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RESEARCH ARTICLE

VARIED DOSES OF STACHYTARPHETA CAYENNENSIS (BLUESNAKE WEED) FLUCTUATE BLOOD CELL VALUES

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ABSTRACT

Effects of stachytarpheta cayennensis on haematological parameters were investigated in thirty (30) albino rats for a period of two (2) weeks. There was significant (P<0.05) decline in red blood cells values with increase in extract concentration as compared with control but the values were within the normal range. There was increase in packed cell value with increase in extract dosage but the difference was not significant (P> 0.05) except in high dose that showed low value with increase dosage concentration and was significant (P< 055) as compared with control. There was little increases in haemoglobin value as in low and medium dosages than control but a drop at high dosage of the extract which was significant P<0.05. The mean corpuscular haemoglobin, (MCH) mean corpuscular volume, (MCV) and mean corpuscular haemoglobin concentration, (MCHC) were all reduced with increases concentration of the extract. But, the white blood cells and the platelets were all increased with increased extract concentration. However, there was a drastic increase in the weight of the rats at increasing dosages of the extract particularly at 14 days of the administration. It is observed that extracted of S. cayennensis does not impact positively on blood cells and it is dangerous in the treatment.

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INTRODUCTION

The use of herbal remedies in the treatment of diseases is gaining popularity on the daily basis due to failure of orthodox drugs. Also such application is increasing because of lack of health care facilities in the rural areas, (Ejeluoba, 2005) unfortunately the use of almost all the herbal preparations is marred with in accuracy in measurement, the right dosages and the duration application. This is influenced by illiteracy as most of the herbal drugs vendors are not educated in the therapeutic dispensing of the drugs. This is also seen even in the dispensing of orthodox drugs e.g antimalarials, (Jimmy, 2000). However, there a few of the vendors who have decided to acquaint themselves with the basic rudiments of herbal dispensing by observing the effects of high dosages of the crude drugs with low dosages on topical application of such preparations, but even this is not a healthy approach. This importance of herbal medicine at this period of many idiopathetic diseases e.g those without real dosages and the complications of the existing ones particularly the terminal diseases is therefore very crucial in the health care system. There is high need to encourage herbal medicine application even alongside with orthodox practice to find solution to intractable health issues. Stachytarpheta cayennensis is one of these interesting herbal plant use traditionally in the treatment of hypertension. In English, it is called, blue snake weed, in Ibibio it is called Adanumon, Yoruba call it Panel, while in Igbo, it is called Ogwuga. It is a perennial herb or shrub with 2-2.5m in length with upright branching stem with leaves oppositely arranged and purple-blue –white flowers. Is phytochemical properties are; flavonoids, polyphenol, tannin, cardiac glycosides, terpenes, steroids (Nguessan, 2011), (Datte, 2010), (Toshio, 1980). The pharmacological contents include anticonvulsant, antioxidant and antimicrobial properties (Ekundayo, 2006), (Oden, 1996). The effects of this plant on blood cells and its parameters are not fully documented hence this study. Blood cells are very important to the body for the transport of oxygen, protection and arrest of bleeding (Guyton, 2011) and of course without blood, there is no life. The herbal contributions of this plant are significant but it would be very dangerous to use a herbal preparation that will cause more complications in the management of any disease. For example of this plant is used in the treatment of hypertension and at the same time it has crucial negative effect on the red blood cells this will result in anaemia. In anaemia there is the increase cardiac output i.e. overworking of the heart due to low oxygen availability. This condition will cause more damage to a hypertension patient by increasing the already existing workload, a situation of double jeopardy. It is therefore

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imperative to impose restrictions on use of herbal plants and preparation to avoid increase mortality and morbidity of such usages.

MATERIALS AND METHODS

Animal

Thirty (30) albino mice male and female weighing 20-25g were used for the acute toxicity study. Also thirty (30) albino rats male and female were used for experimental study. The animals were kept in a ventilated University of Uyo, Department of Pharmacology animal house. They were fed with clean water and pellets. The animals were cared for according to the rules and regulations of the institute of animal ethics committee (IAEC) and all ethical standard laid down in 1964 declarations of Helsinki were observed.

Preparation of Extract

The leaves of starchytarpheta cayennensis were washed chopped into pieces and air-dried for two weeks. It was made into powder using mortar and pestle. 450g of the powder was macerated in 200ml of distilled water. It was allowed to stand for 24hrs, filtered and evaporated to dryness at 45^0C using water bath, (Trease and Evans, 1996).

Acute Toxicity Test (LD50)

Methods of Lorke 1983 was used in this study. Assessment of acute toxicity was based on the dosage that produced 0% mortality and that with 100% mortality. The extract was administered intraperitoneally (IP). The dosage that produced 0% mortality was 800mg/kg while that with 100% mortality was 1000mg/kg. The LD50 was calculated as follows:

$$LD50 = \sqrt{A \times B}$$

Where A = dosage that has 0% mortality
B = dosage with 100% mortality
= 89. 4 mg/kg.

Administration of Extract in Rats

1g of extract was dissolved in 10ml of distilled water to obtain a stock dosage concentration of 100mg/ml. Using this stock concentration, a dosage of each animal was calculated and administered according to body-weight. Group 1 serves as control and were given on till day 14. Extract in low dose (89.4mg/kg) was administered Group II, medium, group III 178.59mg/k, high dose, Group IV (268.33mg/kg) was administered using canula-by-passing the esophagus and delivered into the stomach, (Jimmy 2014) (Bertram, 2004) (Robert, 1979). It was observed for 14 days.

Blood Collection

Methods of Dacie & Lewis 2007 was used. The animals were anesthetized by inhalation of chloroform and blood taken by cardiac puncture for the Red blood, cells, platelet and white blood cells measurement.

Measurement of Weight

The initial weights of the animals were measured before commencement of administration using electronic weighing balance. They were reweighed after seven (7) and at 14 days of the administration of the extract and the different weight values recorded.

RESULTS

The effects of extract on the blood cells and its parameters showed variations from normal values. In the low dose the red blood cells count was 6.4±0.11 lower than control, 6.5±0.23, and in the middle dose it was 5.9±0.17 and 5.4±0.26 with high dose as compared with control Table 1. The packed cell volume was 42.7±0.89 in low dose, 44.9±0.96, medium dose and 40.06± at high dose 1.04 compared with control; 41.86± 0.54, Table 2. The haemoglobin values in control, low, medium and high dosages were 12.70±0.16, 12.72±0.18, 13.4±0.18 and 10.5±0.37 respectively, Table 1. The white cells count were 13.9±2.09 in control, 15.19±0.85, 12.2±2.32 in medium and 14.6±1.55 in high dose Table 1. The platelet counts were, 773.6±55.7, in control, 742.8±36.01 in low dose, 853.0± 18.6 in medium dose and 603.6±82.4 in high dose, table 1. The mean corpuscular volume (MCV) were 63.8±2.25 in control, 67.4±1.27 in low dose 66.4±1.42 in medium dose and 63.8±2.22 in high dose, table 1. The mean corpuscular haemoglobin, (MCH) were 19.44±0.53, in control, 19.8±0.28 in low dose, 19.4±0.6 in high dose, Table 1 Table 7. The mean corpuscular haemoglobin concentration; MCHC in control, low, medium and high doses were, 30.4±0.27 29.6±0.24, 30.8±0.48, 30.4±0.20.

Table 1. Effects of low, medium and high dosages of Cayennensis extract on blood cells and its indices

Experimental Groups	RBC	Hb	PCV	Platelets	WBC	MCV	MCH	MCHC
Control	6.5±0.23	12.70±0.16	41.86±0.54	773.1±55.7	13.9±2.09	63.8±2.25	19.44±0.53	30.4±0.27
Low dose	6.4±0.11	12.72±0.18	42.7±0.89	742.8±36.01	15.19±0.85	67.4±1.27	19.8±0.28	29.6±0.24
Medium dose	5.9±0.17	13.4±0.18	44.9±0.96	853.0±18.6	12.2±2.32	66.4±1.42	19.9±0.28	30.8±0.48
High dose	5.4±0.26	10.5±0.37	40.06±1.04	603.6±82.4	14.6±1.55	63.8±2.22	19.4±0.6	30.4±0.20

DISCUSSION

The study has shown various effects of extract of stachytarpheta cayennensis on the blood cells and indices. The red cell count has shown a reduction from the low dose extract concentration to the high dosage. The implication is that this extract has a phytochemical component with haemolysing properties e.g. saponnins, tannin, (Datte, 2010). But such effects were not morphologically observed in the blood cells as evident for the period of fourteen days of treatment. But it is likely that such action may have been of formation of precipitate on the body of red blood cells as Heinz bodies, (Hoffbrand, 1991). Heinz bodies on the red blood cells will lead to the destruction of the cells by the reticulosendothelial cells which see such cells as foreign and remove from

circulation. This will account for the low count observed the study. This means that use of extract of stachytarpheta can lead to anaemia same result is observed in haemoglobin concentration which low value was observed at high dosage of the extract. It also means that application of this plant in the treatment of hypertension, convulsion, malaria as claimed will have contraindication. For example in the treatment of hypertension, anaemia that will result from the extract application will cause increase in cardiac output. Hypertension already has this as inherent attributes and so will cause undesirable health defects, same in convulsion and malaria treatment in children (Leung et al 1968). Anaemia in children leads to high mortality and it is one of the major causes of death in malaria (Marsh, 1995). Use of this extract will therefore aggravate the anaemia situation.

The raised white blood cells could be attributed to phytochemical properties of the plant e.g. tannin. But such indicate a likely injury to the body in the course of administration or haematopoictic reaction to the extract. But it also demonstrates it antibacterial, antimicrobial properties, (Ekundayo, 2006), (Oden, 1996). Such use may lead to hyperplasia of bone marrow with the resultant effect of leukaemia. The thrombocytosis observed with use in platelet counts has coagulopathy associated effects; as platelet can initiate clotting with its procoagulation properties (Hoffbrand, 1991). The use with increase in the dosage up to the medium and a sudden fall with the high dosage mean likely a setting in thrombocytopenia: The low values of mean corpuscular haemoglobin; (MCH) mean corpuscular volume, (MCV) and mean corpuscular (MCHC) haemoglobin concentration confirms its direct effect on haemoglobin and the resultant anaemia. These values are often reduced in microcytic, hypochromic and haemolytic anaemia, (Oyebola, 2002). However, the extract enhanced weight gain which may be useful in the treatment of energy malnutrition e.g maramus Kwhshlorkor.

Conclusion

The extract of stachtarpheta cayemensis at high dosages is toxic to blood cells and the indices.

Recommendation: The use of this plant for treatment of any ailment should be with great caution to avoid unpleasant consequences than the ailment

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