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EFFECTS OF OCIMUM GRATISSIMUM (SCENT LEAF) AQUEOUS LEAF EXTRACT ON PACKED CELL VOLUME OF WISTAR RATS

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ABSTRACT

The effect of aqueous leaf extract ocimum gratissimum (scent leaf) on packed cell volume (PCV) was carried out in this study using male and female Wister rats. The experimental design comprises of; group1 (Male control), group 2 (Male low dose of the extract, 500mg/kg), group 3 (male high dose of the extract, 1000mg/kg), group 4 (female control), group 5 (female low dose, 500mg/kg) and group 6 (female high dose, 1000mg/kg). Oral administration of aqueous leaf extract was carried out for two months followed by chloroform anesthesia before blood samples were collected for biochemical analyses. The study showed that different group treatments significantly (P=0.006) affected the packed cell volume of male and female Wister rats. The extract did not cause any significant difference (P>0.05) when compared with control group of male and female Wistar rats. The effect of the extract on sex was only observed in group 3 male PCV (47.4 ± 0.9) which was significantly (P=0.002) increased when compared with that of group 3 female PCV (30.4 ± 13.1).

Keywords: *ocimum gratissimum, packed cell volume, wistar rat*

INTRODUCTION

Herbal medicine is still the mainstay of about 75-80% of the world population, mainly in the developing countries for primary health care. This is primarily because of the general belief that herbal drugs are without any side effects, besides being cheap and locally available (Achinewu et al, 1995). The use of plants for healing purposes predates human history and forms the origin of modern medicine. Many synthetic drugs originated from plant sources: a century ago, most of the few effective drugs were plant-based. Examples include: Aspirin (which is a chemical copy of the analgesic chemical in the bark of willow trees), digoxin (from fox glove), guanine (from the bark of various cinchona tree species which was used in the treatment of malaria) and morphine (from the opium poppy). The perennial plant *Ocimum gratissimum* (scent leaf) is widely distributed in the tropics of Africa and Asia. It belongs to the family labiatae and it is the most abundant of the genus *Ocimum*. It has an average height of 1-3m high. The leaves are broad and narrowly ovate, usually 5-13cm long and 3-9cm wide. It is a scented shrub with lime-green fuzzy leaves. It is used commonly in folk medicine to treat different diseases such as upper respiratory tract infections, diarrhea, headache, pneumonia and also as a treatment for cough, fever and conjunctivitis (Onajobi, 1986). The determination of hematological indices provides physiological information on a proper blood assessment. According to (Okonkwo et al 2004), accurate laboratory determination of blood parameters remains the only sensitive and reliable foundation for ethical and rational research, diagnosis, treatment and prevention of anemia. The major concern of the scientific communities with regard to medicinal plants and hematological studies focuses on the measures that can maintain a normal hematological state of being and reverse any negative hematological status associated with various anemic conditions (Alexander and

Griffiths 1993). This study therefore, in part, assessed the hematological potential of *Ocimum gratissimum* (scent leaf) leaf extract in wistar rat model, considering the fact that different parts of the plant have been reported to be useful in the management of various diseases.

MATERIALS AND METHODS

Study centre and period: this research was carried out at the animal house unit of the department of physiology and the health centre laboratory of Delta State University Abraka between October 2011 to December 2011

Study design: It is a laboratory based research using Wistar rats and fresh leaves of *Ocimum gratissimum* (Scent leaf) that was purchased from Ogba and Oghokuogbo market in Benin City.

Preparation of Ocimum Grattissimum Aqouse leaf extract

Fresh leaves of *Ocimum gratissimum* were air-dried for five days and were later grinded into fine powder. 700g of powdered *Ocimum gratisimum* leaf was soaked in five (5) liters of distilled water for three days with continual stirring every six hour. After three days, the filtrate (obtained from the mixture by using sieve, funnel and filter paper) was later evaporated to dryness with the aid of rotary evaporator at a temperature of 80^0C. The dry extract was stored before use.

Population under study

A total number of Thirty (30) Wister rats (15males and 15 females) were purchased from Collage of medical science's animal house, department of physiology, Delta State University, Abraka. They were acclimatized for two weeks in a well ventilated cages and room under natural lighting condition. They were allowed free access to water and feed (Growers mash). Animals were handled in accordance with international institute guidelines for care and use of laboratory animals.

Sampling method

Experimental animals were randomized into six groups as follows:
Group 1: Male Control, five rats (Received distilled water, 10ml/kg)
Group 2: Female Control, five rats (Received distilled water, 10ml/kg)
Group 3: Male low dose, five rats (Received plant extract, 500mg/kg)
Group 4: Female low dose, five rats (Received plant extract, 500mg/kg)
Group 5: Male high dose, five rats (Received plant extract, 1000mg/kg)
Group 6: Female High dose, five rats (Received plant extract, 1000mg/kg)
Oral administration of *Ocimum gratisicimum* aqueous leaf extract was done daily for a period of two months (8 weeks).

METHODOLOGY

Determination of Packed Cell Volume (PCV)

The Microhematocrit method was used for the determination of packed cell volume (PCV). Instead of Wintrobe's tube, special non-graduated glass capillary tubes were used. The capillary tube was filled with venous blood collected from experimental animals. One end of the capillary tube was sealed with modeling plasticine. The filled tubes were then

placed in the microhaematocrite centrifuge and spuned at 12,000g for five minutes. The spuned tube was later placed in a specially designed scale, and PCV was read in percentage.
Normal range
Male: 40-52%
Female: 37-47%

MATERIALS

This includes: Beakers, animal weighing balance, distilled water, syringes (1ml, 2ml, and 5ml) Marker pen, conical flask, hand gloves, dissecting kit, electronic weighing balance Spatula, animal cages, animal feed (Growers mash), centrifuge, test tubes, chloroform
Ethical consideration: the necessary input of the ethical committee of the college of health sciences was obtained at the initial stage of the study.

DATA ANALYSES

Results were expressed as mean ± Standard deviation (SD). Significance difference between the means was determined by two way analyses of variance (ANOVA). Differences between the means were tested with multiple comparison and values of $p< 0.05$ were considered statistically significant

RESULTS

Table 1: Raw data for packed cell volume (PCV) of male and female wistar rats

Treatment	Packed cell volume (PCV) %	
	Male	Female
Group 1(Control, Distilled water)	45, 39, 42, 41, 42	46, 55, 44, 50, 47
Group 2 (Low dose, 500mg/kg extract)	49, 44, 43, 30, 37	47, 30, 50, 30, 30
Group 3 (High dose, 1000mg/kg extract)	46, 48, 47, 48, 48	23, 20, 51, 22, 36

The above table shows the raw data of the effects of *Ocimum gratissimum* (scent leaf) aqueous leaf extract on the hematological parameter: Packed cell volume, PCV of male and female Wister rats. Each group consists of five animals.

Table 2: Packed cell volume, PCV of Male and Female Wistar rats for different groups and its control.

Treatment	Packed cell volume (PCV) %	
	Male	Female
Group 1(Control, Distilled water)	41.8 ± 2.2	48.4 ± 4.3
Group 2 (Low dose, 500mg/kg extract)	40.6 ± 7.3	41.4 ± 10.5
Group 3 (High dose, 1000mg/kg extract)	47.4 ± 0.9	30.4 ± 13.1

Values are expressed as mean ± Standard deviation (SD), n=5.

The above table shows the Values of the effects of *Ocimum gratissimum* (scent leaf) aqueous leaf extract on hematological parameters: Packed cell volume, PCV of male and

female Wister rats which are expressed as mean ± Standard deviation (SD) of five animals per group.

Table 3: SUMMARY OF STATISTICAL ANALYSIS.

S/N	COMPARISON	P-Value	Statistical Remark
1	Interaction between sex and treatment	0.006	Significant
2	Comparison between PCV and Sex	0.269	Not significant
3	Comparison between PCV and treatment	0.211	Not significant
4	Comparison of Group 1 and Group 3 PCV	0.194	Not significant
5	Comparison of Group 1 and Group 2 PCV	0.473	Not significant
6	Comparison of Group 2 and Group 3 PCV	0.818	Not significant
7	Comparison of Group 1 male and female PCV	0.190	Not significant
8	Comparison of Group 2 male and female PCV	0.872	Not Significant
9	Comparison of Group 3 male and female PCV	0.002	Significant

Statistical analyses carried out by two way analyses of variance revealed a significant interaction between the effect of sex and treatment levels (i.e. groups 1, 2, and 3) on packed cell volume (P=0.006). Simple mean effects showed that there is no significant difference between: sex and PCV (P = 0.269), PCV and treatment groups (P=0.211).

DISCUSSION

The study evaluated the effects of *Ocimum gratissimum* (scent leaf) aqueous leaf extract on packed cell volume (PCV) of male and female wistar rats. From Table 2, male PCV value is highest in group 3 (47.4 ± 0.9) followed by group 1(41.8 ± 2.2) and least in group 2 (40.6 ± 7.3). Female PCV mean value is highest in group 1(48.4 ± 4.3) followed by group 2 (41.4 ± 10.5) and least in group 3 (30.4 ± 13.1). The findings revealed that different group treatments significantly affected the packed cell volume of male and female Wistar rats. Such difference could be attributed to the different doses of extract received as well as the control group. Group 3 (high dose), and group 2 (low dose) did not significantly alter the packed cell volume (PCV) level when compared with groups 1 (control). An increase in red blood cell count (RBC), Hemoglobin (Hb) and packed cell volume (PCV) is suggestive of polycythemia and positive erythopoisis (Kuppast et al., 2009). Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC) and Mean Corpuscular Volume (MCV) relates to individual red blood cells while Hb, RBC and PCV are associated with the total population of red blood cells. The absence of observable significant effect of the extracts on these parameters may be an indication that neither the incorporation of hemoglobin into the red blood cells nor the morphology and osmotic fragility of the red blood cells was altered (Adebayo et al., 2005). Since low dose and high dose of the extract did not significantly alter the

packed cell volume (PCV) of the control, the extract could be attributed to be non toxic at the doses investigated. This finding contradicts earlier report on the effects of *Ocimum gratissimum on* packed cell volume (PCV) using Wistar rats *for a period of 4 weeks, where a* Significant decreases ($P<0.05$) in packed cell volume (PCV)and other hematological parameters was observed (Olusegun et al, 2008). Packed cell volume of female Wistar rats at high dose level was significantly ($P<0.05$) reduced when compared with that of the male (Table 2, Group 3). This was in line with Gad and Chengelis (1988) who reported that females are more sensitive to toxicity effects of chemicals compared to males.

CONCLUSION

The result of the study showed that *Ocimum gratissimum* (scent leaf) aqueous leaf extract did not alter the hematological parameter: packed cell volume of male and female wistar rats when compared with control. This may suggest that the extract was safe at the doses studied.

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