Original Research Article

The Effect of Ethanol Leaves Extract of *Anthocleista Vogelii* and *Cocos Nucifera* Water on Some Haematological Indices of Experimental Rats.

ABSTRACT

**Aims:** To evaluate the effects of the ethanol leaves extract of *Anthocleista vogelii* and *Cocos Nucifera* water on three haematological parameters (red blood cell, RBC, white blood cell, WBC, and packed cell volume, PCV) using Wistar rats.

**Study design:** Haematological study.

**Place and Duration of Study:** Department of Pharmacology and Therapeutics, Delta State University, Abraka Delta State, Nigeria, between July and August, 2015.

**Methodology:** Thirty rats divided into 6 groups of five were used for the study. Doses of 10 ml/kg of *Cocos Nucifera*, 200 mg/kg, and 400 mg/kg of *Anthocleista vogelii*, and 200 mg/kg and 400 mg/kg of *Anthocleista vogelii* combination with *Cocos Nucifera* (1:1) were administered to the animals, while the control group received normal saline (10 ml/kg). The experimental animals were administered the extracts orally for 2 weeks according to their body weights, after which blood samples were obtained for haematological analysis.

**Results:** *Anthocleista vogelii* and *Cocos Nucifera* extracts showed significant (P≤0.05) increase in RBC, WBC, and PCV values.

**Conclusion:** The combination of *Anthocleista vogelii* leaves extract and *Cocos Nucifera* fruit juice extract can be used in the traditional treatment of patients with anaemia.

Keywords: *Anthocleista vogelii*, *Cocos Nucifera*, haematological parameters, anaemia.

1. INTRODUCTION

The immense potential of medicinal plants used in various traditional systems in treating ailments has resulted in an increased focus on plant research. This has led to recognition of plants as a possible alternative and rich source for new drugs discovery and development. *Anthocleista vogelii* planch (Loganiaceae) is a common tree that grows around the edges and banks of rivers or in marshy areas of the tropical humid forest of West Africa [1]. This plant is found more in Cameroon and Gabon [2]. In Africa traditional medicine, the stem bark of *Anthocleista vogelii* plant has and still being recruited for the treatment of ailments such as gastro-intestinal disorders, fever, stomach ache and purge (as a laxative), while a combination of *Anthocleista vogelii* stem bark and the leaves is used as anti-inflammatory and anti-diabetic agents [2]. A decoction of the leaves of *Anthocleista vogelii* are known to prevent malaria, reduces symptoms of malaria such as fever, and treat jaundice [3].
Cocos Nucifera Linn (coconut) water is an ancient tropical beverage that is found in inner part of the coconut fruit. Coconut water has a low matter content comprising mainly sugars and minerals, and is a sweet refreshing drink taken directly from the inner part of the coconut fruit [4,5]. Coconut water has nutritional and medicinal effect as it serves as food and drink and is used to increase semen production, promotes digestion and clearing of the urinary path. Coconut water is traditionally prescribed for burning pain during urination, dysuria, gastritis, burning pain of the eyes, indigestion, hiccups, and even expelling of retained placenta [6].

Blood act as a pathological reflector of the status of exposed animals to toxicant and other conditions [7]. Haemtological studies are useful in the diagnosis of many diseases as well as investigation of the extent of damage to the blood [8,9].

The study was carried out to ascertain the level at which the plants extracts (Anthocleista vogelii leaves and Cocos Nucifera water) will improve medical conditions in increasing haematopoiesis and boosting immunity.

2. MATERIAL AND METHODS

2.1 Animals
This study was carried out using 30 healthy Wistar rats obtained from the Animal Facility of the Department of Pharmacology and Therapeutics, Delta State University, Abraka and were housed in wooden cages under standard conditions with a 12 hour light/ dark cycle, and were acclimatized for a period of 14 days. They were fed with growers mash and were allowed free access to pure drinking water throughout the experimental period. Good hygiene was maintained by constant cleaning of the cages and removal of faeces and spilled feed from the cages.

2.2 Plants
Fresh leaves of Anthocleista vogelii plant was collected in the school environment and was authenticated in the Department of Pharmacognosy, Faculty of Pharmacy, Delta State University, Abraka. Cocos
Nucifera fruits were bought from the school market. The coconut fruit was split open by hitting it hard on a concrete floor and the water was filtered into a container and stored in the refrigerator. The fresh leaves of Anthocleista vogelii plant was air dried for three (3) days after its collection and was blended to powdered form. The powdered form (400 g) was soaked and macerated in aqueous ethanol for 48 hours, at room temperature in a well closed container with constant stirring and agitation. The mixture was then filtered with the aid of sieves and filter papers to obtain a filtrate that was concentrated to dryness with the aid of a heating mantle at a temperature of 40 – 50 °C. The weight of the final extract that was recorded, placed in a Petri dish and stored in the refrigerator prior to use. The percentage yield of the extract was 7.23%.

2.3 Experimental designs

Animals were randomly placed into groups as follows;

Group A – Normal saline 10 ml/kg
Group B – C. nucifera 10 ml/kg
Group C – A. vogelii 200 mg/kg
Group D – A. vogelii 400 mg/kg
Group E – A. vogelii 200 mg/kg + C. nucifera 10 ml/kg
Group F – A. vogelii 400 mg/kg + C. nucifera 10 ml/kg

2.4 Sample collection

The experimental animals were administered the extracts orally for 2 weeks according to their body weights. At the end of the 2 weeks treatment, the animals were anesthetized using chloroform. Their abdomens were opened with the aid of a dissecting scissors and a 2 ml syringe was used to drain whole blood directly from the heart and was put into labeled EDTA bottles containing anticoagulants.
2.5 Statistical Analysis

All data obtained were expressed as Mean ± SEM (standard error of mean). Statistical differences were evaluated using a one-way analysis of variance (ANOVA) followed by Dunnet’s t-test. P-values <.05 were considered significant.

3. RESULTS AND DISCUSSION

There was no significant (P>.05) increase in body weight of the animals when compared to the control group (Table 1). This is an indication that the extracts are unlikely to cause obesity since the feeding patterns of the animals were normal [10].

Animals that received 200 mg/kg and 400 mg/kg of the Anthocleista vogelii extract alone and those that received Anthocleista vogelii and Cocos nucifera combinations showed a significant (P<.05) increase in the red blood cell count (RBC) when compared to the control group of the experimental design (Table 2). Animals that received Cocos nucifera alone had a non-significant (P>.05) increase in RBC count. The significant (P<.05) increase observed in RBC count was more profound with the group that received Anthocleista vogelii and Cocos nucifera combination at 400 mg/kg. This implies that Anthocleista vogelii extract can be used in the treatment of anaemia but it will be more effective when used in combination with Cocos nucifera at a higher dose.

Also, the combination of the ethanol extract of the leaves of Anthocleista vogelii and Cocos nucifera at 400 mg/kg showed a significant (P<.05) increase in white blood cell count (WBC) when compared to the control group (Table 2). There was also an increase in the white blood cell count of Wistar rats that were administered 200 mg/kg of Anthocleista vogelii and Cocos nucifera combination, as well as Anthocleista vogelii and Cocos nucifera alone, but this increase was insignificant (P>.05). This is an indication that the combination of Anthocleista vogelii and Cocos nucifera especially at a higher dose promotes the synthesis of leucocytes, hence, it can be used to enhance or boost the immune system of the body in combating infections.
Furthermore, the result obtained of the effect of Anthocleista vogelii and Cocos nucifera on packed cell volume (PCV) (Table 2), there was an increase in PCV level of animals in the treated group when compared to the control group. The combination of Anthocleista vogelii and Cocos nucifera at 200 mg/kg and 400 mg/kg had a significant \((P<.05)\) increase in PCV when compared to the control group. There was also a significant \((P<.05)\) increase in PCV level of the group that received Anthocleista vogelii 400 mg/kg alone. The groups that received Anthocleista vogelii alone at 200mg/kg, and Cocos nucifera alone, showed a non-significant \((P>.05)\) increase in PCV when compared to control group. This shows that Anthocleista vogelii is more effective when used in combination with Cocos nucifera, and when given alone at a higher dose.

The results of this study implies that the ethanol leaves extract of Anthocleista vogelii in combination with Cocos nucifera juice will increase blood indices (RBC, WBC, and PCV), and thus can be very useful in the traditional treatment of anaemia [11,12].

**Table 1: The effect of the combination of Anthocleista vogelii ethanol extract and Cocos nucifera water on body weight of Wistar rats**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Initial (g)</th>
<th>Final (g)</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal saline 10 ml/kg</td>
<td>105 ± 1.58</td>
<td>119 ± 1.87</td>
<td>13.39</td>
</tr>
<tr>
<td>C. nucifera 10 ml/kg</td>
<td>104 ± 1.87</td>
<td>127 ± 3.39</td>
<td>22.43</td>
</tr>
<tr>
<td>A. vogelii 200 mg/kg</td>
<td>113 ± 3.74</td>
<td>129 ± 5.79</td>
<td>14.06</td>
</tr>
<tr>
<td>A. vogelii 400 mg/kg</td>
<td>108 ± 2.00</td>
<td>128 ± 2.00</td>
<td>18.67</td>
</tr>
<tr>
<td>A. vogelii 200 mg/kg + C. nucifera 10 ml/kg</td>
<td>105 ± 3.16</td>
<td>130 ± 4.47</td>
<td>23.94</td>
</tr>
<tr>
<td>A. vogelii 400 mg/kg + C. nucifera 10 ml/kg</td>
<td>102 ± 1.22</td>
<td>128 ± 3.39</td>
<td>25.52</td>
</tr>
</tbody>
</table>

All values are expressed as Mean ± SEM (where n=5)

**Table 2: The effect of the combination of Anthocleista vogelii ethanol extract and Cocos nucifera water on red blood cell (RBC), white blood cells (WBC) counts and packed cell volume (PCV) of Wistar rats**

<table>
<thead>
<tr>
<th>Groups</th>
<th>RBC (\times 10^6)</th>
<th>WBC (\times 10^5)</th>
<th>PCV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal saline 10 ml/kg</td>
<td>4.46±0.36</td>
<td>9.81±1.56</td>
<td>40.60±3.31</td>
</tr>
<tr>
<td>C. nucifera 10 ml/kg</td>
<td>5.64±0.48</td>
<td>10.08±1.44</td>
<td>48.40±3.40</td>
</tr>
<tr>
<td>A. vogelii 200 mg/kg</td>
<td>5.90±0.31*</td>
<td>10.64±1.39</td>
<td>51.20±2.84</td>
</tr>
<tr>
<td>A. vogelii 400 mg/kg</td>
<td>6.42±0.09*</td>
<td>12.46±0.93</td>
<td>56.80±1.24*</td>
</tr>
<tr>
<td>A. vogelii 200 mg/kg + C. nucifera 10 ml/kg</td>
<td>5.84±0.23*</td>
<td>14.24±0.72*</td>
<td>53.80±1.88*</td>
</tr>
<tr>
<td>A. vogelii 400 mg/kg + C. nucifera 10 ml/kg</td>
<td>6.52±0.37*</td>
<td>15.96±2.11*</td>
<td>58.40±3.36*</td>
</tr>
</tbody>
</table>

All values are expressed as Mean ± SEM (percentage decrease), where n=5, all data were analyzed by using one way ANOVA followed by Dunnet's test. * = \(P<.05\) was taken to be significant.
4. CONCLUSION

The results of this study showed that a combination of the ethanol extract of the leaves of *Anthocleista vogelii* and *Cocos nucifera* fruit juice at a higher dose is beneficial in increasing the red blood cell count, white blood cell count, and packed cell volume of the Wistar rats. This implies that this combination can be used in the traditional treatment of patients with anaemia and to boost the body immunity.

CONSENT (WHERE EVER APPLICABLE)

Not applicable.

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

I hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable. All experiments have been examined and approved by the Delta State University’s ethics committee for the use of laboratory animals.

REFERENCES


