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Percentage yield and acute toxicity of the plant extracts of *Ceiba pentandra* grown in Bauchi State, North Eastern Nigeria

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Abstract
The roots and stem bark of *Ceiba pentandra* was subjected to hot Soxhlet extraction using solvent of different polarity, hexane, ethyl acetate, acetone, methanol and water. The methanol extracts gave the highest yield of 17.5% highest polar solvent while hexane being the lowest polar solvent gave the least percentage recovery of 1.12%. The colour and texture of each of the extract was also determined. Hexane and ethyl acetate extract showed yellow and orange colour, with the texture oily and solid. While acetone, methanol and water extracts gave brown and dark brown colour with the texture being solid and pastry. The acute toxicity of the extracts was also determined by using both the oral and intraperitoneally dosage concentration. The intraperitoneally dosage with slight modification tends to be toxic than the oral dosage.

Keywords: Toxicity, intraperitoneally, dosage yield, extracts

1. Introduction
Plant have not only provided mankind with food, clothing, flavours and fragrances but have also been indispensable sources of natural products for relief and treatment of different ailment (Okoli, 2009) [3]. As part of our search for bioactive natural products we considered as a good phytochemical sources. The plants *Ceiba pentandra has a* high medicinal use in part of Nigeria for the treatment of bronchitis, tuberculosis, hepatitis, diuretic and antihypertensive remedies (WHO, 2002) [2].

2. Materials and Methods
2.1 Plant Materials
Fresh roots and stem bark of *Ceiba pentandra* were collected in the month of October, 2014 from the botanical garden of ATBU Bauchi. They were identified by a Botanist Mr Toma Buba of the Biological Sciences Department of ATBU Bauchi. They were air dried for two weeks under shade and milling machine. The powdered roots and stem bark was stored in a sterile bag using the what man No. 1 filter paper for a further used in accordance with the methods adopted by Sofowora.

2.2 Animals
About 72 white rats weighing (120-200g) of both sexes were purchased at National veterinary research institute (NVRI) Vom, Plateau state. They were housed in a metallic cage and starved for food for 6 hours and allowed to have access to water only in order to acclimatize before the experimentation. They were observed for nervousness salivation, restlessness, mortality, wetting stool, decrease in appetite, dullness weakness of the body.

2.3 Extraction
The extraction process was carried out using the soxhlet extractor with n-hexane, ethyl acetate, acetone, methanol and water in increasing order of polarity. Eighty gram (80g) of the powdered sample was weighed accurately and introduced into a porous thimble made up of filter paper and placed in the inner tube of the soxhlet extractor. The loaded extractor was then fitted into a 500cm^3 round bottom flask containing about 250cm^3 of the solvent and boiling chips to a reflux condenser. The set up was mounted on a heating mantle and held in a place with a retort stand and clamps. The extraction process was run for eight hours (8 hours). Until colourless liquid was observed for sometime in the sample chamber of the extractor. This process was repeated using the remaining solvent sequentially on the sample. Each was kept in a desicato rat least three days before further use.

2.4 Acute Toxicity Test

The acute toxicity test of the plant extracts was evaluated using the methods described by (Lorke., 1982) nine albino rats were divide into three groups and were given 50,200 and 500 mg/kg respectively. The administration was both intraperitoneally and oral dosage. The following results doses of 2000, 3000 and 4000m/kg was administered to the rest of the rats.

3. Results

Table 3.1: Percentage yield of the plant extracts of *Ceiba pentandra*

List of extracts	Recovery (g)	Percentage yield (%)	Colour	Texture
Hexane	0.7	0.8	Yellow	Oily
Ethly acetate	1.20	1.52	Orange	Solid
Acetone	3.90	4.80	Brown	Solid
Methanol	6.20	7.75	Brown	Solid
Water	2.50	3.12	Dark	Solid

Table 3.2: Percentage yield of the plants extract of *Ceiba pentandra*

List of extracts	Recovery (g)	Percentage yield (%)	Colour	Texture
Hexane	1.10	1.38	Yellow	Oily
Ethly acetate	4.00	5.00	Orange	Solid
Acetone	10.00	12.5	Brown	Solid
Methanol	14.00	i7.5	Brown	Solid
Water	5.00	3.12	Dark	Solid
Tabl Ethly acetate	1.50	1.87	Orange	Solid
Acetone	4.70	5.87	Brown	Solid
Methanol	4.00	5.88	Brown	Solid
Water	3.20	4.00	Dark	Solid

Table 3.3: Percentage yield of the extracts of *Ceiba pentandra*

List of Extracts	Recovery (G)	Percentage Yield (%)	Colour	Texture
Hexane	1.20	1.50	Yellow	Oily
Ethly acetate	5.00	6.25	Orange	Solid
Acetone	8.00	10.00	Brown	Solid
Methanol	4.00	5.63	Brown	Solid
Water	6.00	7.52	Dark	Solid

Table 3.4: Acute toxicity test of methanol extracts of *Ceiba pentandra*

Group	Noof rats used	Dosage (mg/kg)	Mortality (%)		Salivation (%)		Wetting stool (%)		Inco0rdination (%)		Nervous (%)	
			Oral	I.P	oral	I.P	Oral	I.P	Oral	I.P	Oral	I.P
A	3	50	0	0	0	0	0	0	0	0	0	0
B	3	200	0	0	0	0	0	0	0	0	0	0
C	3	500	0	0	0	0	0	0	0	0	0	0
D	3	1000	0	0	0	0	0	0	0	1	0	0
E	3	2000	0	0	0	0	0	0	0	2	0	0
F	3	5000	0	0	0	0	0	0	0	1	0	0

3. Discussion

The result of the extraction (Table 1) showed that all the extractants used for the extraction were able to extracts some component of the plants parts but with varied quantities. The extractants is as reported by Sultana *et al.* (2009) [5]. This work has shown the difference in the polarity of the solvents which affects the solubility of the constituents in each solvent. The chemical nature of each constituent of the plants parts varies hence their solubility is in a given solvent. The methanol stem of the *Ceiba pentandra* tends to have the highest yield recovery of 7.75%, 5.63% and 5.88% for M(S) A, M(R)A, M(S)B and M(R)B respectively (Table 3. 1-3. 4) while the hexane extracts being the least polar solvent had the least percentage yield of 0.8%, 1.38%, 1.50% and 1.12% respectively for (Table3. 1-3. 4) respectively. (H(R) A, H(S)A, H(R)B, and H(S)B. The percentage yield of the plant under study proves that the plant posses high potential source for the phyto compounds. The yield base on the polarity of the solvents an indication of the plants' pharmacological importance.

The extracts also show difference in nature and colours with extracting solvents. This indicates the difference in the composition of the extracts and each solvent extracts varied in component and quantities. The fraction of the crude extracts of hexane, ethyl acetate, acetone, methanol and water were all oily, solid and shows various colours (Table 3. 1-3.4). Hexane extracts were all oily on evaporation of the solvents, while methanol and water fraction dried to hard solid that had to be ground to powder. The fractions were of varied colours and quantities (Table 3.3 and Table 3.4).

The comparative analysis of the acute toxicity of the methanol extracts was determined using the method described by (Lorke, 1982). The oral and intraperitoneally route's with a varied dosage concentrations, the increase in concentration of the dosage tends to be slightly toxic using the intraperitoneally routes as the oral routes had no effects on the mortality (Table 3.5), while the incoordination tend to be slightly toxic with the increase in the concentrations. But in the case of the (Table 3.6). The mortality was not recorded despite the increase in the dosage using all the routes. But the melting stool was observed with the increase in concentration (Table 3.6). The reason for this variation may be as a results

of the facts that the intraperitoneal dosage had close access to the blood stream than the oral routes. In all the parameters determined for (Table 3.5 and 3.6) the results generally is in agreement with the results of (Ojo *et al.*, 2006) [1].

4. References

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