Heamatological Response of Wister Rat to *Occimum Gratissimum* Extract

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**Abstract:** Changes in haematological parameters are important in the assessment of responses of humans and animals to various disease conditions. It can also serve as the basis of prediction of health outcomes. The haematological response of wister rats to *occimum gratissimum* extract was assessed. Twenty-five Wistar rats weighing between 100-160g were used for the study. The rats were randomly grouped into five; a control group, while groups 1-4 were the experimental groups. Increasing doses of the *Occimum gratisimum* extract at 0.2, 0.4, 0.8 and 1.6 g kg\(^{-1}\) body weight were administered orally to the experimental groups daily for the period of four weeks. Haematological parameters were assessed using standard procedure. The results show a significant decrease in the haemoglobin level, packed cell volume and white blood cells in the experimental rats at \(p < 0.05\). The mean corpuscular haemoglobin and mean corpuscular volume decreased significantly in the experimental groups compared to the control. Also, the haematological responses was found to be inversely related to the dose of the *Occimum gratisimum* extract.

**Key words:** Haemoglobin, Extract, Wister, Rats and *Occimum gratisimum*.

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I. Introduction

Plants have been historically used by man for the treatment and management of many diseases and this practice of using herbs is still very popular in many developing countries and Nigeria is not an exception(1, 2). The advocacy for organic and natural product have also driven many people to preferring herbs over the orthodox medicine and this practice is gradually becoming more popular in some parts of Europe and North America as well as developing countries like Nigeria (3). However, poverty and a number of other factors such as illiteracy and in adequate health infrastructure among others have contributed to the increase in the use of these medicinal herbs in tropical areas. Because this herbs are seen to be more cost effective and accessible to people in resource limited settings.

The need to stay healthy and strong cannot be overemphasize because good health is very vital to human productivity and livelihood. The need of individual to have good health status and optimum immunity to help defend the body against pathogenic organism ad invaders is vital human existence. The prognosis of most diseases is dependent on the immunity level of the individual in question and some herbal said to help boost the immune system (4). This is true of farm animals, especially mammals.

Changes in haematological parameter are important in the assessment of responses of humans and animals to various disease conditions (5, 6, 7). Also, haematological parameters are often used to define the presence and extent of oxidative stresses due to nutrition and some physiological conditions (8). Also, nutrient composition of foods and feeds have been reported to trigger some haematological responses. (9) Animal studies have additionally shown that there can be variations in haematological parameters between different breeds of farm animals (9). Earlier studies have shown that haematological responses, are valuable in accessing toxicity, and tolerable levels of food component as well as the physiological responses and health status of farm animals (10, 11).

Herbs like *Occimum Gratissimum* popularly called “efinrin” is one of the most common herbs used in Nigeria delicacies. It is believed to have great medicinal value in improving health status of individuals. It is an integral part of many soups, herbal mixtures and many health claims have been ascribed to this leaf. However, there is dearth of data on an evidence based reports on this leaf as the use of the leaf have been handed down from one generation to the other as a universal medicine. Therefore, this study aims to the determine the haematological responses to the ingestion of *Occimum Gratissimum* in albino rats kept under laboratory conditions.
II. Materials and Methods

Collection, Authentication and Preparation of Plant Material

The leaves of *Occimum grastissimum* was collected from Ijebu-Ode. The leaves were dried in the absence of sunlight for two (2) weeks. The dried grinded leaves of *Occimum grastissimum* was soaked in 1000mls of absolute ethanol at room temperature for three (3) days after leaves was re-extracted in 800mls of ethanol for another three days, the leaf was finally re-extracted with 500mls of ethanol to allow maximum extraction of *Occimum grastissimum*. The ethanolic filtrate was then oven dried at 35°C until a dried powdery mass was formed.

MATERIALS AND CHEMICAL USED

- Wister Rats
- Cage
- Heparinized bottle
- Oven
- Syringe and needles
- Oral Cannula
- Weighing scale
- Ethanol

Extraction Procedure

![Extraction Procedure Diagram]

Animal selection

Twenty-five Wistar rats weighing between 100-160g were used for the study. The rats were purchased from the animal house at Sango Ota. They were bred for one week at the School laboratory. The rats were fed with pellets grower mash obtained from a local feed mill, and with water during the breeding period designed to acclimatize the rats. The rats were picked at random and grouped into five. One group was randomly selected to be the control group, while groups 1-4 were the experimental groups. Each of the rats were marked at the tail with different colours of pen marker and put into different segments of the cage according.
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Administration of Extract
The aqueous extract was administered orally using a calibrated syringe with a attached rubber cannula. The animals received doses of the extract daily for four weeks. Control group received a quantity of water equal to the volume in group 4. Groups 1, 2, 3 and 4 received the aqueous extract of Ocimum gratissimum at doses of 0.2, 0.4, 0.8, and 1.6 g/kg respectively. The rats were sacrificed after four weeks of extract administration using cervical dislocation. Blood from each rat was collected into labeled heparinized bottle to prevent coagulation of the blood.

Hematological Parameters
Evaluation of the hematological parameters was carried out using automated hematological Analyzer K-X-21 made by Symex, Kobe, Japan. Samples of blood from the Wistar rats in heparinized bottle were analyzed using standard procedures (5, 12). Data obtained were analyzed using t-test and chi-square. Level of significance was predetermined as p < 0.05.

RESULTS
The shows the effect of different doses of aqueous extract of Ocimum gratissimum on the haematological parameters. The mean haemoglobin decreased significantly (p = 0.04) as compared with the control group as shown in Table 1. Both the mean corpuscular haemoglobin and the mean corpuscular volume decreased significantly as compared with the control (p = 0.0217).

<table>
<thead>
<tr>
<th>Groups</th>
<th>RBC (x10^12/L)</th>
<th>MCH (pg)</th>
<th>MCV (FL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7.59</td>
<td>20.67</td>
<td>57.67</td>
</tr>
<tr>
<td>0.2 g/kg</td>
<td>7.08</td>
<td>19.75</td>
<td>55.25</td>
</tr>
<tr>
<td>0.4 g/kg</td>
<td>6.92</td>
<td>19.59</td>
<td>53.25</td>
</tr>
<tr>
<td>0.8 g/kg</td>
<td>6.33</td>
<td>19.5</td>
<td>51.75</td>
</tr>
<tr>
<td>1.6 g/kg</td>
<td>5.57</td>
<td>18.4</td>
<td>30.8</td>
</tr>
</tbody>
</table>

Table 1 shows that the white blood cell and platelets counts decreased in the experimental groups as compared with the control group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Whitecell count (x10^9/L)</th>
<th>Platelet count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>10.03 ± 0.031</td>
<td>798.7 ± 2.30</td>
</tr>
<tr>
<td>0.2 g/kg</td>
<td>8.03 ± 0.024</td>
<td>660 ± 1.42</td>
</tr>
<tr>
<td>0.4 g/kg</td>
<td>6.65 ± 0.041</td>
<td>581.5 ± 2.51</td>
</tr>
<tr>
<td>0.8 g/kg</td>
<td>5.58 ± 0.015</td>
<td>524 ± 3.01</td>
</tr>
<tr>
<td>1.6 g/kg</td>
<td>4.08 ± 0.024</td>
<td>584 ± 2.08</td>
</tr>
</tbody>
</table>

Table 2 shows that the mean packed cell volume (PCV) value in the treated animals was significantly reduced (p = 0.031) at the end of the treatment period as compared with the control group.
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Table3: Effect of leaf extract of Ocimum gratissimum on PCV

<table>
<thead>
<tr>
<th>Groups</th>
<th>PCV(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>32</td>
</tr>
<tr>
<td>0.2g/kg</td>
<td>30</td>
</tr>
<tr>
<td>0.4g/kg</td>
<td>28.75</td>
</tr>
<tr>
<td>0.8g/kg</td>
<td>25.25</td>
</tr>
<tr>
<td>1.6g/kg</td>
<td>19.6</td>
</tr>
</tbody>
</table>

III. Discussion

The study tested the effect of aqueous extract of *Ocimum gratissimum* on hematological parameters of wister rats. The results showed that the leaf extract of *Ocimum gratissimum* administered at the dosages used and for the duration of the experiment suppresses the haemopoietic system.

The hemoglobin values at the end of the experiment showed a reduction in the hemoglobin level, this is in agreement with the finding of Ephraim et al. (13) in which the hemoglobin value decreased significantly after administration of aqueous extract of *Ocimum gratissimum* to the rats. Also, there was a decrease in the PCV value as compared to the control, this agrees with the finding of Obianime et al. (14) who showed the effect of aqueous *Ocimum gratissimum* extract on male mice. This might be due to the presence of some anti-nutritional compounds such as tannins and saponins which will inhibit the absorption of other nutrients (2). The study showed a significant decrease in packed cell volume, and neutrophils however, the decrease observed in the haemoglobin level was not significant. This disagrees with the study of Ojo et al. (2) where the decrease observed in the haemoglobin levels was significant. Therefore, habitual usage can be injurious to health. (17)

The study also showed a progressive reduction in increased usage of the extract from *Ocimum gratissimum*. Blood platelets are known to be part of the mechanism of blood clotting. A low blood platelet concentration implies that the process of blood clotting will be protracted which will invariably bring about too much blood loss in the case of injury. The findings of this study may be able to suggest the implication of habitual consumption of this plant on the health of the individuals.

IV. Conclusion

In conclusion, this study shows that the leaf extract of *Ocimum gratissimum* administered at the dosages used and for the duration of the experiments suppresses the haemopoietic system.

Recommendations

In the light of the findings of the study, the following are hereby recommended:

- The leaves of *Occimum gratissimum*, having been found to have haematological effect however, further studies should be done to determine the safe levels for usage.

- Humans may need to be courteous in the consumption of *Ocimum gratissimum* so that it will not negatively impact the production of blood cells.

References


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