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## EFFECTS OF GARLIC (*Allium sativum*) EXTRACT ON SOME HAEMATOLOGICAL INDICES OF WISTAR RATS

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### ABSTRACT

This study investigates the effect of garlic on some haematological indices of wistar rats. Twenty wistar rats weighing between 150g and 200g were used. The rats were fed with 140mg/kg body weight of garlic extract for a period of twenty one days. At the end of the experimental period the rats were sacrificed and their blood collected with a 5ml syringe into an EDTA containers. Laboratory tests carried out with automated analyzers showed a significant increase ( $p < 0.05$ ) in white blood cells no significant difference ( $p > 0.05$ ) was recorded in the level of red blood cells. Simultaneously, the mean corpuscular haemoglobin concentration, mean corpuscular volume, packed cell volume and platelet counts were also not significantly affected by garlic extracts. However, a significant increase ( $p < 0.05$ ) was seen in the haemoglobin concentration. The study results have shown that administration of garlic is not toxic to the body. It increases the white blood cell, lymphocytes and haemoglobin concentration. It implies that garlic may play an important role in increasing the oxygen carrying capacity of the blood by increasing haemoglobin concentration.

### INTRODUCTION

Garlic commonly known as *Allium sativum* belongs to the family Liliaceae. Evidence from several investigations suggests that the biological and medical functions of garlic are mainly due to their high content in organo-sulphur compounds (Augusti and Mathew, 1974; Wargovich *et al.*, 1988). Thiosulfinates such as allicin as well as other oil-soluble components such as ajoenes (e.g. *E*-ajoene and *Z*-ajoene), vinylthiins and sulfides (e.g. diallylsulphide, DAS, diallyldisulphide, DADS, and diallyltrisulphide, DATS), provide to garlic its characteristic odour and flavour as well as most of their biological properties (Lanzotti, 2006).

Garlic extracts have been used in the treatment of a wide range of disorders in the past (Alan *et al.*, 1995). Treatment with garlic extracts has been reported to improve the activity of natural killer cells and the function of T-lymphocytes (Tang *et al.*, 1997). Allicin, ajoene, DATS, allyl methyl thiosulfinate and methyl allylthiosulfinate have been reported to possess antiviral activity (Hughes *et al.*, 1989; Weber *et al.*, 1992). Sang *et al.*, (1995) demonstrated that garlic oil is active against fat infiltration of the liver. Several studies have demonstrated that garlic extracts are also effective against parasites such as *Opalinaranarum*, (*O. dimidicita*), *Balantidium tozoon*, *Leishmania*, *Leptomonas* and *Crithidia* (Reuter *et al.*, 1996). Also garlic has been found to also have antifungal effects (Lemar *et al.*, 2002) as well as an anti-platelet aggregation function (Cavagnavaro *et al.* (2007).

This study examines the effects of garlic (*Allium sativum*) extract on some haematological indices of wistar rats.

## MATERIALS AND METHOD

### Garlic Extract preparation

The Garlic was pulverized to watering stage using pestle and mortar, the crude product was then filter with cotton wool to separate the filtrate from the residual. The filtrate was then concentrated with water bath crucible to past level then preserved in a refrigerator.

### Experimental animals

Twenty female wistar rats weighing between 150g and 220g were used. The animals were kept under standard laboratory conditions, fed with rat chow and water. They were allowed 2 weeks for acclimatization before being separated into 2 experimental groups.

### Experimental design

The animals were divided into 2 groups, Group 1 animals which serve as control were given water and rat chow while group 2 was given 140mg/kg per body weight of garlic extract and rat chow for 21 days.

### Hematological studies

At the end of 21 days, the rats (both groups) were anaesthetized with chloroform and blood was collected in EDTA bottles. Packed cell volume, White Blood cell counts, red Blood cell count, Hemoglobin concentration, platelet count, mean corpuscular volume and mean corpuscular hemoglobin of each sample were determined by using standard laboratory procedures at the University of Benin teaching hospital.

## RESULTS

Table 1: Shows the Haematological properties of the test rats.

Table 1: Haematological properties of the test rats

S/No	PARAMETER	GROUP 1	GROUP 2
		Mean± S.E.M	Mean± S.E.M
1	White Blood Cell Count ( $\times 10^3 \mu\text{l}$ )	11.94±0.67	28.7±1.89*
2	Lymphocytes ( $\times 10^3 \mu\text{l}$ )	7.6±0.89	15.88±0.79*
3	Red Blood Cell Count ( $\times 10^3 \mu\text{l}$ )	7.43±0.20	7.89±0.31
4	Haemoglobin Concentration (g/dl)	14.18±0.25	17.44±0.25*
5	Packed Cell Volume (%)	41.46±0.84	48.08±1.94
6	Mean Corpuscular Volume (fl)	55.92±1.93	57.42±1.02
7	Mean Corpuscular Haemoglobin (pg)	19.08±0.37	19.94±0.26
8	Platelet Count ( $\times/\mu\text{l}$ )	425.2±49.51	500.2±62.00

Note: \* significant at ( $p < 0.05$ )

## DISCUSSION

Results obtained showed that there was a significant increase ( $p < 0.05$ ) in white blood cell count and in lymphocytes. Generally, White blood cells (WBCs) are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders. All white blood cells are produced and derived from a multipotent cell in the bone marrow known as a hematopoietic stem cell. Leukocytes are found throughout the body, including the blood and lymphatic system.

Garlic has been seen to have antiparasitic (Reuter *et al.*, 1996), antifungal (Lemar *et al.*, 2002) and antiviral (Weber *et al.*, 1992) activities. Hence the increase seen in white blood cells may be a mechanism by which these anti actions are carried out. Treatment with garlic extracts was found to improve the activity of natural killer cells, the function of T-lymphocytes (Tang *et al.*, 1997).

There was no significant difference ( $p > 0.05$ ) in Red Blood Cell count (RBC) count between the control group and the test group. However, a significant increase ( $p < 0.05$ ) was seen in haemoglobin concentration of the test group. Haemoglobin is found in the red blood cells of the

body. Each Red Blood Cell contains approximately 280 million haemoglobin molecules (Perutz, 1978). The main function of haemoglobin is to transport oxygen from the lungs to the tissues and then transport CO<sub>2</sub> back from the tissues to the lungs. One haemoglobin molecule has the ability to transport up to 4 oxygen molecules. An increase in haemoglobin concentration will result in an increase in the amount of oxygen that can be carried by the blood in circulation. There was also no significant difference ( $p>0.05$ ) in packed cell volume, mean corpuscular volume, platelet count and mean corpuscular haemoglobin between the control group and the test group. Garlic has been seen to be associated with anti-platelet aggregation function (Cavagnaro *et al.* (2007).

### CONCLUSION AND RECOMMENDATION

Laboratory test was carried out using automated analyzers. The result shows a significant increase ( $p<0.05$ ) in white blood cells but no significant difference ( $p>0.05$ ) was recorded in the level of red blood cells. Simultaneously, the mean corpuscular haemoglobin concentration, mean corpuscular volume, packed cell volume and platelet count was also not significantly affected by garlic extracts. However, a significant increase ( $p<0.05$ ) was seen in the haemoglobin concentration. From this study, administration of garlic is not toxic to the body; it increases the white blood cell, lymphocytes and haemoglobin concentration. The implication is that garlic may play an important role in increasing the oxygen carrying capacity of the blood by increasing haemoglobin concentration. Its consumption is highly recommended to improve the oxygen carrying capacity of the blood.

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