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Review Article

Medicinal Plants and Their Applications in Poultry Production: A Review

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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.

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

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.

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).

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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.

Table 1: Application and optimum levels of some phytogenics 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)
Yucca schidigera extract	180 mg/kg	Broilers: Growth promoter	Chi *et al*., (2000)
Moringa leaf powder	4 %	Pekin ducks: Gastro-protective	Mazharul *et al*., (2024)
Daniellia oliveri leaf extract	40 mL per litre of water	Broilers: appetite stimulator, gastro-protective, hepato-protective, antimicrobial properties	Olafadehan *et al*., (2020)
Piliostigma thonningii leaf extract	80 mL per litre of water	Broilers: growth promotion, hepato-protective, immune-modulator	Alagbe *et al*., (2020)
Rauvolfia vomotoria 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)
Sida acuta 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)
Balanites aegyptiaca stem bark	20 mL per litre	Broilers: Cardio-protective, Immune stimulator	Musa *et al*., (2021)
Alchornea cordifolia stem bark	10 mL per litre	Broilers: Gastro-protective and hepato-protective	
Aristochia indica 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			
Thymus vulgaris essential oil	180 mg/kg	Broilers: Growth promoter and hepato-protective	Takeli *et al*., (2010)
Zingiber officinale essential oil	120 mg/kg	Broilers: Gastro-protective	Takeli *et al*., (2010); Oluwafemi *et al*., (2021)
Syzygium aromaticum essential oil	120 mg/kg	Broilers: Immune-modulator	Takeli *et al*., (2010)
Allium sativum oil	0.3 mL per kg diet	Broilers: Growth promoter	Oluwafemi *et al*., (2021)
Helianthus annus oil	800 mg/kg diet	Broilers: Growth promoter, hepato-protective	Agubosi *et al*., (2022)
Cymbopogon citratus 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)

CONCLUSION

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.

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