoke, Emmanuel Adegbite and Emiola, I.A. (2023). Haemato-biochemical indices and intestinal microbial population of broiler chickens fed diet supplemented with *Prosopis africana* (African mesquite) essential oil. *Brazilian Journal of Science*, 2(9): 98-110.
- Alagbe, Olujimi John, Oluchi, C. Precious Agubosi., Rufus, Adebisi Oluwafemi., Taiwo, Oladoye Akande., Adegoke, Emmanuel Adegbite and Emiola, I.A. (2023). Haemato-biochemical indices and intestinal microbial population of broiler chickens fed diet supplemented with *Prosopis africana* (African mesquite) essential oil. *Brazilian Journal of Science*, 2(9): 98-110.
- Ao, A.O and Kim, I.H. (2000). Effects of grape seed extract on performance, immunity, antioxidant capacity, and meat quality in Pekin ducks. *Poultry Science* 99:2078-2086.
- Aworinde, D.O., Erinoso, S.M and IbukunOluwa, M.R. (2016).Mineral composition, phytochemical constituents and in vitro antimicrobial screening of some chewing sticks from Ibadan, South Western Nigeria. *Journal of Applied Biosciences*, 101: 9589-9597.
- Bazie, S., Ayalew, A and Woldetsadik, K. (2014). Antifungal activity of some plant extracts against *Colletorichum musael* the cause of post-harvest banana Antracrose. *Journal of Plant Pathology and Microbiology*, 5 (2), 1-4.
- Chi, Y. Zhang, X. Ma, M. Lu, Z. Li, W. Xu and S. Hu. (2000). Antioxidative stress of oral administration of tea extract granule in chickens. *Poultry Science* 99:1956-1966.
- Choi, J., Park, N., Hwang, S., Sohn, J., Kwak, I., Cho, K.K and Choi, I. (2013). The antibacterial activity of various saturated and unsaturated fatty acids against several oral pathogens. *Journal of Environmental Biology*, 34: 673-676
- Daniel Nnadozie Anorue, Friday Ubong and Alagbe Olujimi John (2023). Investigating the effects of pawpaw (*Carica papaya*) essential oil dietary supplementation on the growth performance and carcass characteristics of broilers. *Research in: Agricultural and Veterinary Sciences*, 7(3): 164 - 174.
- Gawali, P and Jadhav, B.L. (2011). Antioxidant activity and antioxidant phytochemical analysis of mangrove species *Sonneratia alba* and

- Bruguiera cylindrical. Asian Journal of Microbiology, Biotechnology & Environmental Sciences, 13 (2): 257-261.
- Jan, D and Ester, V. (2020). Phytogenics – be one step ahead with plant derived feed additives. International Poultry Production. 8 (3): 14-15.
- Jimoh , A.O., Unity, D.S., Ayodele, O.A and Iheajirica, UGD. (2025). Neutraceutical effect of Snot Apple powder on Oxidative stress markers, heamatology and growth performance of broiler chickens. Black Sea Journal of Agriculture, 8(3): 41-50.
- John, A. O. (2024b). Effect of performance, serum biochemistry and heamatological components of feeding Japanese quails phytogenic feed additions comparising Megaphrynium macrostachyum leaves. Brazilian Journal of Science, 3(5), 51-64.
- John, A.O. (2024a). Impact of dietary supplementation of Rhamnus prinoides leaf extract on the growth performance, nutrient retention and intestinal microbial count of Japanese quails. Brazilian Journal of Science, 3(5), 40-50.
- Karthika, K and Paulsamy, S. (2014). Phytochemical Profiling of Leaf, Stem, and Tuber Parts of Solena amplexicaulis (Lam.) Gandhi Using GC-MS. International Scholarly Research Notices; .2014, Article ID 567409, 13 pages, 2014. <https://doi.org/10.1155/2014/567409>.
- Klavina, L., Springe, G., Nikolajeva, V., Martsinkevich, I., Nakurte, I. (2015). Chemical composition analysis, antimicrobial activity and cytotoxicity screening of moss extracts (moss phytochemistry). Molecule, 20, 17221-17243.
- Manilal, A., Sujith, S., Sabarathnam, B., Kiran, G.S., Selvin, J., Shakir, C and Lipton, A. (2011). Biological activity of the red algae Laurencia brandenii. Acta Botanica Croatica, 70 (1): 81-90.
- Mazharul Islam., S. A. Masudul Hoque, Israt Jahan Meem., Abu Sadeque Md. Selim and Morshedur Rahman. (2024). Dietary supplementation of moringa leaf powder improves the productive and reproductive performance of Pekin duck. Journal of Advanced Biotechnology and Experimental Therapeutics, 7(3): 507-519..
- Mojca, O.M. (2020a). Benefits of phytogenics for laying hens during environmental challenges. International Poultry Production 31(3): 12-13
- Mojca, O.M. (2020b). Could phytogenic feed additives prevent bacterial resistance?. International Food and Meat Topics. 34(2): 20-21)
- Musa, B., Alagbe, J.O., Adegbite Motunrade Betty, Omokore, E.A. (2020). Growth performance, caeca microbial population and immune response of broiler chicks fed aqueous extract of Balanites aegyptiaca and Alchornea cordifolia stem bark mixture. United Journal for Research and Technology, 2(2):13-21
- Ojediran, T.K., Emiola, I.A., Durojaye, V and Alagbe, J.O. (2024a). Analysis of Kigellia africana fruit's powder antioxidant and phytochemical properties. Brazilian Journal of Science, 3(7): 38-49.
- Ojediran, T.K., Emiola, I.A., Durojaye, V and John Alagbe (2024a). Proximate, vitamin and GC-MS profiling of Kigella africana powder. Cerrado:

- Agricultural and Biological Research, 1(1): 13-20.
- Olafadehan, O.A., Oluwafemi, R.A and Alagbe, J.O. (2020). Carcass quality, nutrient retention and caeca microbial population of broiler chicks administered Rolfe (*Daniellia oliveri*) leaf extract as an antibiotic alternative. *Journal of Drug Discovery*. 14(33):146-154.
- Oleforuh-Okoleh, V.U., Chukwu, G.C and Adeolu, A.I. (2014). Effect of ground ginger and garlic on the growth performance, carcass quality and economics of production of broiler chickens. *Global Journal of Bio-Science and Biotechnology*, 3(3): 225-229.
- Oluwafemi, R.A., Abdullahi, H and Alagbe, J.O. (2021). Effect of dietary inclusion of ginger (*Zingiber officinale*) and garlic (*Allium sativum*) oil mixture on the growth performance and caecal microbial population of broiler chickens. *Bioequivalence and Bioavailability International Journal* 5(2): 000153.
- Oluwafemi, R.A., Daniel, S.E and Alagbe, J.O. (2021). Haematology and serum biochemical indices of broiler chicks fed different inclusion levels of ginger (*Zingiber officinale*) and garlic (*Allium sativum*) oil mixture. *International Journal of Discoveries and Innovations in Applied Sciences* 1(4): 20-26.
- Oluwafemi, R.A., Lawal Aisha Omolade., Adelowo, Samad Adetope and Alagbe, J.O. (2021). Effects of dietary inclusion of ginger (*Zingiber officinale*) and garlic (*Allium sativum*) oil on carcass characteristics and sensory evaluation of broiler chicken. *Texas Journal of Multidisciplinary Studies*, 2(11): 180-188.
- Oluwafemi, R.A., Uankhoba, I.P and Alagbe, J.O. (2021). Effects of turmeric oil as a dietary supplements on the growth performance and carcass characteristics of broiler chicken. *International Journal of Orange Technologies*, 3(4): 1-9.
- Oluwafemi, R.A., Uankhoba, I.P and Alagbe, J.O. (2021). Effects of turmeric oil as a dietary supplement on the haematology and serum biochemical indices of broiler chickens. *Bioinformatics and Proteomics Open Access Journal* 5(1): 000138.
- Shanmugapriya, R., Ramanathan, T and Renugadevi, G. (2012). Phytochemical Characterization and Antimicrobial Efficiency of Mangrove Plants *Avicennia marina* and *Avicennia officinalis*. *International journal of Pharmaceutical & Biological Archives*, 3 (2), 348-351.
- Sharma, R.R. (2012). Preliminary phytochemical screening of some indigenous medicinal plant leaves extract in regulation of antidiabetic activity. *Science Research Reporter*, 2 (3): 307 310.
- Shittu, M.D., Alagbe, J.O., Adejumo, D.O., Ademola, S.G., Abiola, A.O., Samson, B.O and Ushie, F.T. (2021). Productive Performance, Caeca Microbial Population and Immune-Modulatory Activity of Broiler Chicks Fed Different Levels *Sida Acuta* Leaf Extract in Replacement of Antibiotics. *Bioinformatics and Proteomics Open Access Journal* 5(1): 000143.
- Shittu, M.D., Alagbe, J.O., Alaba, O., Okanlawon, E.O., Adelakun, F.A., Emmanuel, E.O and Adejumo, D.O. (2024). Effect of ginger, garlic and

- Negro pepper on the gut microbes, gut histomorphometry and pathological assessment of selected organs of broiler chickens. Association of Deans of Agriculture in Nigerian Universities, 5: 105-121.
- Subavathy, P and Thilaga, R.D. (2015). GC-MS Analysis of Bioactive Compounds from Whole Body of Methanolic Extract of *Cypraea arabica*. World Journal of Pharmaceutical Research, 5 (3): 800-806.
- Tekeli, A., L.çelik, H.R. Kutlu, M. Görgülü. (2010). Effect of dietary supplemental plant extracts on performance, carcass characteristics, digestive system development, intestinal microflora and some blood parameters of broiler chicks. South African Society for Animal Science. 30 (3) : 200-210.
- Wadood, A., Ghufraan, M., Jamal, S,B., Naeem, M., Khan, A., Gharfar, R and Asnad. (2013). Phytochemical analysis of medicinal Plants Occurring in Local Area of Mardan. Anal Biochemistry, 2, 144