



X-Ray on Efficacy of Bioactive Elements in Sunflower Seed, Improving Cardiovascular Functions, Haematological and Biochemical Profile of Male Consumers in Nnewi Anambra State.

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ABSTRACT

The x-ray on efficacy of bioactive elements in sunflower seed improving cardiovascular functions, haematological and biochemical profile of male consumers in Nnewi urban region were investigated using fifty eight (58) male subjects consisting of sick and apparently healthy subjects (control subjects). Result shows that sunflower seed contains bioactive elements that influenced some cardiovascular profiles. Flavenoids contained in sunflower seed has antioxidant and cardiovascular effect. Lipid profile precisely HDL test in the test subjects were reduced following the administration of sunflower seeds in the male subjects for 2 weeks. The result gave $40 \pm 0.2\text{mg/dl}$ in the test subjects as against $45 \pm 0.4\text{mg/dl}$ of the control subjects. The seed has no bioactive element that influences haematological profile in the test subjects Group B. There was no significant ($P > 0.05$) variation in the test group B results and the control group B results.

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INTRODUCTION

Cardiovascular system and its challenges in health has become a great menace in our system. Most of these sudden deaths of dying during sleep, strokes and arteriosclerosis can be attributed to gradual cardiovascular dysfunction.

The cardiovascular system is a closed circuit of distensible tubes (blood vessels) with a pump (the heart) that generates a pressure to drive blood round the circuit. (Guyton, 2011). Its primary function is to transport oxygen (O₂) and nutrient to the cells and tissues of the body and metabolic products from these organs to excretory organs for excretion. It plays a role in coordinations and integration of body functions and temperature regulations.

High levels of low-density lipoprotein (LDL) cholesterol, also known as "bad" cholesterol can lead to cardiovascular defects including:

- Coronary artery disease which is a reduced blood flow to the heart, increasing risk of heart attack.
- Atherosclerosis: Plaque buildup in arteries, leading to hardening and narrowing
- Stroke: blockage of blood flow to the brain leading to tissue damage
- Peripheral artery disease: a reduced blood flow to limbs, increasing risk of pain, numbness and gangrene

Bad cholesterol plays a significant role in heart disease which can lead to sudden death. In Nigeria, cardiovascular diseases are a leading cause of death and high blood pressure. Other factors are:

- Poor diet: consuming foods high in bad cholesterol eg pork meat, cow meat and low in essential nutrients.
- Lack of exercise: sedentary lifestyle contributes to heart disease.
- Smoking and alcohol: This increase the risk of cardiovascular disease.

Healthy diet such as sunflower seed consumption can be of great help in maintaining and combing off bad cholesterol.

The common sunflower also known as *Helianthus annuus* is a specie of large annual forb of the daisy family Asteraceae. It is an erect herbaceous, tall annual plant. The seeds first originated in the middle American region and spread across the world (Cheenam and Leena 2016).

Sunflower seeds are planted at relatively shallow depths. In soil with a high clay content, seeds are planted at a depth of 25mm. in sandy soils, seeds can be planted at a depth of up to 50mm.

Chemical Contents of sunflower

Sunflower contains mineral elements and phytochemicals such as dietary fiber, manganese vitamins, tocopherols, phytosterols, triterpene, glycosides ∞ - tocopherols, glutathione reductase, flavonoids, phenolic acids, carotenoids, peptdos chlerogenic acid, caffeic acid, alkaloids, tannins and saponins, others are calcium, Iran, manganese, copper, zinc. Additionally, sunflower seeds contain bioactive compounds including phenolic acids, flavonoids, and phytosterols which have been associated with numerous health benefits such as cholesterol reduction, anti-inflammatory properties and potential anticancer effects.

Medical uses of sunflower seeds:

Studies link the consumption of sunflower seeds to a number of health benefits including lowering the risk of developing diseases like high blood pressure or heart disease. Sunflower seed can offer anti-inflammatory benefits for it contains Vit. E, Flavonoids and other plant compounds that can reduce inflammation.

The seeds are rich in polyunsaturated and mono unsaturated fats, which can help lower LDL cholesterol.

Sunflower seeds contain fiber which can help bind to bile acids and remove them from the body. Potentially lowering cholesterol levels. Sunflower seeds are a source of many vitamins and minerals that can support the immune system and increase one's ability to fight off viruses. These include both zinc and selenium. Zinc plays a vital role in immune system, helping the body maintain and develop immune cells. Selenium also plays a role in reducing inflammation, fighting infection and boosting immunity.

High levels of protein in sunflower seeds help to boost energy levels. Other nutrients like vit. B and selenium can help to keep one energized. The Vit B (thiamine) present in sunflower seeds can help one convert food to energy while selenium can increase blood flow and deliver more oxygen to the body. Our curiosity to embark on this study is to evaluate the efficacy of bioactive elements in sunflower seeds on cardiovascular functions haematological and biochemical profiles of male consumers.

MATERIALS AND METHODS

Study design

The objective of this study is to evaluate the efficacy of bioactive elements in sunflower seeds on cardiovascular functions, haematological and biochemical profiles of male consumers. As such fifty eight (58) male subjects having cardiovascular disease were selected after taking their medical history and tests related to heart function. Such tests are blood pressure values, serum cholesterol and triglycerides, haemoglobin concentration, packed cell counts, blood glucose, urea and creatinin tests and ten (10) normal apparently healthy subjects

Experimental Design

The experimental design involved three (3) groups of subjects viz Group A, the control group (10 persons) Group B, the test group (40 persons) and Group C (18 persons, test group not to be given sunflower seed).

The control group are those that are apparently healthy without history of cardiovascular disease from their medical records, while group B are the cardiovascular disease subjects that received sunflower seeds while group C are also cardiovascular disease subjects that did not receive sunflower seed.

Preparation of sunflower seeds for consumption:

To prepare the sunflower seed for consumption by the subjects the seeds of sunflower were harvested and sent to a taxonomist in Botany Department in Chukwuemeka Odumegwu Ojukwu University for identification.

They were then washed and roasted for 10-15 minutes until light browned and fragrant. They were packed and kept in the refrigerator (4°C) to be used for administration to the subjects.

Administration of sunflower seeds;

The seeds were given in this order; Group A which are the control subjects were not given sunflower seeds for 14 days. Group B subjects received 100g of the seed for 14 days and Group C subjects were not given the seeds for 14 days.

Phytochemical analysis of sunflower seed (*Helianthus annuus*).

The aqueous extract preparation of sunflower seeds were screened for the presence or absence of various secondary metabolites using standard phytochemical screening procedures as described by Harbourne (1973), Trease and Evans (1996). The extract was tested for flavenoids carbohydrates, calcium, resins, alkaloids, reducing sugar, saponins, fats and oil, steroids, acidic compounds and glycosides.

Lethality study (LD₅₀)

The lethality study (LD₅₀) of the aqueous extract in albino mice was determined using Lorke's method (1983). The procedure of determining the lethal dose is by increasing the concentration of the extracts administration to the mice (per body weight) in each group for 5 days. The concentration used are as followed; 500mg/kg, 1000mg/kg, 200mg/1kg, 3,000 mg/kg, 4,000mg/kg, 5,000mg/kg, 6000mg/kg, 7000mg/kg and 8,000mg/kg body weight respectively.

The mortality rate was determined and a graph plotted to determine the LD₅₀.

Determination of Biochemical and haematological profile of subjects before and after taking the sunflower seeds:

Blood samples of all the subjects in the 3 groups (A, B and C) were collected before and after the intake of the sunflower seeds from their cubital vein into EDTA sequestrated (anti coagulant bottles) and plain bottles for analysis. The glucose concentration was analyzed using a glucometer, the haemoglobin concentration and packed cell volumes were determined according to the haematocrit method described by Alexander and Griffiths (1993), the biochemical analysis; cholesterol lipid profile, urea and creatinin analysis were done as described by Baker (1985).

Statistical Analysis

The results obtained in the research study were represented as mean and standard deviation (Mean±S.D), while student's t-test was used to compare the result of the control and the test samples. A P value of less than (P<0.05) or equivalent to (P=0.05) was considered statistically significant.

RESULTS

Table 1: phytochemical analysis of *Helianthus annuus* (Sunflower) seed

Constituents in sunflower seed	Glycosides	Flavonoids	Phenols	Alkaloids	Tannins	Saponins	Calcium	Terpenoids Resins carbohydrates, fats and oils
Degree of concentration	++	+++	++	++	++	+	+	-

Key

- (+++) Present in high concentration
- (++) present in moderate concentration
- (+) present in small concentration
- (-) Negative (absent)

Table 2: Some haematological and biochemical values of male subjects on sunflower seed.

Groups	Hb g/dl ± S.D	PCV % S.D	Glucose mg/dl ± S.D	Cholesterol mg/dl ± S.D	Urea mg/dl ± S.D	Creatine mg/dl ± S.D	HD/mg ± SD
Control Group A n=10	15.2 ± 0.4	45 ± 1.2	72 ± 3.0	186 ± 7.0	8.5 ± 0.6	0.7 ± 0.2	45 ± 0.8
Before sunflower seed Group B n = 40	15.0 ± 0.3	45 ± 0.9	69 ± 1.5	190 ± 5.0	8.7 ± 0.4	0.8 ± 0.3	45 ± 0.4
Group C n = 18	15.3 ± 0.5	45.9 ± 1.5	70 ± 2.0	192 ± 3.0	9.0 ± 0.2	0.7 ± 0.4	4.6 ± 0.3
After sunflower seed (14 days) Group B n = 40	15.4 ± 0.2	46.2 ± 0.6	62 ± 0.8	160 ± 2.0	6.2 ± 0.3	0.6 ± 0.3	40 ± 0.2
Group C n = 18	15.2 ± 0.2	45.6 ± 0.6	70 ± 2.0	193 ± 2.0	8.9 ± 0.4	0.7 ± 0.3	46 ± 0.3
P value	P> 0.05	P> 0.05	P> 0.05	P<0.05	P<0.05	P<0.05	P<0.05

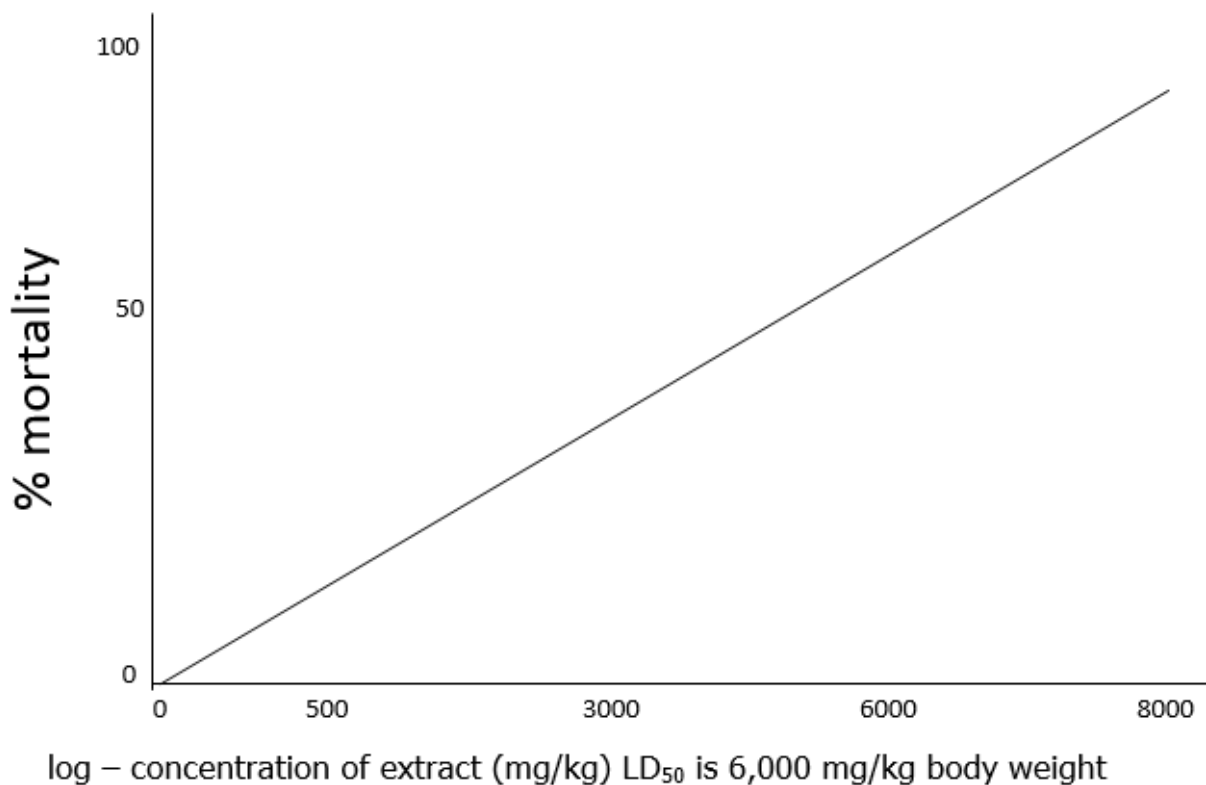


Figure 1: The lethality studies (LD₅₀) of sun flower seed showing the effect of administering graded doses (500 – 7,000mg / tg 1.p) in nice against the percentage mortality

DISCUSSION

The x-ray of efficacy of bioactive elements in sunflower improving cardiovascular functions, haemopoietic and biochemical functions in the male consumers has been studied.

Delicious and crunchy sunflower seeds are widely appraised as great health food. They are high in calories and also an impressive source of health benefitting nutrients, vitamins, minerals and antioxidants

A good amount of their calories come from the fatty acids. The seeds are specifically rich in PUFA (poly-unsaturated fatty acid mainly linoleic acid which contribute around 50% fatty acids in them. Oleic acid a mono-unsaturated fatty acid (MUFA) is also found in good amounts in the seeds. Studies suggest daily diet schedule with good amounts of MUFA prevents cardiac disorders and stroke by maintaining a healthy lipid profile (Philips et al 2005). The result of the phytochemical studies showed typical plant features in sunflower. The table 1, showed the presence of moderate concentration of Tannins, alkaloids phenols and glycosides, high concentration of flavonoids, little concentration of saponins and calcium while there was complete absence of terpenoids, resins, carbohydrates, fats and oils.

Flavonoids contained in sunflower seed plays the role of antioxidant, anti-inflammatory and cardiovascular protective effect hence it played a good role in the male subjects who took it for 14 days. In table 2, the lipid profile precisely HDL test conducted in the test subject was 45 ± 0.4 mg/dl before the administration of the extract. After the administration of the extract for 2 weeks, the result was 40 ± 0.2 mg/dl indicating an interference by the active element contained in the sunflower seed. This supports the work of Pietta, 2000.

The phenols and Glycosides play the roles of antioxidant, anti-inflammatory and anti-microbial properties (Rice- Evans) (1996)

Sunflower seeds showed no effect in some of the haematological profile conducted in this research studies ($P > 0.05$).

It could be deduced from this research study that daily diet schedule with food amount of monounsaturated fatty acid contained in sunflower seed can prevent cardiac disorders and stroke by maintaining a healthy lipid profile.

The LD₅₀ showed a concentration of 6,000 g/kg 1.p. hence the concentration of 100g given to the subjects in Group B for 14 days was safe.

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