

SHORT COMMUNICATION,
ACUTE TOXICITY STUDIES OF RAW *MUCUNA UTILIS* EXTRACTS USING
BROILER CHICKS

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ABSTRACT

Acute toxicity of *Mucuna utlis* was investigated using 5-weeks old 30 Anak broiler birds. A phosphate buffered saline (PBS) extract with a concentration of 200mg/ml was prepared. There were five treatments with six replicates each and a bird per-replicate in a completely randomised design. Four treatments were drenched with doses 3500mg/kg, 4000mg/kg and 5000mg/kg. The fifth treatment was used as a control and was drenched 0mg/kg. The birds were observed for 24hrs after drenching. Result showed a number of effects which include: restlessness, dizziness and diarrheic dropping by the birds. Conclusively, there was toxicity for all the doses but no mortality.

Key words: Acute toxicity, *Mucuna utlis*, Broiler chicks

INTRODUCTION.

There is low protein and general malnutrition in the developing countries. This is due to the high cost of proteinous food sources as a result of inadequate low production of proteinous grains which animals feed on and convert into animal protein. There exist an intense competition for the available proteinous grain between humans and animals with the animals being the loser (Akinnutimi *et al.* 1997).

There is therefore the need for alternative proteinous sources that are cheap, available and of low preference by man (Akinnutimi *et al.*, 1997). Iyayi and Egharevba (1998) suggested the adoption of *M. utlis*, a lesser known and neglected tropical legume in Nigeria as animal feed. *M. utlis* like most other legumes contain anti-nutritional factor, some of which are potent poisons toxic to man and animals when improperly processed seeds are consumed (Ene-Ononji and Carnovale, 1992, Ukaechukwu *et al.* 1999). Such toxic substances in *M. utlis* include tannins, L-Dopa, phytin acid, trypsin inhibitors and cyanide (Revindra and Revindra, 1998, Siddhuraju 1996).

Some of these toxic substances are protein which inhibits the activities of specific enzymes and some others may have direct influence on the central nervous system of the animal (Ukaechukwu, *et al.* 1996) while others cause vomiting and diarrhoea in pigs (Duke, 1981). There is yet no report on the toxicity of *M. utlis* on broilers since the crop is a potential feed ingredient for broilers (Iyayi and Egharevba, 1998). It is pertinent that

the toxicity of the seed is investigated in broilers. This work therefore is aimed at investigating the toxicity of *M. utilis* extract on broiler chicks.

MATERIALS AND METHODS.

Site of study and experimental birds

The experiment was carried out in the Poultry Unit of Michael Okpara University of Agricultural, Umudike. The seeds were purchased from Nsukka market in Enugu State and identified at Botany Dept., Michael Okpara University of Agriculture, Umudike. Thirty twenty-eight day-old broiler chicks were used to investigate the effects of *M. utilis* extract. The extract was administered by oral drenching. The body weight of the birds used for the study is shown in Table 1.

Extraction

The extract of sword bean (*M. utilis*) was prepared as carried out by Ukachukwu (2000). This involves the use of phosphate buffered saline (PBS) of pH 7 as solvent. One hundred grammes of finely ground raw *M. utilis* was put in a beaker. PBS of about five times the volume of sample was added and stirred thoroughly. The set up was allowed to stand one hour but with stirring at intervals of ten minutes. At the end of the period, the solvent was strained out through a clean cloth. The filtrate was used as the extract.

Determination of concentration of extract:

A clean dry empty beaker was weighed. One millilitre of *M. utilis* extract was put into beaker to evaporated to dryness under a laboratory -heating unit. The beaker with dry sample was cooled and weighed again. Concentration of solute in extract, expressed as 0.2g/ml or 200mg/ml.

Calculation of volume of extract given to each bird:

Using the determine concentration of extract of 200mg/ml, the volume of extract given various birds at the projected dosage levels kg^{-1} body weight were as shownS in Table 1.

Experimental procedure:

30 broiler birds were selected and divided into five groups of 6 birds each. The 4 groups were drenched with 3500mg/kg^{-1} , 4000mgkg^{-1} and 5000mgkg^{-1} doses of extract of mucuna extract respectively and the fifth group (the control) received 0mgkg^{-1} of the extract (Table1). The birds were observed for 24 hours.

TABLE 1: BODY WEIGHT OF THE BIRDS WITH THE CORRESPONDING VOLUMES OF *M. UTILIS* EXTRACT THE BIRDS RECEIVED IN EACH DOSE.

Replicate	Control		3500mg/kg		4000mg/kg		4500mg/kg		5000mg/kg	
	Body Weight	Extract Volume	Body Weight	Extract Volume	Body weight	Extract Volume	Body Weight	Extract Volume	Body Weight	Extract Volume
1	600	00mg	500	8.750	400	8.0	550	11.250	600	15.00
2	550	00mg	450	7.875	500	10.0	550	12.375	550	13.75
3	450	00mg	500	8.750	400	8.0	600	13.500	500	12.50
4	500	00mg	500	8.750	550	11.0	500	11.250	450	11.25
5	550	00mg	500	9.625	550	11.0	550	12.375	450	11.25
6	600	00mg	500	8.750	600	12.0	400	9.000	420	10.50

RESULTS AND DISCUSSION

After the administration of the extract, the birds showed signs of restlessness at initial stage followed after by dizziness for all the doses. However, the intensity of dizziness was more in the birds that received the higher doses. Also they all produced diarrheic droppings but the intensity of dropping increased with increasing doses. No death was recorded in any of the group. The restlessness experienced by the birds at the initial stage can be attributed to the increased heart rate which is one of the consequences of increased peripheral dopamine (a major component of the extract) (Metman and Mouradian, 1999, Standard and Young, 1996).

The dizziness is an indication of some level of toxicity of the extract in the broiler chicks. This is in agreement with Ene- Obong and Carnovale, (1992) who reported that eating of mucuna seeds caused dizziness in human. It is also in agreement with the report of Ukachukwu *et al* (1999) who investigated the toxicity of *M. cochinchinensis* extract S on broiler and they attributed the result to the effect of dopamine on the central nervous system of the birds.

Furthermore, phytic acid, another toxic component of the extract, has been reported to lower bio-availability of minerals and hence indirectly influence energy transformation and metabolism which are capable of bringing about dizziness (Hashim and Idris, 1977). The diarrhoea observed may be due to side effect of digestive and excretory problem (Szabo and Tebbitt, 2000). Earlier on Moffat (1986) reported that about 80% of the administered doses of mucuna species was excreted within 24 hours through frequent stooling and diarrheic droppings. Also Duke (1981) reported that feeding of *M. utilis* resulted in vomiting and diarrheic in pigs. The increasing diarrheic dropping associated with increasing doses observed may be due to rapid excretion of toxic components like tannin, 3 - methyldopa etc (Jankovic and Caine, 1987). The observed diarrhoea and increasing quantity of diarrhoea as the doses increased were in agreement with the report of Ukachukwu *et al* (1999) who studied the effect of *M. cochinchinensis* to any death even at very high dose of 5000mg / kg body weight

CONCLUSION AND RECOMMENDATION

There was acute toxicity but not fully for all the range of doses administered leading to restlessness, dizziness, diarrhoea but no mortality. However, further research will be able to determine the dosage at which acute toxicity signs begins between 0mg/kg and 3500mg/kg and the lethal dose begins (above 5000mg/kg doses of the extract).

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