



## HYPOLIPIDAEMIC EFFECTS OF AQUEOUS EXTRACT OF *SANSEVIERIA LIBERICA* LEAVES EXTRACTS IN HYPERCHOLESTEROLAEMIA RATS

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### ABSTRACT

This study was done to determine the effects of *Sansevieria liberica* leaf extract on lipid profile in wistar rats fed on high cholesterol and normal control. The administration of cholesterol at a dose of 0.50mg per 0.2ml 3times daily for 14days led to hypercholesterolaemia in rats. However, these rats were treated with extract of *Sansevieria liberica* at doses of 50mg and 100mg/kg. The treatment with *Sansevieria liberica* caused a significant decrease in cholesterol, triglyceride and low density lipoprotein – cholesterol when compared with the control at  $P < 0.05$ . Also, it was observed that high density lipoprotein cholesterol was significantly increased when compared with the control. This result suggests that the leaf extract of *Sansevieria liberica* could probably serve as a potential natural therapy for treatment of hyperlipidemia.

### INTRODUCTION

The use of herbs in recent times has become of interest because of their vast role in the treatment of different diseases. It is an inherent part of Africa traditional medical practices [1]. *Sansevieria liberica* is a very unique plant which can be used for the treatment of various diseases such as gonorrhoea, eczema etc [2]. The plant has long rhizomes with long fibrous roots and a rapid rate of growth, the fruit is red or orange berry. It is a rather stout herb. With several stiff red margined leaves about 2 feet high arising from the creeping plant, 50-80 cm long inflorescence longer than leaves with abundant white flowers. They are grown as ornamental plants. They are widely distributed throughout the tropics. In Nigeria, the leaves and roots of *Sansevierialiberica* are used in

traditional medicine for the treatment of asthma, abdominal pains, colic, diarrhea, eczema, gonorrhoea, hemorrhoids, hypertension, monorrhagia, piles, sexual weakness, snake bites and wounds of the foot. The anti- anaemic activities of the leaves have been reported in recent times [3]. The root part of the plant is also used in ethnomedicine in the treatment of fever, headache, cold, analgesic, antibiotic and an anti - inflammatory agent. Also, the aqueous root extract of *Sanisevierialiberica* was found to possess antidiarrhoeal property perhaps due to inhibition of gastro intestinal propulsion and fluid secretion, which is possibly mediated through inhibition of the nitric oxide pathway. The benefit of the traditional use of *Sansievierialiberica* has been supported by the isolation and identification of several possible active constituents, including flavonoid, saponins, tannins and anthraquinones [4]. Similar observations were made which included the presence of carbohydrates, alkaloids, saponins, reducing sugars and oils in aqueous not extract. Presence of these compounds

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could help to account for both the anti-diarrheal activity and embryotoxicity. Extensive studies on experimental animals indicated that the consumption of extract of *Sensevieraliberica* may have different effects on cholesterol metabolism. *Sensevieraliberica* belong to the family *Agavaceae* (*Ruscacea* or *Dracaenaceae*). It is one of the bowstring hemp species with concave, short petioled leaves that are in part transversely banded with light and dark green, also linearly striated with whitish to light green and dark green striations. The leaves are very rich in fiber, protein, potassium, calcium, magnesium, vitamin c, biotin and riboflavin [5].

Different types of dietary lipids have shown to affect lipid metabolism and serum lipid profile differently. The effects of dietary fat on the risk of coronary artery disease (CAD) have traditionally been estimated from their effect on serum total cholesterol. Furthermore, the effect of dietary cholesterol on plasma cholesterol levels may be influenced by the types of fatty acid consumed which may be saturated or unsaturated [6]. Lipoprotein disorder is among the most common metabolic disease occurring in human. It may lead to coronary heart disease (CHD) [7]. As early as 1910, Lindaus described cholesterol in the lesions of atherosclerotic diseased arteries [8]. It is therefore established that hypercholesterolemia is a risk factor in the development of atherosclerosis [9]. Knowledge about the levels of cholesterol sub fraction has been found to be more meaningful than simple plasma cholesterol level. The higher the level of low density lipoprotein cholesterol (LDC-C) the greater the risk atherosclerotic heart disease, conversely, the higher the level of high density lipoprotein cholesterol (HDL-C) the lower the risk of coronary heart disease [10]

## MATERIAL AND METHODS

Cholesterol was manufactured by Aldrich chemical co Milwaukee, WI U.S.A and was purchase from the chemist in Ekenunwa market in Owerri, Imo state Nigeria.

## PLANTS MATERIAL AND EXTRACTION

The leaves of *Sensevieraliberica* was collected at

the suburb of Amucha Njaba L.G.A Imo State. The plant was identified and confirmed by the head of Department of plant biology and biotechnology of Imo State University Owerri. They were washed, sundried and ground into powder and was used

**EXPERIMENTAL DESIGN:** The albino rats weighing 200-250 grams obtained from the animal house of Imo state University were used in this investigation. The animals were kept in cages in a room maintained at room temperature; with a 12 –hours light dark cycle for one week to acclimatize The animals were randomly assigned to six experimental groups (n=6 x 6group). The first group of animals which served as normal control was given distilled water. Group II, and III were given 50mg/kg, and 100mg/kg body weight of extract for 14days. The group IV received 0.5mg/0.2ml of cholesterol only. Group V and VI received 0.5mg/0.2ml of cholesterol and were treated with 50mg/ml and 100mg/ml of extract. In all groups, the extract was administered through oral route. This treatment was by oral compulsion. All animals were allowed free access to food and water throughout the experiment.

**Blood Collection:** Twenty four hours after the last doses were administered the animals were anaesthetized with chloroform vapour, quickly brought out of the jar and sacrificed. Whole blood was collected by cardiac puncture from each animal into clean dry test tubes and EDTA containers. The blood in the clean dry test tubes were allowed to stand for about 15minutes to clot and further spun in a Westerfuge centrifuge (Model 1384) at 10,000g for 5minues, serum was separated from the clot with Pasteur pipette into sterile sample tubes for the estimation of lipid profile.

The serum lipid profile was measured by the colorimetric method using Biosystem Kits. Cholesterol (COD11505), triglyceride (COD11528) and HDL-C (COD 11523) and LDL-Cholesterol (COD11579)

**Statistical analysis:** The results were expressed as mean  $\pm$  standard deviation. The statistical evaluation of data was performed by using Studet t-test

## RESULTS

**Table 1. Lipid profile of rats fed with high cholesterol and different concentration of Sensevieralibericaleaf extract.**

Groups	Treatment	Cholesterol(mg/dl)	Triglyceride(mg/dl)	HDL(mg/dl)	LDL(mg/dl)
Group 1	Normal control	84 $\pm$ 4.2	79.1 $\pm$ 6.7	24.9 $\pm$ 4.1	62.6 $\pm$ 4.4
Group 2	50mg/kg body/wt	76 $\pm$ 2.94*	68.89 $\pm$ 5.41*	28.32 $\pm$ 3.92*	59.11 $\pm$ 3.14*
Group 3	100mg/kg body/wt	71 $\pm$ 4.73*	65.11 $\pm$ 5.47*	32.66 $\pm$ 6.22*	50.39 $\pm$ 4.57*
Group 4	High cholesterol	106 $\pm$ 4.82	87.59 $\pm$ 3.17	22.81 $\pm$ 4.33	66.15 $\pm$ 5.48
Group 5	50mg/kg.body/wt	92.55 $\pm$ 5.21*	80.11 $\pm$ 2.83*	24.99 $\pm$ 4.81*	60.94 $\pm$ 4.25*
Group 6	100mg/kg body/wt	86.15 $\pm$ 3.52*	76.21 $\pm$ 6.53*	27.93 $\pm$ 4.87*	53.19 $\pm$ 5.44*

\*significantly different from control at P<0.05



## DISCUSSION AND CONCLUSION

The presence of high cholesterol in diet has been linked to cause elevated plasma cholesterol and may increase aortic atherosclerosis. Few studies have indicated that diet treatment or drug therapy can reduce plasma cholesterol. Several efforts have been made to reduce the risk of cardiovascular disease through cholesterol regulation. Hence, the therapeutic benefits of plant foods have been the centre of different dietary studies [1]. The study showed that *Sansevieria liberica* has a varying effect on various lipid fractions when administered at a different concentration. However, it was observed from the study a decrease in the lipid fraction. There was a significant decrease in the total cholesterol and triglyceride levels of rats fed with 50 and 100mg/body weight of *Sansevieria liberica* when compared with that of the control group ( $p < 0.05$ ). Though there was an abrupt decrease in the concentration of those fed with 100mg/body weight of *Sansevieria liberica* than those fed with 50mg/body weight of *Sansevieria liberica* due to increased consumption. Elevated levels of serum triglyceride are both an independent and synergistic risk factor for cardiovascular diseases. It is often associated with hypertension, abnormal lipoprotein metabolism, obesity, insulin resistance and diabetes. The administration of *Sansevieria liberica* extract

reduced the level of triglyceride significantly. This finding is also in line with the work of Ikewuchi *et al* [11] which stated vividly the hypotriglyceridemic effect of the extract.

There was a significant increase in the value of high density lipoprotein in rats fed with 50 and 100mg/body weight of *Sansevieria liberica* when compared with the control ( $p < 0.05$ ). The significant increase of HDL-cholesterol level portends reduction of cardiovascular risk. According to clinical data, increase in serum HDL-cholesterol concentration decreases cardiovascular risk [12, 13]. High plasma level of LDL-cholesterol is a risk factor for cardiovascular disease and often accompanies hypertension. Conversely, reductions in serum LDL cholesterol have been considered a reduced risk of coronary heart disease [14, 15]. In this study, a significantly lower serum LDL-cholesterol levels were observed in the animals given the extract indicating the likely cardio-protective effects of the extract. The decrease in LDL-cholesterol maybe due to the presence of  $\beta$ -sitosterol and tannic acid in the extract. This is in conformity with the work of Gotto *et al* [16] which elucidated the hypocholesteremic effect plants.

The present study suggests that the consumption of extracts of *Sansevieria liberica* could be beneficial in reducing cardiovascular disease.

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