

The Effects of Cucumber (*Cucumis Sativa*) on Hematological Parameters and Weight of Wistar Rats

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Abstract

Aim: This present study is designed to evaluate the effects of cucumber (*Cucumis sativa*) on some hematological parameters on rat. **Method:** Animals weighing between 130-150g were used for the present study. The animals were acclimatized to room temperature ($28\pm5^{\circ}\text{C}$) with a relative humidity of $55\pm5\%$ in a standard wire meshed plastic cages for 4 to 5 days prior to experimentation of the experiment. In this study, all the animal experimentation was carried out according to the guidelines of Institutional Animal Ethics Committee (IAEC). **Results:** The aqueous and ethanol leaves extract of *Cucumis sativa* showed significant difference ($P>0.05$) in packed cell volume level of animals in extract treated groups (41.50 ± 1.50 , 39.00 ± 1.00 and 42.50 ± 2.50) when compared to packed cell volume in control group (37.50 ± 7.50) and group 5 (46.00 ± 1.00) reveal significant increase when compared with control group. Same result was observed with Hemoglobin (Hb). There was no significant difference in platelet level of animals in extract group 4 (165.00 ± 5.00) and 5 (190.00 ± 10.00) when compared with control group (185.00 ± 15.00) and treated groups (157.50 ± 7.50 and 152.50 ± 2.50) shows significant decrease when compared with total white blood cell level in control group (185.00 ± 15.00). **Conclusion:** The ethanolic extract of *Cucumis sativa* has a mild alterations in hematological parameters.

Keywords: Cucumber, Hematology, Weight, Wistar rat

INTRODUCTION

Medicinal plants are the richest bio-resource of drugs of traditional systems of medicine to treat different diseases in different areas of the world.¹ Plants have a limitless ability to synthesize aromatic substances mainly secondary metabolites which are used as defensive molecules against predation by microorganisms, insects and herbivores.² However, these defensive molecules give plants their medicinal value which is appreciated by human beings because of their great importance in health care of individuals and communities.

The plant *Cucumis sativa* (Fam.Cucurbitacea) commonly known as "Mullu vellari" in Tamil, "Sakusa" in Sanskrit, "Kheera" in Hindi and "Cucumber" in English is reported to possess a number of medicinal values.³ The botanical family Cucurbitacea, commonly known as cucurbits also displays rich diversity of sex expression and the cucumber has served as a primary model system for sex determination studies.⁴

Cucumis sativa fruit is shown to possess various activities

such as antihyperglycemic activity,⁵ inhibitory effects on protein Kinase C (PKC) activity,⁶ antioxidant activity.⁷

METHOD

Study Design

An experimental design will be adopted using qualitative analysis.

Materials

During the research, the following materials were used; 20 albino wistar rats, wooden cage, saw dust, animal feed (growers mash, laboratory coat and dissecting board and kit, fresh cucumber, electric blender, EDTA container, weighing balance, syringe and canuler and ethanol.

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Sample and Sampling Technique

A sample of two hundred and fifty-six (256) patients were used and the study adopted the purposive sampling technique.

Collection and Identification Of Plant

The fresh matured fruit of *Cucumis sativa* was bought from Abraka market, Delta State. It will be authenticated and identified at the Department of Botany, Delta State University Abraka.

Preparation of Extract

The fresh fruit of *Cucumis sativus* weighing 60g each will be collected, cut into small pieces and blended with 100ml of water each with the aid of electric blender per week. Then filtered into a beaker with the aid of a white handkerchief

to get a clear solution and the juice will be preserved in the refrigerator for the experimental use.

Experimental Design

Albino rats of one sexes weighing between 150g-200g was housed in plastic cage and rats were acclimatized in the laboratory for a period of two weeks with adequate food and water. Twenty rats were randomly grouped into five groups with four rats in each group.

Hematology Studies

At the end of twenty-eight days, bleeding and clothing time of all the rats in each group was determined. The rats were anaesthetized and their respective blood sample was collected with the aid of syringe and niddle from apex of the heart in heparin tubes.

Table 1. Effect of cucumis sativus extract on body weight and organ weight of wistar rats

Label	Group 1	Group 2	Group 3	Group 4	Group 5
	CONTROL	ETHANOIC	EXTRACT	AQUEOUS	EXTRACT
W0	13.00±0.00	137.50±2.50	150.00±0.00	162.50±7.50	177.50±2.50
W2	130.00±0.00	133.50±3.50	144.50±4.50	160.00±0.00	172.50±2.50
W4	130.00±20.00	117.50±2.50	125.00±25.00	165.00±5.00	165.50±12.50
Change in Body Weight	2.42±5.76	17.03±0.36	25.00±5.00	-1.27±7.54	9.76±6.91
Liver weight	4.75±1.05	3.35±0.55	5.45±0.95	4.70±0.20	5.45±0.35
Right kidney	0.35±0.15	0.45±0.15	0.70±0.10	0.50±0.10	0.70±0.10
Left kidney	0.50±0.00	0.50±0.00	0.55±0.05	0.50±0.00	0.65±0.05

Values are presented as mean ± Standard Error of Mean (SEM) of sample replicated (n=4)

From table 1 above, there was dose dependent increase in body weight gain of animals given extract at group 2 (117.50±2.50), group 3 (25.00±5.00) group 4 (-1.27±7.54) and group 5 (9.76±6.91), more increase was observed with

aqueous treated groups than ethanol treated groups and control. No statistical significant changes were observed with the organs weight of both control and extract treated groups.

Table 2. Effect of cucumis sativus extract on hematological parameters

Label	Group 1	Group 2	Group 3	Group 4	Group 5
	CONTROL	ETHANOIC	EXTRACT	AQUEOUS	EXTRACT
PCV (%)	37.50±7.50	41.50±1.50	39.00±1.00	42.50±2.50	46.00±1.00
HB (g/l)	12.50±2.50	13.80±0.50	13.00±0.30	14.15±0.85	15.35±0.35
RBC (x10 ¹² /L)	33.33±0.00	4.30±0.30	3.60±0.30	4.45±0.65	5.30±0.10
MCH	75.00±15.00	32.17±1.08	36.47±3.22	32.21±2.79	28.96±0.11
MCV	7.75±0.25	33.26±0.01	109.38±9.38	33.29±0.04	33.37±0.04
TWBC (x10 ⁹ /L)	7.75±15.00	96.74±3.27	7.00±50	96.75±8.52	86.79±0.25
PLATELET (x10 ⁹ /L)	PLATELET (x10 ⁹ /L)	7.38±0.13	152.50±2.50	8.25±0.25	190.00±10.00

Values are presented as mean ± Standard Error of Mean (SEM) of sample replicated (n=2). P<0.05: Significantly different from group 1. PCV; Packed cell volume, Hb: Hemoglobin, RBC: Red blood cell, MCH: Mean corp, MCV, TWBC, Platelet count.

From table 2 above, there was no significant difference (P>0.05) in packed cell volume level of animals in extract treated groups (41.50±1.50, 39.00±1.00 and 42.50±2.50) when compared to packed cell volume level in control group (37.50±7.50) and group 5 (46.00±1.00) reveal

significant increase when compared with control group. Same result was observed with Hemoglobin (Hb). There was no significant difference (P>0.05) in red blood cell levels of animals in extract treated groups when compared to red blood cell level in control group.

DISCUSSION AND CONCLUSION

Administration of herbal preparations without any standard dosage coupled with non-availability of adequate scientific studies on their safety has raised concerns on their toxicity.⁸ Toxicity studies in animals are commonly used to assess potential health risk in humans caused by intrinsic adverse effects of chemical compounds/plant extract.⁹ These adverse effects may manifest significant alterations in the levels of bio-molecules such as hematological parameters, enzymes and metabolic products, normal functioning and histomorphology of the organs.¹⁰

The result of this study reveal no significant difference ($P>0.05$) in packed cell treated volume, hemoglobin (Hb), red blood cell level of animals in extract treated groups when compared to control group and group 5 reveal significant increase when compared with control group, from table 2 above, there was no significant difference ($P>0.05$) in total white blood cell and platelet level of animals in extract treated groups (7.38 ± 0.13 and 7.00 ± 0.25) and group 4 (8.25 ± 0.25) and 5 (9.50 ± 0.50) shows significant increase when compared with control group. The increase in only the WBC and platelets out of all the hematological parameters investigated in the present study could imply selective systemic ameliorating effect by the extract.

The present study has revealed that it was only the platelet count that was affected whereas there was no effect on the volume and distribution width of the platelets. Furthermore, the reduction in platelets of groups 2 and 3 may hamper the process of blood clotting. Hb, RBC and PCV are associated with total population of red blood cells while MCV, MCH, MCHC, relates to individual red blood cells. Lack of an effect on these parameters indicates that both the individual and total population of red blood cell was not affected by the extracts.¹¹

In conclusion, the mild alterations in hematological parameters by the ethanolic extract of *Cucumis sativus* are indications of no effects on the various organs of the animals. These will have consequential cause no effect on the normal functioning of these organs.

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