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A Study of Haemato-Stimulatory Effects of Graded Dose Of Aqueous *Carica Papaya* Seed Extract In Wistar Rats

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ABSTRACT

The stimulatory effect of Carica papaya seed extract on hematopoiesis was studied. A total of thirty two (32) adult Wistar rats were randomized into four (4) groups (n=8). Group A served as control and administered with rat chow and water only. Group B,C and D were administered with 100mg/kg, 200mg/kg and 300mg/kg respectively of aqueous extract of Carica papaya seed extract for 28 days. After an overnight fast, the rats were sacrificed and blood collected for haematological analysis. The result showed a dose dependent statistically significant ($p<0.05$) increased in all haematological parameters (RBC, WBC, Platelets, PCV and lymphocyte count) and a dose dependent decrease in the total body weight of the rats which was not statistically significant. It is therefore concluded that Carica papaya seed extract may have a stimulatory effect on haematopoeisis which may have resulted from the available bioactive and Vitamins components of its phytochemistry.

Keywords: Carica papaya, haematological parameters, seed extract

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INTRODUCTION

Herbal prescriptions and natural remedies are commonly employed in developing countries for the treatment of various diseases, this practice being an alternative way to compensate for some perceived deficiencies in orthodox pharmacotherapy [19,22]. Unfortunately, there is limited scientific evidence regarding safety and efficacy to back up the continued therapeutic application of these remedies. The rationale for their utilisation has rested largely on long-term clinical experience [22]. But now, with the upsurge in the use of herbal medicines, a thorough scientific investigation of these plants will go a long way in validating their folkloric usage [19].

Carica papaya belongs to the family Liliaceae and is probably native of south west Asia and is widely cultivated throughout the world [7]. The different parts of the *Carica papaya* plant (the fruits, leaves, latex and seeds) can be eaten and also have been used for medicinal purposes as claimed traditionally for treatment of different ailments [21] and wound healing [16]. Some of the traditional claims have been investigated scientifically using animal model and the efficacy have been proven [8, 9]. Recent studies showed that *Carica papaya* seed extract orally administered could induce reversible male infertility and could be used for pharmaceutical development of a male contraceptive [2].

For several years, *Carica papaya* have enjoyed special reputation as therapeutic and prophylactic agents [3]. Its most popular modern uses is to lower blood pressure [7], antiseptic [11], hypoglycaemic and hypocholesterlemic properties [14]. They are widely used as food supplements and have many health benefits that are related to their bioactive components [4, 6, 12, 17]. Their role in preventing diseases of the cardiovascular system is widely recognized.

Literature has shown that ingestion of drugs can alter normal range of hematological parameters [2]. However, such studies dealing with the effects of *Carica papaya* on hematological parameters are scarce. Therefore, this study examines the effect of *Carica papaya* seed extract on hematological parameters such as packed cell volume (PCV), hemoglobin (Hb), red blood cells (RBC), white blood cell (WBC), platelets and lymphocyte count in Wistar rats.

MATERIALS AND METHODS

Animal Handling

Thirty two (32) adult male Wistar albino rats (210 – 280g) were used for this study, they were obtained from and housed at the animal house of the Faculty of Basic Medical Sciences, Delta State University, Abraka. They were kept in rat cages in a well ventilated house, and exposed to 12 hours light and 12 hours darkness where they were fed with clean tap water and rat chow once daily (8.00am - 9.00am). They were allowed to acclimatize for fourteen (14) days prior to the experiment.

Extract preparation

Matured fresh *Carica papaya* fruit was bought from a local market in Abraka, and was authenticated at the Botany Department, Delta State University, Abraka. The fruit was peeled and the seeds were collected. The seeds air dried and later grounded. The grounded *Carica papaya* seed was weighed, 170g of the grounded seed was soaked with 2000ml of distill water for 72 hours and the residue was separated from the solvent. The solvent was concentrated to a paste like solid with a heating mantle yielding 36g. The extract was kept in a clean container and refrigerated until use.

Extract Administration

The administration of the extract was done orally with the help of an orogastric canulla once daily for a period of 28 days.

Experimental Design

A total of thirty two (32) Wistar albino rats were randomly divided into four groups of six rats each.

Group A: Fed with rat chow and water daily.
Group B: Fed with rat chow and water daily, and then received a dose of 100mg/kg of aqueous extract of *Carica papaya* seed.
Group C: Fed with rat chow and water daily, and then received a dose of 200mg/kg of aqueous extract of *Carica papaya* seed.
Group D: Fed with rat chow and water daily, and then received a dose of 300mg/kg of aqueous extract of *Carica papaya* seed.

Hematological Analysis

On the necropsy day, after an over- night fast, blood was withdrawn through cardiac puncture from the posterior vena cava of all rats under ether anesthesia. The blood was placed into EDTA bottles for hematological assay. The blood was immediately analyzed using a hematological analyzer (KX-21N Sysmex Cooperation, Japan). The parameters measured were white blood cell (WBC), Pack Cell Volume (PCV), hemoglobin (HGB), red blood cell (RBC), lymphocyte %, and platelets (PLT).

Ethical Issues

Standard ethical standards were observed in handling the animal model. Local ethical committee granted permission for the conduct of the research.

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Statistical Analysis

Results were expressed as mean ± SD. The evaluation of data for statistical significance between control and experimental groups was done using Student *t*-Test. Statistical software, SPSS 17, was used to analyze the data. A $P<0.05$ level was considered as statistically significant.

RESULTS

Body Weight, Food and Water Consumption

The body weight of the treatment and control rats were shown in the table below (Fig. 1). The body weight of the treatment rats decreased in a dose dependent manner, while that of the control rats increased during the duration of treatment. The initial body weight of the treatment rats were not significant different when compared with their corresponding final body weights while there was significant ($p<0.05$) increase in body weight when comparing the initial body weight with the final body weight of Control rats.

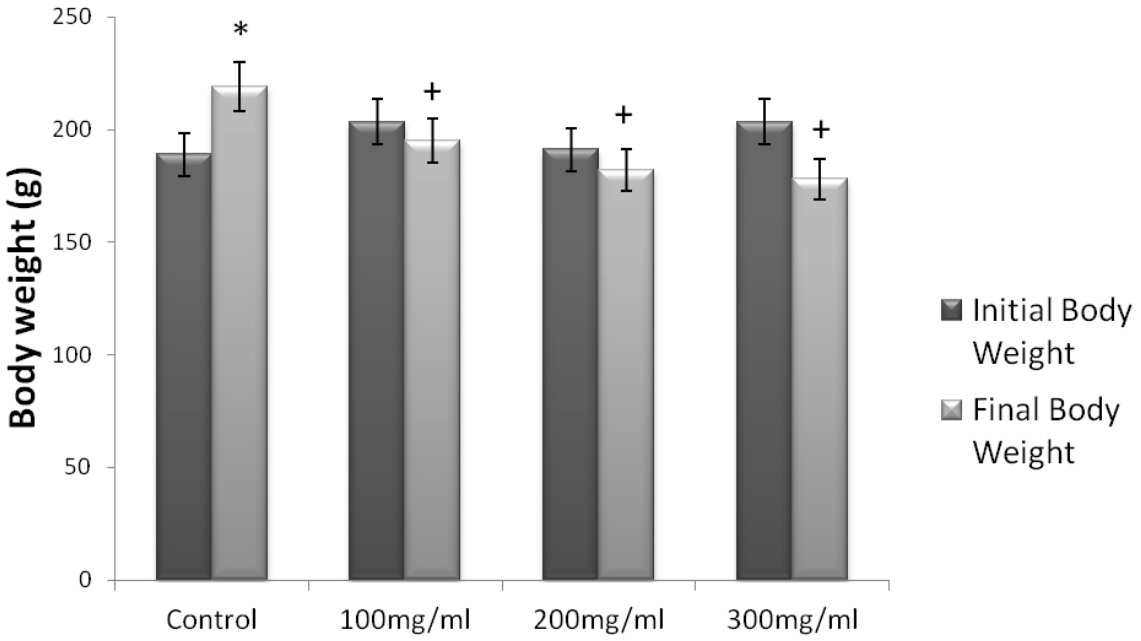

Fig 1 Effect of *Carica papaya* on body weight (n=8)

* $p<0.05$ when comparing initial body weight and final body weight

\+ $p<0.05$ when comparing final body weight of Control with treatment

Hematological findings

Result on the Hematological data is presented in the various figures below. Hematological values measured showed a significant ($p<0.05$) elevation of RBC, WBC, Platelets, PCV and lymphocyte level in the treatment group. This increase in the various hematological parameters was dose dependent.

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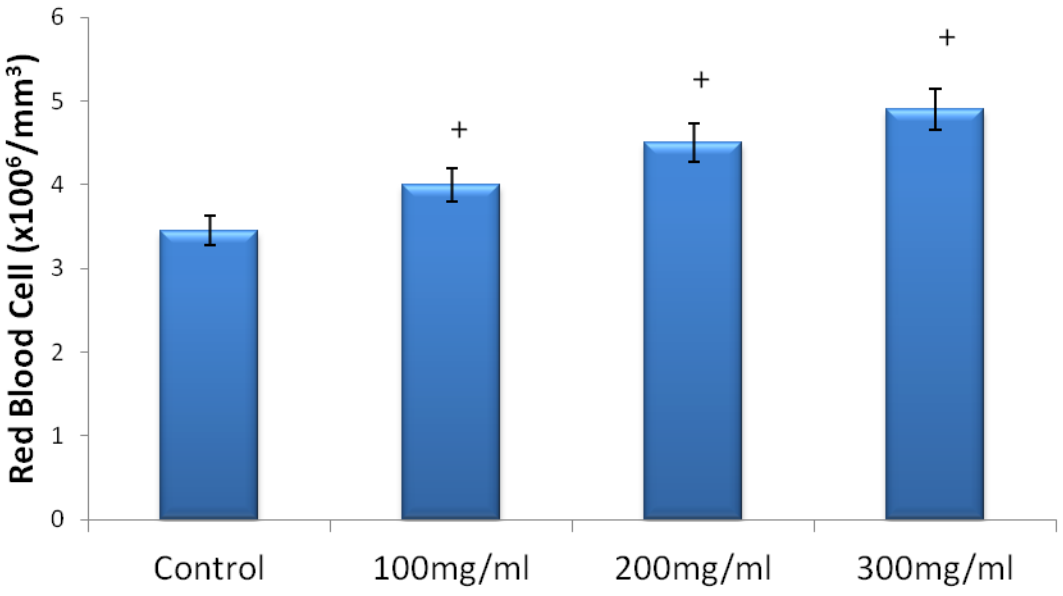

Fig 2 Effect of *Carica papaya* on Red Blood Cells
(n=8); +p < 0.05 compared with control group

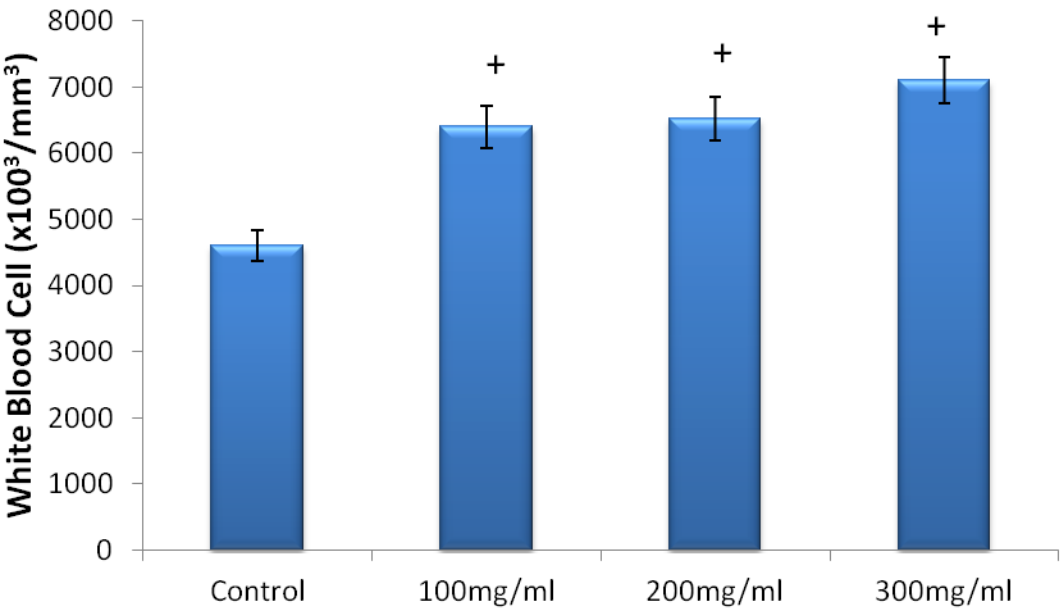

Fig 3 Effect of *Carica papaya* on White Blood Cells
(n=8); +p < 0.05 compared with control group

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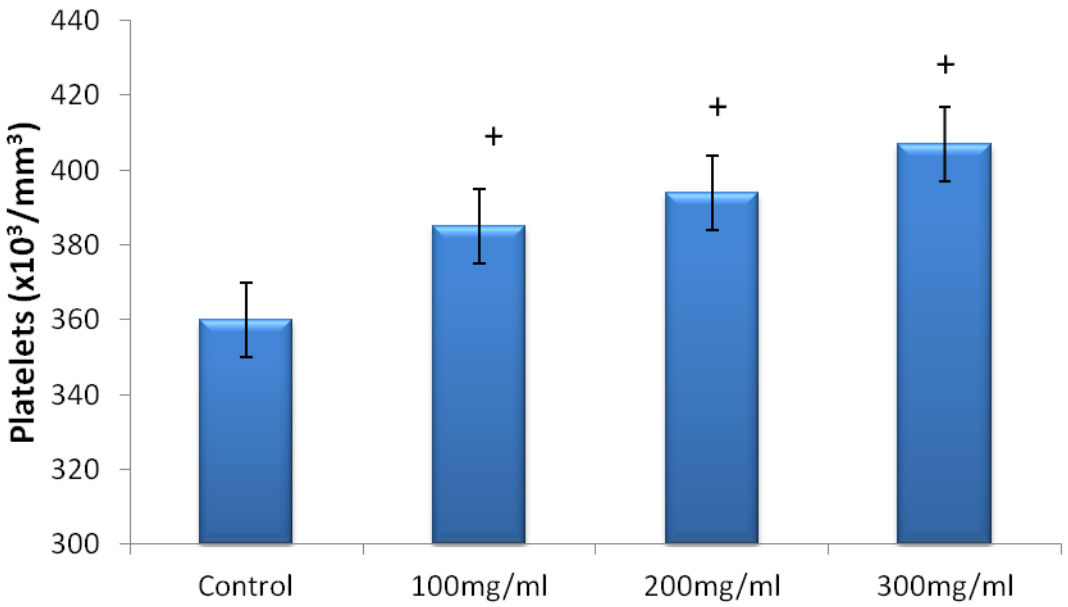

Fig 4 Effect of *Carica papaya* on Platelets
(n=8); +p < 0.05 compared with control group

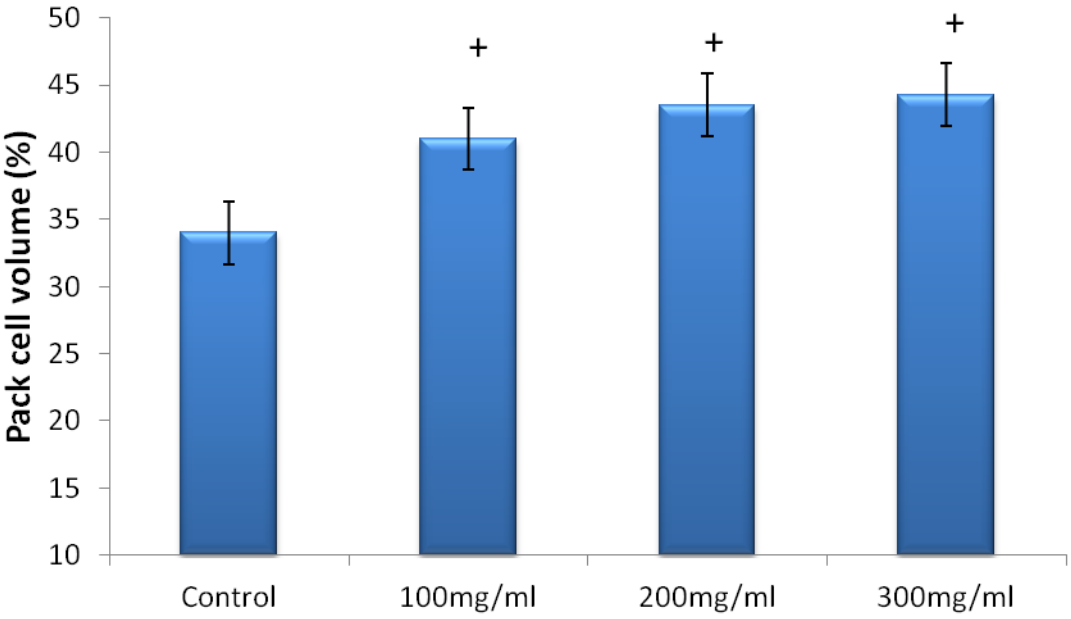

Fig 5 Effect of *Carica papaya* on Pack Cell Volume
(n=6); +p < 0.05 compared with control group

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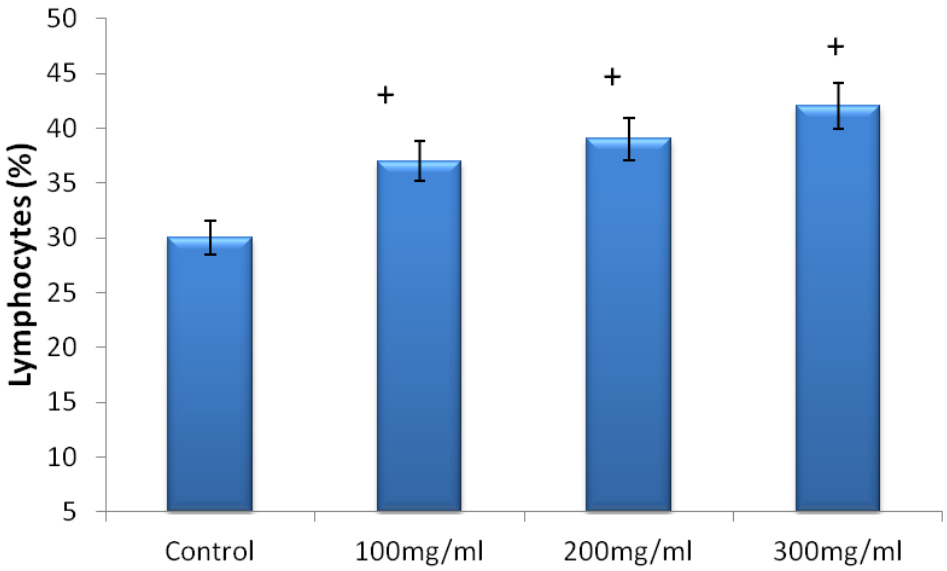

Fig 6 Effect of *Carica papaya* on Lymphocyte
(n=8); +p < 0.05 compared with control group

DISCUSSION

The use of herbal preparations as a treatment for diseases is very common. In Nigeria, rural communities use herbs as food and traditional medicine. *Carica papaya* extract has been used traditionally by some population as digestive agent, food and skin wound healing [18]. Some of these usages have been studied in vitro and in animal models. Scientific evidence for their efficacy in haematological parameters is lacking.

Findings from this study show that *Carica papaya* caused a dose dependent increase in the various haematological parameters. The RBC, WBC, Platelets, lymphocytes, PCV all increased significantly ($p<0.05$) when compared with control rats. An increase in the amount of RBC is suggestive of positive erythropoesis [10, 13,] and therefore PCV level increase as shown in this study in treated rats may result from increase in red blood cell production [15]. Reports of plant extract inducing increase in WBC and lymphocytes have pointed out their ability in boosting immune system [1], such is the case in *Carica papaya* from this study.

Also, in this study, *Carica papaya* reduced the body weight in a dose dependent manner, this reduction was not significant. This reduction in body weight could be understandable after findings from Dyer (1994) showed that *Carica papaya* causes inhibition of nutrient absorption from the gastrointestinal tract, and suppression of the appetite and are most likely reasons for the reductions in body weight.

CONCLUSION

It was concluded that the study of aqueous extract of *Carica papaya* administered orally to Wistar rats decreased the body weight and increased the haematological parameters.

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