

# Hematological and Blood Glucose Regulatory Properties of Methanolic Extract of *Capsicum Annum* (Chilli Pepper) in Rats

Nkpurukwe C.I., Odia, K.M\*, Bekinbo, M. T.

Department of Human Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, University of Port Harcourt, Nigeria

\*Corresponding Author

**Abstract:-** The aim of the study was to determine the effects of methanolic extract of *Capsicum annum* (chilli) on haematological parameters and blood glucose level in wistar rats. A total of 30 male rats were used. The animals were divided into five groups of five animals each. Group 1 served as control and was not treated. Groups 2, 3, 4 and 5 were treated with 5mg/kg; 10 mg/kg; 15mg/kg and 20mg/kg respectively of the *capsicum annum* extract. All administrations were done orally for four weeks. At the end of the study, blood samples were obtained from the animals by cardiac puncture method. After specified laboratory screenings and statistical analysis of the values obtained, the result revealed that there was a significant increase ( $p<0.05$ ) in white blood cell count of groups 4 and 5, however, group 2 showed significant decrease compared to the control. On WBC differentials, monocyte levels for groups 2, 3, 4 and 5 were found to be significantly ( $p<0.05$ ) reduced. The red blood cells (RBC), haemoglobin (Hb) concentration, mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) were significantly elevated ( $p<0.05$ ) as well as the haematocrit levels. However, the platelets values of all treated groups showed significant ( $p<0.05$ ) decreases in groups 3, 4 and 5 (i.e. 10mg/kg, 15mg/kg and 20mg/kg dose treated groups respectively). Groups 3, 4 and 5 had significant ( $p<0.05$ ) decreases in blood glucose level. In conclusion, the methanolic extract of *Capsicum annum* (chilli) can be considered safe to boosts haematological profile and moderate doses have the potential to attenuate blood glucose level in Wistar rats.

**Keywords:** *Capsicum annum*, haematological parameters, haematocrit

## I. INTRODUCTION

Most local spices and herbal plants have been reported to possess rich medicinal properties (WHO, 2008). According to this report, tradition medicine evolved from environmental resources, which the people of a community adapted in desperation for survival from diseases and maintenance good health.

*Capsicum Annum* is a genus of flowering plants in the night shade family Solanaceae. Its species are native to Americas, where they have been cultivated for thousands of years (Barnes *et al.*, 2007).

*Capsicum annum*, and *C. frutescens* are rich sources of antioxidant compounds, including capsaicinoids and phenolic compounds, particularly flavonoids (Materska and Perucka, 2005). The consumption of these components has potential health benefits due to their activity as free-radical scavengers, which may help prevent inflammatory diseases and pathologies associated with oxidative damage, such as atherosclerosis and Alzheimer's disease (Barnes *et al.*, 2007).



Chilli pepper (source: Wikipedia, 2017)

These *Capsicum* species possess anti-inflammatory, antioxidant, antiplatelet, antihypertensive, hypoglycemic, and hypocholesterolemic properties *in vitro* and *in vivo* models (Srinivasan, 2005).

The present study aims to investigate the effect of methanolic extract of *capsicum annum* on hematological and its blood glucose regulatory properties in rats.

## II. MATERIALS AND METHODS

A total of 30 male rats were used following standard guidelines. The animals were divided into five groups of five animals each. Group 1 served as control and was not treated. Groups 2, 3, 4 and 5 were treated with 5mg/kg; 10 mg/kg; 15mg/kg and 20mg/kg respectively of the properly prepared (Nworah *et al.*, 2012) methanoic extracts of *capsicum annum*. All administrations were done orally for four weeks. At the end of the study, blood samples were obtained from the animals by cardiac puncture method. After specified laboratory screenings and statistical analysis of the values obtained

### III. RESULTS AND DISCUSSION

Assessment of haematological parameters is relevant in health risk evaluation, as changes in the haematological system have higher predictive value for human toxicity, especially when the data are extrapolated from animal studies (Adebayo *et al.*, 2010).

The presence of phytochemicals like saponin in plant extracts have been reported to be mainly responsible for the blood glucose/lipid-lowering effect of such extracts (James *et al.*, 2010; Otitoju *et al.*, 2014).

The result in this study, revealed that there was a significant increase ( $p < 0.05$ ) in white blood cell count of groups 4 and 5, however, group 2 showed significant decrease compared to the control. On WBC differentials, monocyte and

eosinophil levels for groups 2, 3, 4 and 5 were found to be significantly ( $p < 0.05$ ) reduced. The red blood cells (RBC), haemoglobin (Hb) concentration, mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) were significantly elevated ( $p < 0.05$ ) as well as the haematocrit levels. However, the platelets values of all treated groups showed significant ( $p < 0.05$ ) decreases in groups 3, 4 and 5 (i.e. 10mg/kg, 15mg/kg and 20mg/kg dose treated groups respectively). Groups 3, 4 and 5 had significant ( $p < 0.05$ ) decreases in blood glucose level.

As earlier reported by Materska and Perucka, (2005), obviously, the effects of the methanolic extract of *C. anuum* in this study, clearly indicated the rich antioxidant properties and glucose regulatory properties of the plant.

**Table 1: Total White Blood Cell Count and Differential White Blood Cell Count.**

GROUPS	WBC ( $\times 10^{12}/L \pm$ sem)	% Lymphocyte (% $\pm$ sem)	% Monocyte (% $\pm$ sem)	% Granulocyte (% $\pm$ sem)
Group 1 (control)	14.50 $\pm$ 2.5	45.25 $\pm$ 3.2	27.25 $\pm$ 0.8	47.75 $\pm$ 12.1
Group 2 (5mg/kg)	6.25 $\pm$ 1.8*	37.50 $\pm$ 4.7*	20.50 $\pm$ 0.3*	42.25 $\pm$ 10.4*
Group 3 (10mg/kg)	12.18 $\pm$ 2.3	44.25 $\pm$ 2.9	9.5 $\pm$ 0.5*	46.25 $\pm$ 11.5
Group 4 (15mg/kg)	18.03 $\pm$ 4.38*	45.7 $\pm$ 3.5	9.00 $\pm$ 0.3*	45.30 $\pm$ 13.0
Group 5 (20mg/kg)	18.35 $\pm$ 1.78*	41.75 $\pm$ 5.3	10.37 $\pm$ 0.9*	47.88 $\pm$ 12.9

All values are presented in mean  $\pm$  sem. n=6,  $P \leq 0.05$ . \* means values are statistically significant compared to the control  
WBC= white blood cell count.

Table 2 Table Showing Red Blood Cell Count, Blood Indices and Platelets Count.

GROUPS	RBC ( $\times$ $10^9/L \pm$ sem)	Hb (g/dL $\pm$ sem)	MCV (fl $\pm$ sem)	MCH (pg $\pm$ sem)	MCHC (g/dL $\pm$ sem)	HCT (% $\pm$ sem)	Platelets ( $\times 10^9/L \pm$ sem)
Group 1 (control)	4.25 $\pm$ 0.6	10.35 $\pm$ 1.6	72.35 $\pm$ 4.7	24.18 $\pm$ 1.5	33.40 $\pm$ 0.03	31.0 $\pm$ 4.9	295.25 $\pm$ 52.6
Group 2 (5mg/kg)	6.03 $\pm$ 0.5*	13.75 $\pm$ .9*	79.53 $\pm$ 6.7*	29.85 $\pm$ 2.3*	40.33 $\pm$ 0.02*	45.25 $\pm$ 2.8*	289.75 $\pm$ 40.1
Group 3 (10mg/kg)	6.80 $\pm$ 0.6	14.58 $\pm$ 1.1	80.40 $\pm$ 4.6	26.80 $\pm$ 1.6	42.10 $\pm$ 0.0	37.75 $\pm$ 3.3*	181.75 $\pm$ 81.6*
Group 4 (15mg/kg)	5.18 $\pm$ 0.2	12.50 $\pm$ 0.3	72.65 $\pm$ 2.0	24.23 $\pm$ 0.7	33.33 $\pm$ 0.03	37.50 $\pm$ 0.9*	148.0 $\pm$ 39.6*
Group 5 (20mg/kg)	5.33 $\pm$ 0.5	13.10 $\pm$ 0.6	75.03 $\pm$ 5.2	25.05 $\pm$ 1.7	33.35 $\pm$ 0.03	39.25 $\pm$ 1.7*	219.75 $\pm$ 85.6*

All values are presented in mean  $\pm$  sem. n=6,  $P \leq 0.05$ . \* means values are statistically significant compared to the control  
RBC= red blood cell, Hgb conc= haemoglobin concentration, MCV= mean corpuscular volume,  
MCH= mean corpuscular haemoglobin, MCHC= mean corpuscular haemoglobin concentration, HCT= haematocrit.

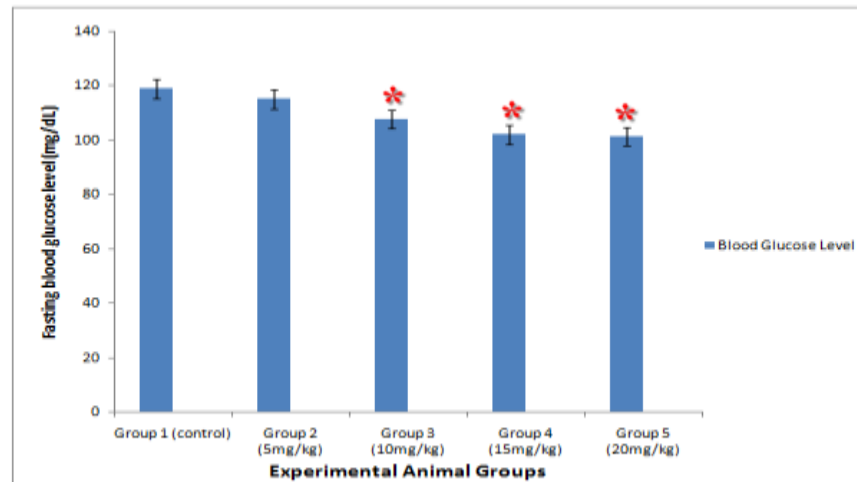


Figure 1: Showing Blood Glucose Level of the Experimental Animals

#### IV. CONCLUSION

In conclusion, the methanolic extract of *Capsicum annum* (chilli) can be considered safe to boosts haematological profile and moderate doses have the potential to attenuate blood glucose level in Wistar rats.

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