PHYTOCHEMICAL SCREENING OF MAHOGANY (*Khaya senegalensis*) BARK AQUEOUS EXTRACT AS FEED ADDITIVE FOR BROILER CHICKEN PRODUCTION

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ABSTRACT
The phytochemical screening was conducted to determine the phytochemical components (secondary metabolites) of mahogany (Khaya senegalensis) bark aqueous extract to be used as feed additive in broiler chicken production. Feed additives have been playing an important role in meeting the nutritional requirements of poultry birds. With the ban on the use of antibiotic growth promoters (AGP) which encouraged the emergence of resistant bacterial species, the need to explore other natural sources of growth promoters with limited or no residual effect is on the increase. The phytochemical screening revealed the presence of the following phytochemicals: saponins, flavonoids, terpenoids, phenols, alkaloids and tannins. Other secondary metabolites tested but absent include; quinones, glycoside, anthocyanin, steroids, betacyanin and coumarins.
Keywords: Mahogany (Khaya senegalensis), Extract, Phytochemicals, Screening, Broiler Chickens.

INTRODUCTION

The livestock industry has been in action for long with the aim of producing inexpensive source of protein for human consumption (Nworgu, 2002). With this, the place of poultry industry can never be overemphasized as it occupies a prominent position as a major source of animal protein supply to the citizens (Adedokun *et al.*, 2019). However, the success of the livestock industry depends on the amount of nutritional information available and appropriate management techniques relevant to farmers (Odukoya *et al.*, 2019). The demand for poultry products has been on the increase due to many factors; some of which are raising population, urbanization and increasing income (FAO, 2020). In its effort to bridge the protein malnutrition gap, the poultry industry is gaining popularity in developing countries through economic empowerment of the resource-poor segment of the society (Adedokun *et al.*, 2019), provision of by-products like feathers for making household items used in decorations and droppings from birds used as organic manure.

The massive use of synthetic additives for prophylaxis, growth promotion and metaphylaxis has promoted the emergence of antibiotic resistant bacteria that can be transmitted from animal to human (Attia *et al.*, 2018; Chokshi *et al.*, 2019). Poultry production is considered a high risk for antibiotic resistance emergence because poultry generally receives higher quantities of antibiotics than other livestock species (van den Bogaard *et al*., 2001; Graham *et al*., 2017). This has brought the ban for the use of antibiotics as growth promoters in animal agriculture in European Union (EU) in the year 2006 and in US in the year 2017 (van der Aar *et al.*, 2017). Today, there is a growing need to find alternatives for synthetic additives to improve performance and maintain health of livestock species, especially poultry birds. Therefore, the objective of the screening was to determine the phytochemical components of mahogany (Khaya senegalensis) bark aqueous extract to be used as feed additive for broiler chicken production.

MATERIALS AND METHODS

Study Area

The screening was conducted at the Biochemistry Laboratory of the College of Medical Sciences, University of Maiduguri, Borno state.

Collection and Preparation of Extract

Mahogany bark was obtained from *Khaya senegalensis* trees within the University of Maiduguri. The bark was freshly harvested, washed with water, cut into small pieces and allowed to air dry for 3 – 5 days. Mahogany bark was ground into fine particles using pestle and mortar after which 100 g of the ground particles was soaked in one litre of water for 12 hours. The preparation was then filtered using filter cloth to separate the debris from the filtrate. The filtrate was subjected to heat to evaporate the water content until a gelatinous extract was obtained. The test for the secondary metabolites was conducted using procedures as described by AOAC (1980).

RESULTS AND DISCUSSION

The result on phytochemical screening of aqueous mahogany bark extract is shown in Table 1. The screening revealed the presence of the following phytochemical compounds; saponins, flavonoids, terpenoids, phenols, alkaloids and tannins. Other secondary metabolites tested but absent include; quinones, glycoside, anthocyanin, steroids, betacyanin and coumarins. Phytochemical screening conducted by Makut *et al.* (2008) on the ethanolic and methanolic extracts of *Khaya senegalensis'* bark revealed the presence of flavonoids, glycosides, steroids and tannins while alkaloids, phlobatannins, and saponins were absent. Similarly, Ukepke *et al.* (2019) used acetone, ethanol and methanol extracts of *Khaya senegalensis'* bark and showed the presence of saponin, tannin, cardiac glycoside, alkaloids, flavonoids and phlobatannin.

Studies have shown that some of these phytochemical compounds possess the ability to improve growth performance of broiler chickens when administered in line with the right quantity. Starčević *et al.* (2015) reported that flavonoid supplementation in broiler chickens has the potential to improve their growth performance. According to Ebrahim *et al.* (2015), high quantities of tannins have been demonstrated to have antinutritional effects in monogastric animals. However, tannins have received a lot of interest in the poultry industry as an alternative to antibiotic growth promoters (AGP) due to their antibacterial, antioxidant, and anti-inflammatory characteristics. Bili´c-Šobot *et al.*, (2016) revealed that tannins can improve the intestinal microbial ecosystem, enhance gut health, and hence increase productive performance when applied appropriately in the diets of monogastric animals. Chaudhary (2017) reported that serum total cholesterol level was significantly decreased and the HDL cholesterol was significantly increased following supplementation of saponin rich feed additives. Zhai *et al.,* (2014) reported that administration of saponins isolated from ginseng stems and leaves through drinking water of chickens significantly enhanced the immune responses to vaccination against Newcastle disease, avian influenza and infectious bursal disease.

Table 1: Phytochemical Screening of Aqueous Mahogany (*Khaya senegalensis*) Bark Extract

Phytochemicals	Aqueous Extracts
Saponins	+++
Flavonoids	+
Terpenoids	++
Phenols	++
Alkaloids	++
Quinones	-
Glycoside	-
Anthocyanin	-
Tannins	++
Steroids	-
Betacyanin	-
Coumarins	-

+ = Present; - = Absent

CONCLUSION

The result of the screening revealed that there are some beneficial secondary metabolites present in mahogany (Khaya senegalensis) bark aqueous extract capable of enhancing the growth and performance of broiler birds. Further study should be conducted to establish the quantitative values of the secondary metabolites present in the extract.

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