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Research Article

# Percentage Yield and Acute Toxicity of the Plants Extracts of *Ceiba pentandra* and *Anogeissus leiocarpus* Grown in Bauchi State, North Eastern Nigeria

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## ABSTRACT

The roots and stem bark of *Ceiba pentandra* and *Anogeissus leiocarpus* 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 interperitoneally dosage concentration. The interperitoneally dosage with slight modification tends to be toxic than the oral dosage.

**Keywords:** Toxicity, Dosage yield, Extracts, *Anogeissus leiocapus*

## INTRODUCTION

Plant have not only provided mankind with food, clothing, flavours and fragrances but have also been indispensable sources of natural product for relief and treatment of different ailment[1]. As part of our search for bioactive natural products we considered as a good phytochemical sources. The plants *Ceiba pentandra* and *Anogeissus leiocarpus*. Which they possess the indigenous use in part of Nigeria for the treatment of bronchitis, tuberculosis, hepatitis, diuretic and antihypertensive remedies[2].

## MATERIALS AND METHODS

### Plant materials

Fresh roots and stem bark of *Ceiba pentandra* and *Anogeissus leiocarpus* 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 Whatman No. 1 filter paper for a further used in accordance with the methods adopted by Sofowora[3].

### Animals

About 72 white rats weighing (120 g-200 g) 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 to acclimatize before the experimentation. They were observed for nervousness salivation, restlessness, mortality, wetting stool, decrease in appetite, and dullness weakness of the body.

### 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 grams (80 g) 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 500 $cm^3$ round bottom flask containing about 250 $cm^3$ 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 some time in the sample chamber of the

extractor. This process was repeated using the remaining solvent sequentially on the sample. Each was kept in a desiccator at least three days before further use.

### Acute toxicity test

The acute toxicity test of the plants extracts was evaluated using the methods described by Sofowora[3] nine albino rats were divided into three groups and were given 50, 200 and 500 mg/kg respectively. The administration was both interperitoneally and oral dosage. The following results doses of 2000, 3000 and 4000 m/kg was administered to the rest of the rats[4].

## RESULTS AND DISCUSSION

The result of the extraction showed that all the extractants used for the extraction were able to extracts some component of the plants parts but with varied quantities (Table 1). The extractants is as reported by Sultana et al.[4]. 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 2) 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 (H(R) A, H(S)A, H(R)B, and H(S)B (Table 3). The percentage yield of two plants under study proves that the plants possess high potential source for the Phyto compounds. The yield bases on the polarity of the solvents an indication of the plants' pharmacological importance[5].

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 extract 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 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 (Tables 3 and 4).

The comparative analysis of the acute toxicity of the methanol extracts was determined using the method described by Sofowora[3]. The oral and interperitoneally

routes with a varied dosage concentration, the increase in concentration of the dosage tends to be slightly toxic using the interperitoneally routes as the oral routes had no effects on the mortality (Table 5), while the incoordination tend to be slightly toxic with the increase in the concentrations (Table 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 6). The reason for this variation may be because of the facts that the intraperitoneal dosage had close access to the blood stream than the oral routes[6].

## CONCLUSION

In all the parameters determined for *Ceiba pentandra* and *Anogeissus leiocarpus* the results are generally in agreement with the results of previous works mentioned in this article and interesting observations were made.

## ACKNOWLEDGMENT

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**TABLES**

| List of extracts | Recovery (g) | Percentage yield (%) | Colour | Texture |
|---|---|---|---|---|
| Hexane | 0.7 | 0.8 | Yellow | Oily |
| Ethyl 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 1:** Percentage yield of the root extracts of *Ceibapentandra.*

| List of extracts | Recovery (g) | Percentage yield (%) | Colour | Texture |
|---|---|---|---|---|
| Hexane | 1.10 | 1.38 | Yellow | Oily |
| Ethyl acetate | 4.00 | 5.00 | Orange | Solid |
| Acetone | 10.00 | 12.5 | Brown | Solid |
| Methanol | 14.00 | 17.5 | Brown | Solid |
| Water | 5.00 | 3.12 | Dark | Solid |

**Table 2:** Percentage yield of the stem extract of *Ceibapentandra.*

| List of extracts | Recovery (g) | Percentage yield (%) | Colour | Texture |
|---|---|---|---|---|
| Hexane | 1.20 | 1.50 | Yellow | Oily |
| Ethyl 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:** Percentage yields of the root extract of *Anogeissus leiocarpus.*

| List of extracts | Recovery (g) | Percentage yield (%) | Colour | Texture |
|---|---|---|---|---|
| Hexane | 0.90 | 1.12 | Yellow | Oily |
| Ethyl 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 4:** Percentage yields of the stem extract of *Anogeissus leiocarpus.*

| Group | No. of rats used | Dosage (mg/kg) | Mortality (%) | | Salivation (%) | | Wetting stool (%) | | Incoordination (%) | | 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 | 3 |
| B | 3 | 200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| C | 3 | 500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| D | 3 | 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| E | 3 | 2000 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| F | 3 | 5000 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 |

**Table 5:** Acute toxicity test of methanol extracts of *Ceiba pentandra*.

| Group | No. of rats used | Dosage (mg/kg) | Mortality (%) | | Salivation (%) | | Wetting stool (%) | | In-coordination (%) | | 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 |

**Table 6:** Acute toxicity test of methanol extracts of *Anogeissus leiocarpus*.