Study on The Effect of Aqueous Extract of *Mucuna sloanei* (Ukpo) On Haematological and Haemostatic Mechanisms of Albino Wistar Rats.

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**Abstract:** The study on the haemostatic and haematological effect of extract of *Mucuna sloanei* (ukpo) was investigated. Twenty (20) albino wistar rats weighing 130-180g were divided into two (2) groups, group A (8 rats) served as control while group B (12 rats) served as the test rats. The control groups were given normal rat pellets and water for 28 days while the test group (group B) received 1.0ml of the extract and normal rat feed. At the end of the feeding, blood samples were collected from the animals by cardiac puncture for haematological analysis while cuts were made on their hairless tails for bleeding and clotting times. Results from the analysis showed a significance increase (P<0.05) in the mean haemoglobin concentration, packed cell volume, total white blood cell count, platelet count and a reduction in bleeding and clotting times of the rats. It could be concluded that the consumption of *M. sloanei* fruits enhanced the haemostatic and haematological profile of male albino wistar rats.  

**KEY WORDS:** *Mucuna sloanei*, haemostasis, packed cell volume, platelet, wistar rats.

**INTRODUCTION**  
*Mucuna sloanei* is popularly known as ‘ukpo’ by the Ibo speaking part of south eastern Nigeria. It is a legume belonging to a family Fabaceae. Its origin is from Asia and was introduced into the western hemisphere via Mauritius. It is known as ‘horse eye beans’. The Hausas in Nigeria call it karasu, while the Yorubas call it ‘Yerepe’. *Mucuna sloanei* whisker-like hairs called trichones that are irritating when it comes in contact with the skin or eyes. Each pod may contain 1-3 seeds with a hard coating which is white when immature and turns black when mature and dry (Enwere, 1998). *Mucuna* species generally have high protein content of 20 to 25%, lipid content 2.8-9.8%, crude fibre 5.3-11.5%, ash 2.9-5.5% and carbohydrate 59.2-64.8%. (Ariathan et al, 2003).

The anti-nutritional factors found in *mucuna* species include L-dopa, phenolics, tannins, haemagglutins, trypsin, chymotrypsin inhibitors, phytic acid, saponins and cyanogenic compounds. However, most of these anti-nutritional factors are eliminated to low levels during processing. Ukachukwu and Obioha 1997, reported detoxification for 90 minutes or toasting for 60 mins. *Mucuna sloanei* is used as a soup thickener in traditional soups preparation by the Igbos of the Eastern part of Nigeria. Here the seeds are cracked, boiled, debulled, ground to powder and added to the soup. In some localities, it is prepared as a choice dish. In this case the *Mucuna sloanei* is cracked, boiled overnight and dehulled. The cotyledons are spiced to taste and served as a delicacy (Ezueh, 1997).

Nutritional values of *Mucuna sloanei* include carbohydrates (43-49%), protein (20-25%), fat (5-7%) and dietary fibre (5.3-11.5%).

Dietary fibre also called roughages is the part of food that cannot be digested and absorbed to produce energy. It comprises the cell walls and supporting structures of vegetables and fruits. Fibre may be soluble or insoluble and helpful in the treatment of many diseases like constipation, appendicitis, obesity etc.
The exciting nutritional contents of M. sloanei is what stimulated our curiosity to embark upon this study hence the aim and objectives of this research are to determine its effect on haemoglobin contents, packed cell volume, white blood cell count and platelet count, its effect on clotting and bleeding times of male albino wistar rats.

MATERIALS AND METHODS

Twenty male albino rats were randomly selected and kept in a metal cage with iron netting in a laboratory environment. They were kept in the animal house for 21 days to get acclamitized to the environment before commencing an acute feeding with the extract for 28 days.

EXPERIMENTAL DESIGN:

Twenty male albino wistar rats (130-180g) were selected and divided into two groups. Group A rats served as control while group B rats served as test animals. Group A rats were fed with normal rat feed and water ad libitum. Group B rats received rat feed in addition to the oral administration of 1.0ml of the seed extract of Mucuna sloanei once daily and water.

PREPARATION OF EXTRACT

This was prepared using the method of Ugochukwu et al, 2003. Seeds of M. sloanei were purchased from local market around the campus. The botanical identification and authentication was confirmed by a botanist from the department of Biological Science, Chukwuemeka Odumegwu Ojukwu University (Former Anambra State University) Uli Campus. The seeds were washed, sun dried for 18 days. The seeds were cracked, boiled, dehulled and grounded to powder. The powdered seeds were stored in a glass bottle with a screw cap and kept in a refrigerator (4ºc). Later the powdered seeds were homogenized with distilled water and kept for 12hrs. The mixtures were filtered with Whatman No. 1 filter paper. The filtrates were concentrated in one tenth (1/10) of the original volume at 38-40ºc using a rotatory evaporator. 5.0g of the powder were re-suspended in 100ml of distilled water before being given to the rats. 1.0ml of the suspension was administered to the rats daily for 28 days using blunt needle and syringe.

TOXICITY STUDIES (LD$_{50}$)

The LD$_{50}$ of the extract in albino wistar rat was determined using Lorke’s method (1983). Mice (60-80g) were fasted overnight for 22hrs and doses of the extract of Mucuna sloanei (100mg) was administered intraperitoneally to the groups of the mice (n=3) and observed for another 24-48hrs. The mice that served as control received normal saline only. The LD$_{50}$ for the extract was calculated by geometric mean of the dose killing none of the three mice in the group and dose killing all the animals in the group.

\[
LD_{50} = \sqrt{ \text{Dose killing all animals in the group} \times \text{Dose killing none of the animals in the group}}
\]

PHYTOCHEMICAL ANALYSIS OF MUCUNA SLOANEI:

The aqueous extract of the Mucuna sloanei (ukpo) was screened for the presence or absence of metabolites using standard phytochemical screening procedures as described by Harborne (1973), Trease and Evans (1996). The extract was tested for carbohydrates, steroids, sugars, saponins, alkaloids, flavonoids, resins, calcium, glycosides, steroids, acidic compounds, fats and oils.

DETERMINATION OF HAEMOSTATIC AND HAEMATOLOGICAL INDICES

Blood samples were collected into EDTA and sodium citrate bottles from the animal by cardiac puncture. The samples were distributed into 2.0ml for EDTA bottles and 2.0ml into sodium citrate bottles. The haematological studies were done within hours of the blood sample collection while the haemostatic analysis were carried out immediately and directly using the animals as in bleeding time. The Packed cell Volume and haemoglobin concentration were done by the method described by Alexandar and Griffiths (1993). The total white blood cell count and platelets were estimated according to the visual method of Dacie and Lewis (1991). The whole blood clotting and bleeding times were carried out by the method of Dejana (1982).

STATISTICAL ANALYSIS

The results obtained in the study were represented as mean and standard deviation (mean ± S.D), while the students’-t-test was used to compare the
result of the control and the test. A P value of less than (P<0.05) or statistically significant.

RESULTS

The results obtained from this study are presented in Table 1-2 and Figure 1.

Table 1: Indicates the phytochemical analysis of *Mucuna sloanei*.

<table>
<thead>
<tr>
<th></th>
<th>Alkaloids</th>
<th>Tanins</th>
<th>Carbohydrate</th>
<th>Calcium</th>
<th>Saponins</th>
<th>Protein</th>
<th>Steroid</th>
<th>Reducing Sugar</th>
<th>Resin, Glycosides, Flavenoids, Terpenoids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of concentration</td>
<td>-</td>
<td>++</td>
<td>+++</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
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- Negative,
+ Present in small concentrations
++ Present in moderate concentrations
+++ Present in high concentrations.

Table 2: Shows the mean and standard deviation for some of the haematological and haemostatic indices of wistar rats after 28 days with *Mucuna sloanei*.

The result shows that *Mucuna* Sloanei slightly increased the haematological profile of albin wistar rat and prolonged their bleeding time (P<0.05).

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>HB g/100ml ± S.D</th>
<th>PCV% ± S.D</th>
<th>WBC/mm³ ± S.D</th>
<th>Platelet count x 10⁹/l ± S.D</th>
<th>Bleeding time/min ± S.D</th>
<th>Clotting time/min ± S.D</th>
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</thead>
<tbody>
<tr>
<td>Group A Control n=8</td>
<td>13.8 ± 0.5</td>
<td>41.5 ± 1.2</td>
<td>4,866 ± 188</td>
<td>178 ± 13.3</td>
<td>2.75 ± 0.1</td>
<td>5.30 ± 0.2</td>
</tr>
<tr>
<td>Test Rats (Grp B) before Extract n=12</td>
<td>13.7 ± 0.2</td>
<td>41.0 ± 0.5</td>
<td>4,750 ± 120</td>
<td>180 ± 17</td>
<td>2.6 ± 0.3</td>
<td>5.32 ± 0.5</td>
</tr>
<tr>
<td>Test Rats Grp 2 28 Days after extract</td>
<td>14.0 ± 1.5</td>
<td>42.0 ± 3.0</td>
<td>5181 ± 212</td>
<td>192.5 ± 17.1</td>
<td>2.8 ± 0.4</td>
<td>8.4 ± 0.3</td>
</tr>
<tr>
<td>P value</td>
<td>P&lt;0.05</td>
<td>P&lt;0.05</td>
<td>P&lt;0.05</td>
<td>P&lt;0.05</td>
<td>P&gt;0.05</td>
<td>P&gt;0.05</td>
</tr>
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</table>

**FIG 1:** Lethality studies indicating the effect of administering graded doses (500-5000mg/dl) of mice on aqueous extract of *M. sloanei*. LD₅₀ = 4000mg/dl.
DISCUSSION

*Mucuna sloanei* extract displayed a slight effect in the haematological profile of albino wistar rats. There is a slight increase in the haemoglobin concentration (P<0.05), white blood cell counts and platelet count (P<0.05) (Table 5).

This observed effect can be attributed to the protein content (20-25%), carbohydrate content (43.5%-49%) and a little fat (5-7%) in the seed of *Mucuna sloanei*. Proteins and carbohydrates are for energy, form the structural material of muscles, tissues and organs and are equally regulators of function, as enzymes and hormones.

Protein is synthesized in the body from their constituent of amino acids which are obtained from the digestion of proteins in the diet. Carbohydrates are manufactured by plants and animals from diet. All carbohydrates are eventually broken down in the body to the simple sugar, glucose which can then take part in energy producing metabolic processes.

The acute toxicity study (LD$_{50}$) showed that *Mucuna sloanei* extract was non toxic as shown in Fig 1 (LD$_{50}$ of 4000mg/kg); hence the dose used in this study (1.0ml) was considered safe throughout the period of study. The consumption of *Mucuna sloanei* in the rats indicated a positive effect in the blood forming cells hence the slight increase in the haemoglobin concentration, packed cell volume, white blood cell and platelet counts (Table 2). This then present *Mucuna sloanei* as a safe seed and food that can be consumed by individuals to fight against malnutrition.

*Mucuna sloanei* plant indicated a pure plant characteristic by possessing moderate concentrations of tannins and saponins but lacked alkaloids and a little calcium (Table1) hence it presented a very, poor haemostatic agent and prolonged the bleeding and clotting times of albino wistar rats.

REFERENCES


