

Research Article

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Effect of Carrot (*Daucus carota*) Extract on the Body Weight and Blood Glucose Levels of Wistar Rats

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Abstract: Background to the study: Carrot (*Daucus carota*) is a root vegetable eaten for its numerous health benefits. The aim of the present study was to investigate the effects of *Daucus carota* on blood glucose and body weight. **Methodology:** The study involved 28 male wistar rats separated into 4 groups of 7 rats each. Group 1 served as control and was given distilled water, whilst groups 2, 3 and 4 served as test groups and were given aqueous extract of *Daucus carota* at daily doses of 200mg/kg, 400mg/kg and 600mg/kg respectively. The experiment lasted for 28 days. The weights of the animals were measured at the onset of the experiment and recorded as Weight in Day 0 and also at the end of the experiment and recorded as Weight in Day 28. The blood glucose levels of the animals were also measured on Day 28. **Results:** Results showed that oral administration of 200mg/kg and 400mg/kg of carrot extract respectively caused significant reduction in the blood glucose concentrations but no significant change was observed in response to administration of 600mg/kg compared to the control. The percentage change in body weight increased to 24.65% and 27.49% with administration of 200mg/kg and 400mg/kg respectively from the pre-experiment weight. Administration of 600mg/kg of carrot extract only caused a percentage weight change of 21.3% similar to the control group. **Conclusion:** Conclusively, moderate consumption of carrot extract significantly reduced blood glucose with a slight increase in body weight. Based on the blood glucose lowering effect of carrots in our study, we recommend that carrots be considered good in the dietary management of diabetes.

Keywords: Carrot (*Daucus carota*), Body Weight, Blood Glucose, Wistar Rats.

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INTRODUCTION

Carrot is a seasonally cultivated root vegetable which has gained an almost global recognition especially as it is a good source of vitamin A. The root vegetable is often chewed raw or used to garnish cooked food. It has numerous health benefits including lipid lowering potential, antioxidant, improved vision, immune boosting potential amongst others [1-6]. This is because the root vegetable is enriched with many bioactive compounds that have proven protective effects on the body.

Fruits and vegetables are natural products that have enormous potential to improve glucose homeostasis [7-8]. The glycaemic index of fruits and vegetables varies depending on the type and ripeness of the food. However, most fruits are classified as low glycaemic index foods except for those that are highly processed.

Carrots are considered to have low glycaemic index especially in its fresh form. Many studies have associated increasing weight with higher levels of blood glucose to the extent that obesity is a major risk factor of diabetes mellitus [9-12].

The aim of the present study was to determine the effect of carrot juice on the body weight and plasma glucose of wistar rats.

MATERIALS AND METHODS

The experiment was carried out at animal house of the department of Human Physiology, faculty of Basic Medical Sciences, University of Port Harcourt in the year, 2019. Ethical approval was obtained from the university of Port Harcourt Research Ethics Committee with approval number; UPH/CEREMAD/REC/MM67/012. A total of twenty

eight male wistar rats weighing 120 to 150g were purchased and acclimatized for a period of two weeks. These animals were grouped and housed in plastic cages and allowed to feed and drink *ad libitum* with Top feed Finisher mash and clean water. Their immediate environment (beddings) was changed daily, the temperature of the environment kept at normal conditions while the external environment was cleaned and disinfected regularly.

Preparation and administration of carrot extract

Mature carrot tubers were bought from Oil Mill market in Obio Akpor Local Government Area of Rivers State, Nigeria. The plant was identified at the department of Plant Science and Biotechnology, University of Port Harcourt; *Daucus carota L*, in the family; Apiceace with assigned herbarium number; UPH/C/132. The tubers were washed with water to remove soil particles. About 2kg of the fresh carrot was cut into tiny pieces and air dried for seven days. The dried carrots were blended using a blender and carefully poured into a maceration jar containing four liters of water. The mixture was allowed to macerate for 24hours after which a Whatman filter (20-25µm, pore size) was used

to get a clear filtrate. The filtrate was now poured into an evaporating dish and dried in a water bath at 45°C to obtain a semi-solid aqueous extract of *Daucus carota*. The dosages administered in the study were based on the lethal dose (LD50) of 5000mg/kg which was previously determined [13]. Following acclimatization, the wistar rats were weighed and separated into four groups of seven rats each. Group 1 served as control and was given distilled water, whilst groups 2, 3 and 4 served as test groups and were given aqueous extract of *Daucus carota* at daily doses of 200mg/kg, 400mg/kg and 600mg/kg respectively. The experiment lasted for 28 days. The weights of the animals were measured at the onset of the experiment and recorded as Weight in Day 0 and also at the end of the experiment and recorded as Weight in Day 28. The blood glucose levels of the animals were also measured on Day 28.

Statistical analysis was done using SPSS software version 22.0. Results were presented in tables. Continuous variables were expressed as mean ± Standard error of mean (SEM). Statistical difference was determined using analysis of variance (ANOVA) and at $p < 0.05$.

RESULTS AND DISCUSSION

Table-1: Effect of Carrot extract on Glucose and body weight of wistar rats

Group	Blood glucose (mmol/l)	Body weight (g) Day 0	Body weight (g) Day 28	Percentage change in body weight
Control	6.58±3.65	120.67±6.84	146.33±6.65	21.26
200mg/kg	5.73±0.26*	131.17±5.55	163.50±7.81	24.65
400mg/kg	5.73±0.24*	125.50±7.13	160.00±7.19	27.49
600mg/kg	6.45±0.21	115.83±4.11	141.00±4.35	21.73

* Significantly different compared to control.

The results of our study showed that oral administration of 200mg/kg and 400mg/kg of carrot extract respectively caused significant reduction in the blood glucose concentrations but no significant change was observed in response to administration of 600mg/kg compared to the control. The percentage change in body weight increased to 24.65% and 27.49% with administration of 200mg/kg and 400mg/kg respectively from the pre-experiment weight. Administration of 600mg/kg of carrot extract only caused a percentage weight change of 21.3% similar to the control group. Our study suggests that administration of moderate doses of carrot extract slightly increased body weight but significantly reduced blood glucose. Higher doses (600mg/kg) of the extract did have any significant effect on the body weight compared to the control group and with the higher dose, the blood glucose levels gradually increased towards the control group. Carrots contain dietary fibers [14] which are known to decrease the absorption of glucose and other nutrients from the intestines [12,15,16]. This can probably explain the reduction in blood glucose levels following

administration of moderate amounts of the carrot extract in wistar rats. However, increasing the dosage of the extract will provide more glucose in the intestines to surmount the absorptive slowing function of dietary fibers, so that the plasma glucose rises slightly towards the level of the control group. Therefore to obtain the optimal benefits of carrot, it should be consumed in moderate amounts.

CONCLUSION

Conclusively, moderate consumption of carrot extract significantly reduced blood glucose with a slight increase in body weight. Based on the blood glucose lowering effect of carrots in our study, we recommend that carrots be considered good in the dietary management of diabetes.

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