The effects of ethanol extract of *Corchorus olitorus* leaves on haematological indices of Wistar albino rats

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**ABSTRACT**

*Corchorus olitorus* is a common native vegetable used as spice in many homes in West Africa including Nigeria. The investigation of the effect of ethanolic extract of *C. olitorus* leaves on haematological indices of Wistar albino rats after twenty-one days of oral administrations of the doses of 50, 100 and 200 mg/kg body weight was carried out. The ethanol extract significantly (p<0.05) reduced haematological indices such as the white blood cell count (WBC), mean cell haematocrit (MCHC) and packed cell volume (PCV) at all the doses when compared to those of the control. Similarly, the extract significantly (p<0.05) increased indices such as red blood cell count (RBC) and platelet (PLT) at all the doses and haemoglobin (Hb) at 50 and 200 mg/kg body weight. The results of this study indicate that the ethanolic extract of *C. olitorus* has potential beneficial effects on some haematological indices especially the platelets and hence, may be taken as a good food spice.

**Key words:** Effects, *Corchorus olitorus*, haematological indices, Wistar albino rats, ethanol extract.

**INTRODUCTION**

Plants have contributed immensely to the well being of humans and animals. In the early days before the introduction of modern drugs, humans use herbs for the cure of various diseases through trial and error method. Fauci (1998) reported that one quarter of prescribed drugs dispensed by community pharmacists today contains at least one active ingredient derived from plants materials.

Plants have diverse pharmacological roles they play in the health of people. These pharmacological roles have depended on the occurrence of varieties of chemical components in the plants (Duke and Wain, 1981). Medicinal plants are sources of a number of novel chemical compounds (Bor et al., 1998). The metabolites that have effects on human health are known as phytochemicals. Examples of such chemicals include alkaloids, flavonoids, saponins, phenol compounds, steroids and proteins (Negem et al., 1980).

In view of plant pharmacological importance, especially in Nigeria, traditional medical practitioners make use of largely plant. One of such plant is *C. olitorus*. This plant is known and used by many Nigerian natives as vegetables for making soup and spices for food.

*C. olitorus* known as jute plant belongs to the family, Tiliaciae and has been used in different parts of the world, including Asia and Africa not only as spice for food but also for the treatment of chronic cystitis and dysuria (Pan et al., 2000). In Africa, mainly Nigeria, Ghana and Cameroon, the edible shoot tips and leaves are always eaten and cooked as potherbs. In West Africa, their edible qualities are widely appreciated, where the shoots and leaves are combined in soups and stews. It contains high quantity of Vitamin A, protein, fiber, calcium, iron, carotene and folic acid (Qomen and Grudden, 1978).

The objective of this study was to analyze the effects of the ethanol extract of *C. olitorus* leaves on the haematological indices of Wister rats.

**MATERIALS AND METHODS**

**Plant extract preparation**

The fresh leaves of *Corchorus olitorus* were bought from Eke-Awka market, in Awka south LGA; Anambra state of
Nigeria. The leaves were washed and dried at room temperature for four days and pulverized with an electric blender to produce fine powder. The powdered plant material that weighed (450 g) was extracted by macerating in 1 l of 70% ethanol for 48 h. The extract was filtered and concentrated by indirect heating using water bath. The yield was 15.56 g of the concentrated ethanol extract, which was stored at 4°C for further uses.

Animals

Twenty-four adult Wister albino rats (100-150 g) were obtained from the Animal House of Safety Diagnostic and Research laboratory, Nsukka and used for the study. They were kept in animals houses at a temperature of 29 ± 2°C. They were fed with commercial rat chow (Top feed grower’s mash) with nutrient composition. The animals were divided into four groups of six rats each. They received the ethanol extract orally for the period of twenty one days as follows:

Group I (Six rats) received 2 ml of distilled water/kg body weight and was also used for in vitro tests.
Group II (Six rats) received 200 mg/kg body weight of ethanol extract.
Group III (Six rats) received 100 mg/kg body weight of the ethanol extract.
Group IV (Six rats) received 50 mg/kg body weight of the ethanol extract.

Extract was administered orally once a day for 21 days. On day 21, the animals were sacrificed by cardiac puncture using chloroform as a sedative agent and blood samples measuring 3 ml were collected and poured into a sample container containing 3.8% Tri-sodium-citrate as anticoagulant. Each container was thoroughly mixed to prevent coagulation of the blood.

Blood parameters counts

Blood parameters were counted by an automated Haematology Sysmex Analyser England. The white blood cells, red blood cells, haemoglobin concentration, haemocrit, mean cell volume, platelet concentration, and lymphocyte concentration were determined.

RESULTS AND DISCUSSION

On the last day of administration, the control group was analyzed before the main experiment groups. Table 2, shows the effect of oral administration of ethanol extract of C. olitorus on haematological parameters of experimental rats. Oral administration of different doses of the extracts resulted in alterations of haematological indices with different groups of the rats responding differently. The administration of the extract at 200 mg/kg bwt to the experimental rats resulted in the reduction of some haematological indices like MCHC, WBC and PCV and increased the values of indices like RBC, Hb, and PLT. The values of WBC, PCV and MCHC reduced significantly when compared with the control.

As observed in Table 1, the ethanol extract of C. olitorus at different doses reduced the levels of WBC, PCV, and MCHC significantly and some other haematological parameters at the different concentrations of the extract. At a dose of 200 mg/kg bwt, the amount of WBC reduced to $4.91 \times 10^9$ cells/L when compared with the value of the control group which had $8.29 \times 10^9$cells/L.

Some phytochemicals perturb the growth of differentiation inducers involved in the synthesis of blood cells (Keller and Snyder, 1986). The extract of C. olitorus reduced the amount of WBC at all doses administered when compared with the control (Table 2). This indicates that, the extract of C. olitorus may contain some bioactive agents that could cause destruction or impairment in the production of white blood cells (Adebayo et al., 2005).

It has been reported that granulocyte-macrophage stimulating factor, interleukins 2, 4 and 5 regulate the proliferation, differentiation and maturation of committed stem cells responsible for the production of white blood cells (Dacie and Lewis, 2002). The implication is that C. olitorus could make an individual vulnerable to infection, since it reduces the concentration of white blood cells (Adebayo et al., 2005).

The ethanol extract of C. olitorus increased the values of RBC, Hb, HCT and PCV at different doses. At 200 mg/kg bwt, the RBC increased to $5.95 \pm 0.40 \times 10^{12}$ cell/L compared to the value of the control $4.41 \pm 1.51 \times 10^{12}$ cells/L. At dose of 100 mg/kg bwt, the value of RBC increased to $4.71 \pm 0.30 \times 10^{12}$ cells/L compared to the $4.41 \pm 1.51 \times 10^{12}$cells/L for the control. At dosage 50 mg/kg bwt, the values of RBC increased to $5.91 \pm 1.22 \times 10^{12}$ cells/L compared to the values of the control. This shows that C. olitorus has an active agent that encourages the proliferation of red blood cells.

Reduction in PCV and MCHC was observed in this study. At 200 mg/kg bwt, PCV and MCHC reduced to $52.18 \pm 3.10$ fl while the value for the control was $72.13 \pm 8.40$ fl. At 100 mg/kg bwt, PCV reduced to $51.86 \pm 3.28$ fl and at 50 mg/kg

<table>
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<tr>
<th>Nutrient</th>
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<tr>
<td>Crude protein</td>
<td>16</td>
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<tr>
<td>Minimum energy</td>
<td>11.1</td>
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<td>Calcium</td>
<td>1.0</td>
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<td>Phosphorus</td>
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bwt, PCV also reduced to 54.06±2.0 fl when compared with the values of the control 72.13±8.40 fl. Observation from the test, at 200 mg/kg bwt, MCHC reduced to 17.45±0.43 pg at 100 mg/kg bwt, MCHC reduced to 17.88±0.17 pg while 50 mg/kg bwt reduced the MCHC to 17.11±0.64 pg all compared with the value of the control 20.46±1.29 pg. The extract may positively enhance the oxygen-carrying capacity of each red blood cell; hence increase the oxygen carrying capacity of the whole blood because of the reduced population of RBC in the blood. There was increase in the different values of individual cells of the WBC like lymphocyte and neutrophils.

There was a significant increase of the lymphocyte at doses 200 mg/kg bwt which increased to 72.0±0.33% and 100 mg/kg bwt gave an increase of 77.66±2.93%, when compared to the value of the control which is 71.16±0.81%. There was a significant increase of the platelet (thrombocytes) at the various doses when compared to the value of the control. At 200 mg/kg bwt, the platelet value increased to 336.33±63.06×10⁹/L, at 100 mg/kg bwt, it increased to 307.66±46.51×10⁹/L whereas at 50 mg/kg bwt, it increased to 138.83±50.96×10⁹/L compared to the value of control which is 125.60±58.60×10⁹ cells/L. This indicates that C. olitorus could have platelet aggregatory effect.

The high increase of the values of platelet at all doses implies that C. olitorus may be taken by patient who is to be operated upon in order to help boost their platelet counts.

**Conclusion**

The results of oral administration of the ethanol extract of C. olitorus to albino rats at different doses of 200, 100 and 50 kg/mg body weight of rats led to alteration in the amount of WBC, PCV and MCHC. The results of this study indicated that the ethanol extract of the leaves of C. olitorus have both beneficial effects on red blood cells and platelets on albino rats after the oral administration for duration of three weeks.

**REFERENCES**


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