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CADIO PROTECTIVE ACTION OF AQUEOUS EXTRACT OF ONION (ALLIUM CEPA) ON THE LIPID PROFILE IN ADULT WISTAR RAT (RATTUS NOVERGICUS)

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ABSTRACT

Allium Cepa has been used in folk medicine for treatment of tumors and to relieve dropsy (heart failure related edema). This present study was conducted to determine the cardio protective action of the aqueous extract of onion (Allium Cepa) on the lipid profile of adult wistar rats. Twenty (20) male rats were randomly divided into 4 groups of 5 animals (n = 5) each, labelled A, B, C and D of which groups A, B, and C were the experimental groups while group D served as the control. Average weights of the animals in each group were 163.1g, 169.2g, 199.8 and 137.1g respectively. Group A, B, and C were treated with 4mg/kg, 6mg/kg and 8mg/kg of the aqueous extract while group D received 1ml of phosphate buffered saline for 18days, of experimental period. Animals were sacrificed 24hours after the last administration of the extract; Blood samples were collected to investigate the serum level of High Density lipoprotein (HDL), triglyceride, Low Density lipoprotein and total cholesterol as compared with the control. There was significant increase in serum level of HDL ($p < 0.05$), and low level of LDL, total cholesterol and triglyceride in the group that received the high dose of the extract compared with the control. The increase in the HDL and reduction in the serum level of LDL, Triglycerides and total cholesterol will reduce the rate of fat deposit on the blood vessel wall, and this will have a protective action on the heart and blood vessels.

Key words: Lipid profile, Wistar rat, Onion

INTRODUCTION.

Plant as natural resource is now being used in different parts of the world to treat or prevent many diseases. *Allium cepa* has been used as food additive or supplement for many centuries.

Onion (*Allium Cepa*) was also a popular folk remedy, being applied to treat tumors, made into syrup for relieving cough, or dropsy (heart failure related edema). It was considered a weaker version of garlic by many herbal practitioners, like garlic onion has a long standing but a substantiated reputation as an aphrodisiac. Onion varieties clearly show that onion has potent antioxidant and anti-proliferative activities, and that the more the total phenolic and flavonoid contents of an onion, the stronger the antioxidant and protective effect (Lea, 2008; Kanti Bhooshan Pandey and Syed Ibrahim Rizvi 2009). Wide range claims have been made for the effectiveness of onion, against conditions ranging from common cold to heart disease, diabetes, osteoporosis and other disease (Sten and Mylers, 1975; Yusuf et al., 2012). Onion contain chemical compound, believed to have anti-inflammatory, anticholesterol, anticancer, and antioxidant properties such as quercetin. However, it has not been conclusively demonstrated that an increase in onion consumption is directly linked to health benefits. Some studies have shown that increased consumption of onions reduces the risk of head and neck cancers (Lea, 2008; Kanti Bhooshan Pandey and Syed Ibrahim Rizvi 2009). In India some sects do not eat Onion due to

its alleged aphrodisiac properties (Lea, 2008; Lipi Das et al., 2012).

One of the most common metabolic diseases in human is the lipoprotein disorder. It may leads to several heart diseases, which may include Coronary heart disease (CHD) (Sten and Mylers, 1975; Yusuf et al., 2012). High level of Cholesterol in blood increases the risk of atherosclerosis, while, it's lowering in blood reduces the incidence of Coronary Heart Disease (CHD) (Sten and Mylers, 1975; Woong-Suk Yang et al., 2019). The higher the level of LDL cholesterol, the greater the risk of atherosclerotic heart disease, conversely the higher the level of HDL cholesterol the lower the risk of coronary heart disease (CHD) (Sten and Mylers, 1975, Woong-Suk Yang et al., 2019).

The fact that *Allium cepa* (onion) being widely used as food additive and due to its high antioxidant properties, its effects on the plasma lipid profile need to be investigated.

MATERIALS AND METHODS

Experiment animals: Twenty adult male weighing between 160 – 260 g were obtained from animal house in the Department of Physiology Ladoke Akintola University of Technology (LAUTECH) Ogbomoso, Nigeria. They were kept in the laboratory for two weeks to acclimatize and maintained under standard conditions, food and water was given *ad libitum*

Extract preparation: Fresh onion bulbs were obtained from Oja Oba market, Ilorin, Kwara State. Authentication was done in the Department of Botany, University of Ilorin.

Fresh onion juice was obtained using a juice extractor, the fresh onion juice was concentrated in an evaporator at a temperature of 30°C and 132g of the extract were obtained, and dissolved in phosphate buffer saline for dosage preparation and for administration.

Extract administration: The extract was given orally once daily using oropharyngeal cannula, for a period of 18 days of the experiment. This was given according to the average body weight of the animals in each group. Group A, B and C received 4mg/kg, 6mg/kg and 8mg/kg body weight of the extract respectively while group D served as the control group and did not take the extract.

Animal Sacrifice: Animals were sacrificed by cervical dislocation 12 hours after the last extract administration; Blood Samples were collected following abdominal incision from descending thoracic aorta for lipid profile analysis.

Analytical Procedure: Serum total cholesterol concentration was estimated using Randox Laboratory method, which

explained it based on Enzymatic and point method.

Serum HDL – cholesterol was determined using Hiller method (1987), Serum level of triglyceride level was estimated by method of Stens and Myers (1975). LDL cholesterol was obtained by subtracting the value of HDL cholesterol and Triacylglycerol from the Total cholesterol.

Statistical analysis: The values were recorded as mean \pm SEM, level of significance at $p < 0.05$ using student "t" test

RESULTS AND DISCUSSION

There was significant increase in the HDL cholesterol level in the treatment group as compared to the control. The level of triglyceride and LDL decrease in treatment group and total cholesterol level shows significant reduction in treatment groups as compared to the control.

Table 1: shows the effects of onion on the serum level of HDL, LDL, Triglyceride and Total cholesterol.

	HDL (mg/dl)	LDL (mg/dl)	TRIGLYCERIDE (mg/dl)	TOTAL CHOLESTEROL (mg/dl)
A	44.00 \pm 1.00	40.35 \pm 0.15	73.00 \pm 1.00	105.10 \pm 0.10
B	45.00 \pm 1.00	39.95 \pm 0.15	75.75 \pm 0.15	100.06 \pm 0.10
C	48.25 \pm 0.15	39.05 \pm 0.15	74.75 \pm 0.15	100.15 \pm 0.10
D	38.40 \pm 0.10	50.20 \pm 0.01	76.10 \pm 0.15	99.46 \pm 0.08

Values are mean \pm S.E.M (n): * indicate significant different when compared with the control ($p < 0.05$)

The lipid profile is a group of blood test which are carried out to determine the risk of coronary heart disease (CHD). The results of lipid profile are considered as a good indicator of whether someone is prone to develop stroke or heart attack caused by atherosclerosis (Becque *et al.*, 1980; Anne Langsted and Børge G Nordestgaard 2019).

This study shown that there is increase in high density lipoprotein (HDL) in dose dependent manner, HDL is referred to as the good cholesterol. This is because it enhances transport of cholesterol and phospholipids from tissues and organs back to the liver for degradation and elimination. The increase in HDL may be due to sulphur compounds, the major active component in Onion bulbs, and chromium with vitamin B6 which helps prevent heart disease by lowering homocysteine levels, another significant risk factor for heart attack and stroke.

Increase consumption of onion tends to increase HDL and lower high cholesterol in the blood this may prevent the deposition of cholesterol on the wall of arteries by transporting cholesterol away from the heart, and emptying it to the liver and consequently may prevent high blood pressure, and myocardial infarction.

Reduction in the level of triglyceride, LDL and total cholesterol in the treatment group may be as a result of the reduction in the circulating cholesterol in blood cause by increase in HDL which facilitates cholesterol transport from blood back to

the liver from where it goes to different area of the body via muscles and organ such as the heart.

Conclusion: This research work revealed that Onion extract, positively influences the serum levels of total cholesterol, HDL LDL and triglyceride. This is an indication that onion extract has a protective action, by reducing the risk of high blood cholesterol (hyperlipidemia) and prevent atherosclerosis both of which play a major role in heart disease.

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