PROXIMATE COMPOSITION AND PHYTOCHEMICAL SCREENING OF TOASTED SOYABEAN HULL

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ABSTRACT
Raw soyabean hull were obtained from soyabean processing industry in Ibadan, toasted and milled. Proximate composition (%) and phytochemical screening of the hulls were determined using standard procedures. Dry matter, crude protein, crude fibre, ether extract and ash content of the toasted soyabean hull determined were 89.50%, 31.75%, 14.50%, 8.70% and 22.19% respectively. Tannin, protease inhibitors, haemagglutinin and cyanogenic glycosides were 0.04%, 1.84mg/kg, 11.24Hu/g and 0.27mg/kg respectively. The results of proximate composition showed that toasted soyabean hull contains a very high nutritive value and the phytochemical screening revealed that the toasted soyabean hull have low levels of all the constituents assayed. This may be as a result of detoxification method (i.e toasting) that perhaps have reduced the constituents to a non-toxic level.
Keywords : Proximate, anti nutritional factors, toasting, soyabean hull.

INTRODUCTION
Increasing population pressure, fast depletion of natural resources, poverty and low agricultural production are some of the problems faced by the developing countries. The rapid growth between human and livestock which is creating an increase need for feed in the developing countries has demanded that alternative feedstuffs must be located, identified and evaluated so that they can be utilized as feed to livestock. This is aimed at avoiding the overdependence on the limited conventional feeds as key protein and energy feedstuffs for livestock (Ayo *et al.,* 2007) and it has become necessary therefore to find alternatives to the orthodox feedstuffs in order to widen sources of raw materials. One of such legume that could be exploited to serve as an alternative source of nutrients in monogastrics diets is the soyabean hull. Proximate analysis of the toasted soyabean hull could reveal the nutrients compositions that may be useful for feed materials and those that could be improved upon or eliminated before use.

MATERIALS AND METHODS
Collection of seed sample : Soyabean hull used in this experiment were obtained from Kamal Mill Industries Limited, Ibadan. It was toasted over fire at 50^0c for 30 minutes. The toasting involved adding about 5kg soyabean hull into an open cast-iron pan already set over a fire. The soyabean hull was steadily stirred to prevent it from sticking to pan and from burning until it turned brownish and produced sweet smelling aromatic flavor.

Proximate Analysis : The proximate analysis for dry matter, crude protein, crude fibre, ether extract and ash were carried out according to the methods described by (AOAC,2005). The nitrogen content was estimated by the micro-kjeidahl method and the crude protein content was calculated (N X6.25). Crude lipid content was determined using soxhlet apparatus (AOAC,2005).The ash content was determined by heating 2g of the dried sample in a silica dish dish at 600^0c for 6hours. All proximate results were expressed as percentage of sample analysed.

Quantification of toxins
The anti-nutritional compounds, protease inhibitor, haemagglutinin, tannin and cyanogenic glycoside were quantified. Quantitative estimation of tannins in the samples were determined according to the method described by (Swain,1979). Haemagglutinin contents were quantified photometrically using the method of (Liener,1955).Protease inhibitor

were determined by the casein digestion method described by (Kakade *et al.*, 1974). The cyanogenic glycoside were quantified by the methods of analysis of Analytical Methods Committee of Royal Society of Chemistry AMC-RSC

RESULTS AND DISCUSSION

The results of the proximate and anti nutrients composition of toasted soyabean hull are presented in Table 1and 2 respectively. The results for proximate analyses revealed that the seed is rich in crude protein, ash, dry matter and crude fibre. The dry matter content of the seed was high (89.50%).This value were lower than (92.37%) reported for soyabean hull when used to feed dairy cattle by (Gerngang,2003). This shows that the seeds are rich in organic matter. The crude protein of (31.75%) for the hull is higher than (12.10%) reported for new rape cultivar (Banaszkiewicz, 2000). The crude protein levels of the studied samples suggest its usefulness as alternative source of protein. The result showed that soyabean hull contain enough (31.75%), essential amino acid needed and this implies that the amino acids in the seed of soyabean hull have a high biological value and could contribute meaningfully in meeting the nutrient requirement of animals for these essential amino acid. Crude fibre value of (14.50%) in toasted soyabean hull was lower than (43.00%) reported for toasted soyabean hull (Gerngang,2003) .The differences in the value might have been as a result of differences in the geographical location, soil nutrients and species variety. The presence of dietary fibre suggests that the consumption of soyabean hull would greatly enhance digestibility. Fibre diets ease the passage of waste and lowers cholesterol level in the blood..The ether extract of toasted soyabean hull (8.70%) is much higher than the value (2.1%) recorded for soyabean hull (Banaszkiewicz, 2000) Fats and oils are the most abundant lipids found in nature . They are a heterogenous group of organic compounds which are important constituents of plant and animal tissue. The ash contents which is an indicator for mineral elements was 22.19% which were higher than (4-5%) reported by (Mitaru *et al.*, 1984). The presence of ash is a reflection of inorganic matter in a feed sample. The anti-nutritional factors of toasted soyabean hull are presented in Tabble 2. The tannin content (0.04%) observed in the present study is lower than the (0.12%) tannin in raw lablab seed (Osman, 2007).The poor palatability associated with high tannin diets can be ascribed to its astringent properly by reacting with proteins making them less accessible to the gastric juice of the animals (Ologhobo, 2012). The protease inhibitors interfere with the digestion of proteins, resulting in decreased animal growth. The value of protease inhibitors recorded in this study was very low (1.84mg/g) and as a result the ability of the protease to inhibit the activity of certain digestive enzymes would not occur. Haemagglutinins are glycoprotein with the ability to bind carbohydrate containing molecules. Haemagglutinins cause disruption of the intestinal microvilli, shortening or blunting of villi, impairment of nutrient digestion and absorption and increased endogenous nitrogen loss (Liener, 2000). The value of 0.27mg/kg of cyanogenic glycosides recorded in this trial is very low. High level of cyanogenic glycoside has been implicated for cerebral damage and lethargy in animals (DMello,2000).

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Table 1 : Proximate Composition of Toasted Soyabean hull

Parameters (%)	Values
Dry matter	89.50
Crude Protein	31.75
Crude Fibre	14.50
Ether Extract	8.70
Ash	22.19

Table 2 : Toxicant Composition of Toasted Soyabean hull

Parameters	Values
Tannin (%)	0.04
Protease inhibitor (mg/kg)	1.84
Haemagglutinin (Hu/g)	11.24
Cyanogenic glycosides (mg/kg)	0.27