MON -16

Proximate Component and Phytochemical Screening of Coffee Weed(*Senna occidentalis*) Leaves as Phytobiotic Additive in Poultry Diets

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Abstract
The proximate and phytochemical screening of *Senna occidentalis* were carried out to assess some nutrients and phytobiotic properties of the leaves. The fresh leaves which were thoroughly rinsed, dried and milled were subjected to proximate and phytochemical analyses. Data on the proximate composition revealed low moisture, high crude protein, crude fibre, crude fat, ash and nitrogen free extract (NFE). The phytochemicals positively present were cardiac glycosides, phenols, flavols, flavonols and alkaloids, while saponins were largely present. Conclusively, *Senna occidentalis* leaves can be used as phytobiotic additive in poultry diets.

Keywords: Coffee weed, proximate, phytochemical, phytobiotic, poultry.

Introduction

Coffee weed (*Senna occidentalis*) L. (Syn: *Cassia occidentalis*.) a small shrub of about 5-8m high belongs to the family leguminosae. It is indigenous to the tropical regions of America and naturalized in Australia, east Africa, southern and eastern USA (Isah and Mujib, 2013). The plant has been used as a natural medicine in the rain forest and other tropical areas for centuries and its roots, leaves, flowers and seeds have been employed in herbal medicine around the world (Sambasivam *et al*., 2016). This plant is widely consumed by local people as a coffee substitute. The seeds are brewed into a coffee like brewage for asthma and a flower infusion is used to treat bronchitis (Babitha, 2011). The roots are considered as tonic and diuretic; they are also used for menstrual problems, tuberculosis, anaemia and liver complaints and as a tonic for general weakness and illness (Arya, 2011). The leaves are used in gonorrhoea, fever, urinary tract disorder and edema (Yadav, 2010). *Senna occidentalis* extract is used to cure eye inflammations. It is also used for curing diarrhoea, dysentery, constipation, fever, eczema and venereal diseases. *Senna occidentalis* has been found to possess significant antibacterial, antifungal and diuretic properties. Sreejith *et al.* (2010) suggested the potentials of *S. occidentalis* for the treatment of allergic and inflammatory diseases.

From the foregoing, the present experiment was conducted to evaluate the proximate and phytochemical constituents of coffee weed leaves with a view to assessing its potential benefits as phytobiotic additive in poultry nutrition.

Materials and Methods

Experimental location and climate: The experiment was carried out at the Poultry Unit of the Teaching and Research Farm, Ambrose Alli University, Ekpoma. The farm lies between latitude 6.44°N and longitude 6.80°E in Esan West Local Government Area, Ekpoma, Edo State, Nigeria. Ekpoma is within the South – South geo-political zone of Nigeria and has a prevailing tropical climate with a mean rainfall of about 1556mm. The mean ambient temperature ranges from 26°C in February, relative humidity ranges from 61% in January to 92% in August with yearly average of about 82%. The vegetation represents an interface between the tropical rainforest and derived savannah.

Source and processing of fresh coffee weed leaves: Fresh coffee weed (*Senna occidentalis*) leaves were purchased from Ekpoma main market in Esan West Local Government Area, Edo State, Nigeria. The fresh leaves were thoroughly rinsed, sparsely spread on jute mat and dried at room temperature for 6 – 7 days until they become crispy. The leaves were turned regularly to avoid uneven drying and decay to ensure that the greenish colour of the leaves was maintained. Thereafter, dried crispy leaves were hammer milled through a 2mm sieve and stored in airtight containers to avoid the absorption of moisture till they were used for laboratory analyses.

Proximate Analysis and Phytochemical Screening of *Senna occidentalis* Leaves: The proximate composition of the leaf meal was determined according to AOAC (1990), while the phytochemical screening were performed on the extracts from the leaf meal using standard procedures of Sofowora (1993), Trease and Evans (1989) as well as Odebiyi and Sofowora (1978).

Results and Discussion

The proximate components of the leaf meal as displayed in Table 1 indicated 9.35, 21.88, 19.72, 16.88, 9.70 and 22.47% of moisture content, crude protein, crude fibre, crude fat, ash and nitrogen free extract (NFE) respectively. The low

moisture content of the sample implies that the leaf meal can be preserved for a long period after drying at room temperature. This will perhaps increase the relative concentration of the nutrients and improve the shelf life of the meal (Ikewudi and Catherine, 2009). The 21.88% crude protein content of the sample suggests that the leaves can serve as source of protein in livestock feed if dried

Table 1: Proximate Composition of *Senna occidentalis* leaf

Components	Quantity (%)
Moisture	9.35
Crude protein	21.88
Crude fibre	19.72
Crude fat	16.88
Ash	9.70
Nitrogen free extract	22.47

However, this value was higher than that of *Senna occidentalis* seed meal (19.92%) and *Boerhavi adiffusa* (21.35%) as reported by Augustine *et al.* (2014) and Wuanor*et al.* (2012) but lower than 30.40% for *Momordia charantia* recorded by Sese *et al.* (2012). The crude fibre (19.72%) in this study was higher than 12.45 and 18.52% in the seeds of *Senna obtusifolia* and *Senna occidentalis* respectively (Augustine *et al.,* 2014). Crude fat value (16.88%) was higher than 3.57, and 2.45% respectively recorded for *Boerhavia diffusa*and *Momordia charantia* (Wuanor *et al.*, 2012; Sese *et al.*, 2012). Ash content was 9.70% which is an indication of high amount of minerals in the leaf (Awasthi and Verma, 2007). The NFE was estimated to be 22.47% and was lower than 38.21% reported by Seriki *et al.* (2017) for water lettuce (*Pistiastratiotes*).

The phytochemical screening of *Senna occidentalis* leaf meal revealed the presence of cardiac glycosides, saponins, phenols, flavols, flavonols and alkaloids (Table 2). The presence of the cardiac glycosides is an indication that when animals feed on the leaf, it will serve as source of heat and energy to their system, add bulkiness to their bowels, assist in the complete oxidation of fats and forms components of DNA. Saponins which are steroid or interpenoid glycosides characterised by their bitter or astringent taste, foaming properties and their haemolytic effect on red blood cells were found in the sample. Meanwhile, the consumption of saponins had been encouraged because of their hypocholesterolemic activity. Flavols and flavonols are flavonoids which are present in the plant and are antioxidants as well as antimicrobial agents against a wide range of microorganisms by inhibiting their membrane bound enzymes (Chowen, 1999). While mentholated flavonoids are incomplete protein of plant origin in vegetables, cereals and legumes and are among the essential amino acids that cannot be synthesised by the body and therefore must be present in protein food consumed.

Thus, flavonoids promote growth, repair of worn out tissues, serve as source of energy in the absence of carbohydrates and fats, build hormones that assist in the regulation of body processes and build antibodies that fight infections and diseases (Idris *et al.,*2017). Generally, phenols are any compound containing a benzene ring with one or more hyroxy (OH-) group such as phenolic acids, flavonoids, condensed tannins, coumarins, alkyl resorcinols etc. They impart taste, odour, colour and oxidative stability in plant based foods (Naczk and Shahidi, 2004). Besides, a high positive correlation between total phenols and antioxidant activity in sorghum grains have been reported by Guajardo-Flores *et al.* (2006). The presence of alkaloids in this plant is worthy of note because of their protective metabolic roles.

Table 2: Phytochemical screening of *Senna occidentalis*leaf

Parameters	Results
Cardiac glycosides	+
Saponnins	++
Phenols	+
Flavols	+
Flavonols	+
Alkaloids	+

Key: + = Present, ++ = Largely present

Conclusion

It is crystal clear that *Senna occidentalis* contains high levels of antioxidants and antimicrobial agents that could promote growth by enhancing nutrient utilization, repair of worn out tissues and disease control. Further studies are therefore recommended for the phytobiotic effects on the performance of poultry.

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