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Evaluation of the Antioxidant vitamins and mineral Contents of Ethanol Extract of Sunflower Seed

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ABSTRACT

This study is aimed at investigating the *in vitro* antioxidant vitamins of sunflower seed extract and antioxidant related minerals of ethanol extract of sunflower seed. Sun flower seeds were obtained from Minna shopping mall Niger State, Nigeria and processed. The *in vitro* antioxidant properties and acute toxicity of the seeds were determined using standard methods. The results showed the presence of antioxidant vitamin A, C and E in different proportion. Vitamin C (1924.20 μ g/mg) was significantly the highest ($p < 0.05$) followed by vitamin E (42.01 \pm 1.02 μ g/mg) and the least was vitamin A (18.01 μ g/mg). While Zinc, Iron, Copper, Manganese and Selenium as the antioxidant related minerals. In conclusion, the ethanol extract of Sunflower seed possesses antioxidant properties due to the antioxidant vitamins and minerals present

Keywords: Antioxidant, vitamins, minerals and Sunflower Seed

INTRODUCTION

The sunflower seed contain significant cancer prevention agent, antimicrobial, mitigating, antihypertensive, injury recuperating, and cardiovascular advantages found in its phenolic compounds, flavonoids, polyunsaturated unsaturated fats, and nutrient. It is utilized in ethno medication for treating various illness conditions including coronary illness, bronchial, laryngeal and pneumonic contaminations, hacks and colds and in beating hack. These striking therapeutic, dietary, and culinary advantages have brought about authentic and developing prevalence of the sunflower and its constituent parts around the world. Oil seeds have been found with expanding request as diet from most recent couple of many years attributable to their rich photochemistry basically liable for giving since they have been demonstrated to be wealthy in segments gainful for human health [1]. Many researchers have worked about the piece and science of oilseeds [2]; [3] however now the scientists have completely explored that the photochemical like tocopherols and phenolic compounds addresses the minor segments of oilseeds [4]. These compound represses lipid oxidation [5]; [6] and can forestall cardiovascular sicknesses [7]; [8] and these gainful impacts of tocopherols and phenolic compounds are because of cancer prevention agent action when they balance out oil [9]. Sunflower (*Helianthus annuus* L.) is quite possibly the main oilseed crop filled on the planet [10]. A small sunflower seed is a bundle of solid unsaturated fats, protein, fiber and other significant supplements like

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nutrient E, selenium, copper, zinc, folate, iron and phytochemicals. After palm, soy and rapeseed oil, sunflower oil positioned fourth with an overall creation of about 10.6 million metric tons during 2006 [11].

Aim of the Study

This study is aimed at investigating the *in vitro* antioxidant vitamins of sunflower seed extract and antioxidant related minerals of ethanol extract of sunflower seed.



PLATE 1

MATERIALS AND METHODS

Plant Materials

Sunflower seeds were gotten from Minna Shopping Mall in Niger state, Nigeria and was distinguished by a taxonomist Dr G.O Ogbuozobe of Botany division Unizik.

METHODOLOGY

Preparation of sunflower seed

The sunflower seeds were dried under room temperature and ground. Known loads (200g) of sunflower seeds were washed with clean water to eliminate soil and sand, depleted, and cleaved. The coriander seed was macerated in 500 ml of ethanol and afterward sifted to get homogenous ethanol concentrates.

ANTIOXIDANT VITAMIN CONTENTS

Antioxidant vitamins were evaluated using the modified methods by Pearson (1974).

INVITRO ANTIOXIDANT RELATED MINERALS

The minor element component fixation in the different natural product tests was controlled by the Atomic Absorption Spectrophotometric strategy. Processing of the example was finished utilizing Nitric corrosive (HNO_3) and Perchloric corrosive (HClO_3) at the proportion of 6:3. A large portion of a gram (0.5 g) of the example was added into 250 ml conelike cups, trailed by 6 ml of nitric corrosive (HNO_3) and 3 ml of Perchloric corrosive (HClO_3), the arrangement was twirled and warmed at temperature 120°C for 10 minutes. Bubbling chips were utilized as hostile to foaming specialist to diminish the gurgling impacts of the bubbling arrangement. After

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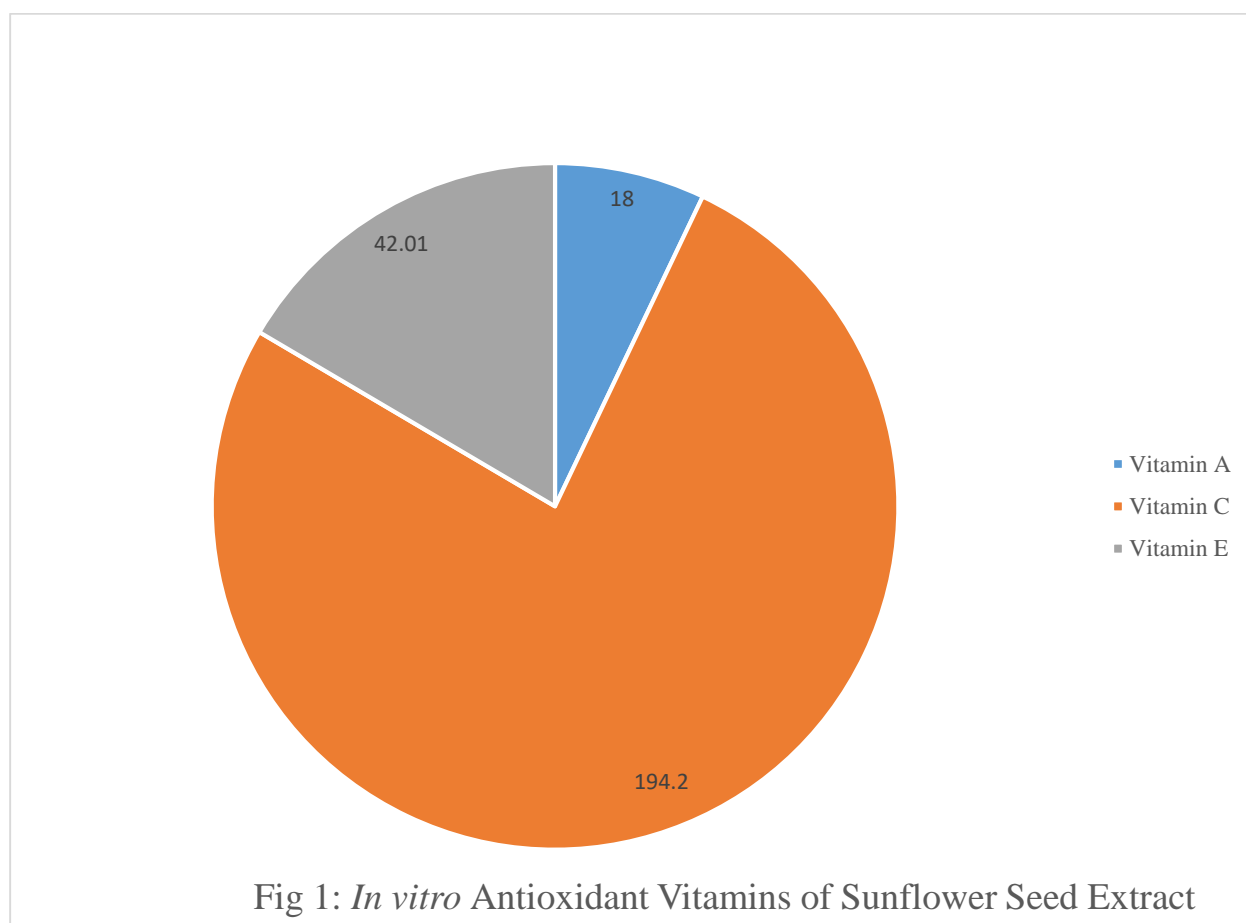
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warming, earthy colored vapor of nitric corrosive (HNO_3) show up first, trailed by white ice which demonstrated finish of processing. The arrangement was permitted to cool at room temperature and afterward sifted utilizing Whatman channel paper. The filtrate was filled fittingly named aligned plastic compartment and made up to stamp (50 ml) with deionized water. The holder was stopped and racked for examination. The processed examples were additionally examined utilizing the Atomic Absorption Spectrophotometer (GBC Avanta Ver 2.20 furnished with lights).

RESULTS

Antioxidant vitamin composition of sunflower seed extract

The result of antioxidant vitamins of the sunflower seed extract shown in figure 4.2 indicated that vitamin C (194.20 ug/mg) was significantly highest ($p < 0.05$) followed by vitamin E (42.01+ 1.02 ug/mg) and the least was vitamin A (18.01ug/mg).

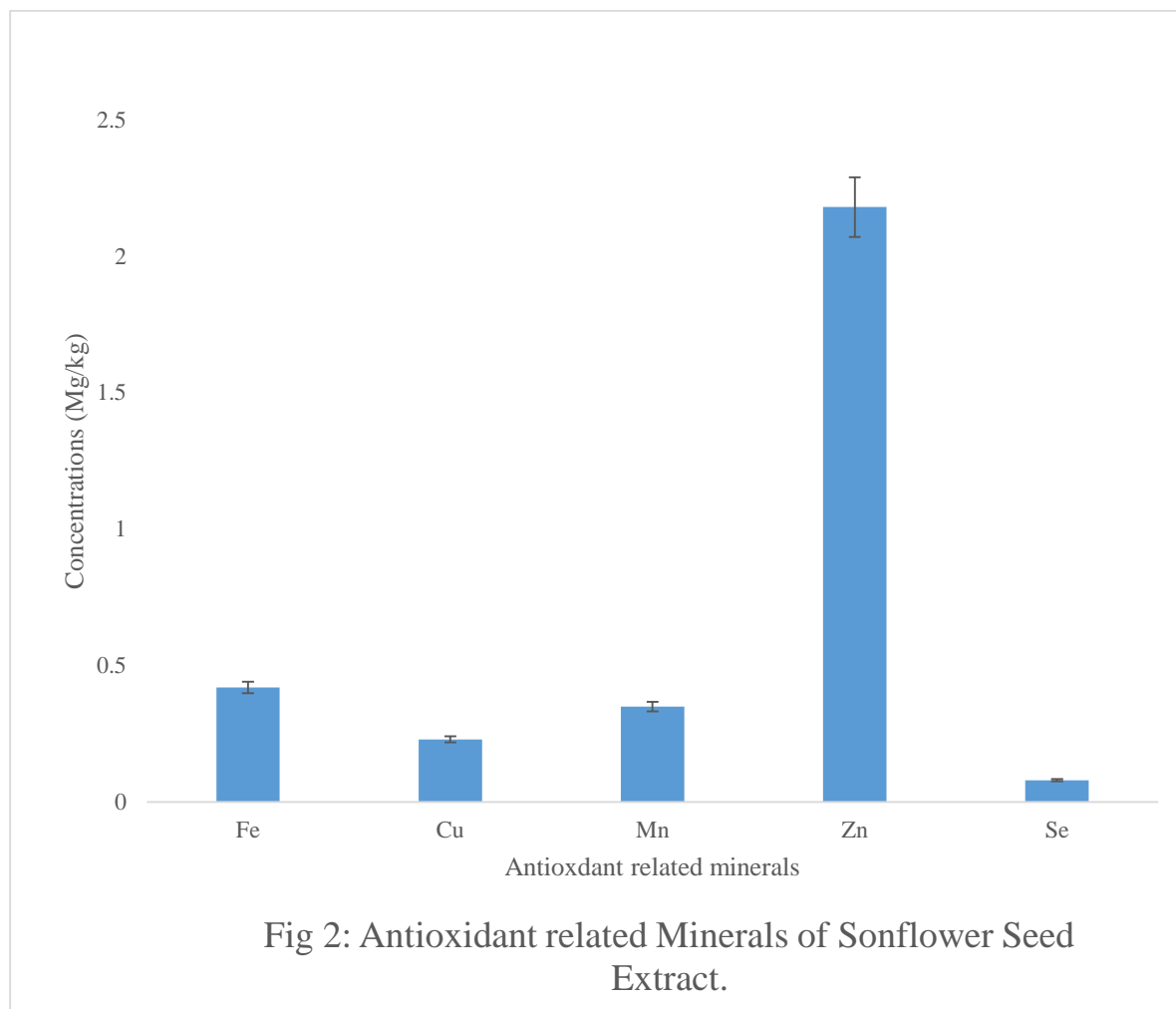


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Antioxidant related Mineral composition of sunflower seed extract

The antioxidant related minerals of sunflower extract is as shown in figure 4.3. The result showed that Zinc (2.18mg/kg) was highest followed by iron (0.42+0.01mg/kg) the least was selenium (0.08+0.00mg/kg). The differences were significant at $P < 0.05$.



DISCUSSION

From the result of the experiment, it was observed that the ethanol extract of Sunflower seed contained important Vitamins (A, C, E) and Minerals (Fe, Cu, Mn, Zn, Se). Vitamins are one of the vital nutrients needed by organisms in limited amounts. They have varied biochemical functions, some of which (vitamin A, E and C) have antioxidant properties, [12]. From the study, Vitamin C was highest followed by vitamin E and the vitamin A (fig 1). Vitamin A which is a fat-soluble vitamin is essential for normal function of the retina, particularly for visual adaptation to darkness. Vitamin A deficiency includes night blindness, metaplasia and keratinisation of the cells of the respiratory tract and other organs; increased susceptibility to respiratory and urinary tract infections; occasionally diarrhoea and loss of appetite [13]. On the other hand, it is very important to avoid taking in too much vitamin A. Though it is almost impossible to consume too much vitamin A from food, supplemental vitamin A and/or vitamin A in

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certain medications may result in toxicity. Symptoms of excess vitamin A include dizziness, nausea, headaches, coma, and even death. Females who may be pregnant should not take high doses of vitamin A. Most cases of vitamin A toxicity occur from the continued intake of high amounts of supplemental vitamin A. Vitamin C is a water-soluble vitamin. Vitamin C is absorbed by passive and active transport mechanisms, predominantly in the distal portion of the small intestine (jejunum) and to a lesser extent in the mouth, stomach and proximal intestine. Vitamin C deficiency may lead to scurvy while the excessive intake of vitamin C is believed to have a low toxicity. Still, a high intake of vitamin C has been associated with diarrhea, nausea, abdominal cramps, and other gastrointestinal problems [14]. Vitamin E is a fat-soluble vitamin. Vitamin E is an antioxidant, protecting PUFAs in membranes and other critical cellular structures from free radicals and products of oxidation. It works in conjunction with dietary selenium (a cofactor for glutathione peroxidase), and also with vitamin C and other enzymes, including superoxide dismutase and catalase. Vitamin E deficiency is associated with haemolytic anaemia, thrombocytosis, increased platelet aggregation, intraventricular haemorrhage and increased risk of retinopathy especially in premature infants. Excessive amounts of vitamin E supplementation may increase the risk of bleeding, especially in the brain, which may cause a stroke [14]. The result of this study (Figure 4.2) showed that sunflower seed extract has varying concentrations of antioxidant vitamin A, C and E. The presences of these three vitamins in the seed extract were of great importance to human health which provides good health benefits.

Studies on antioxidant related minerals of sunflower seed extract (fig 2) showed that zinc level was highest followed by iron then manganese the least was selenium. Iron is an essential trace mineral and is a component of haemoglobin, myoglobin and many enzymes that are involved in a variety of metabolic functions, including transport and storage of oxygen, the electron transport chain, DNA synthesis and catecholamine metabolism. Iron deficiency leads to microcytic, hypochromic anaemia [13]. Selenium is an essential trace element. Selenium functions as an integral part of the enzyme glutathione peroxidase and other selenoproteins. Selenium deficiencies have been associated with muscle pain and tenderness; some cases of cardiomyopathy have occurred in patients on total parenteral nutrition with low selenium status. Low selenium status has been linked to loss of immunocompetence [15], miscarriage [16], male infertility [17], depressed mood [18], senility and Alzheimer's disease [18] and poor thyroid function [19]. Zinc is an essential component of over 200 enzymes. It plays an important role in the metabolism of proteins, carbohydrates, lipids and nucleic acids. It is a cofactor in a range of biochemical processes, including the synthesis of DNA, RNA and protein [3]. Zinc is also crucial for maintaining the structure and integrity of cell membranes [20]. Zinc has regulatory roles in cell signaling and influences nerve impulse transmission [21]. Zinc is essential for reproduction. It is necessary for the metabolism of reproductive hormones, ovulation, testicular function, the formation and maturation of sperm, fertilization and the health of the mother and foetus during pregnancy [22]. Clinical manifestations of severe zinc deficiency include alopecia, diarrhoea, dermatitis, psychiatric disorders, weight loss, intercurrent infection (due to impaired immune function), hypogonadism in males, and poor ulcer healing. Maternal zinc deficiency before and during pregnancy may lead to intrauterine growth retardation and congenital abnormalities in the foetus [13]. High intake of zinc is known to impair the absorption of copper, which may cause anemia and fatigue. Manganese activates several enzymes, including hydroxylases, kinases, decarboxylases and transferases. It is also a constituent of several metalloenzymes, such as arginase, pyruvate carboxylase, and also superoxide dismutase, which protects cells from free radical attack. It may have a role in the regulation of glucose homeostasis and in calcium mobilisation. Manganese deficiency in individuals consuming mixed diets is very rare. Symptoms thought to be associated with deficiency (which have occurred only on semi-purified diets) include weight loss, dermatitis, hypocholesterolaemia, depressed growth of hair and nails and reddening of black hair [13]. On the other hand, too much dietary manganese may result in high levels of the mineral in body tissues, which have the potential to cause neurological problems. Elevated levels of manganese have been associated with poor cognitive performance and learning disabilities in school children. People may also be exposed to excessive amounts of manganese through air and water supplies [14]. Copper is an essential trace mineral. Copper functions as an essential component of several enzymes (e.g. superoxide dismutase) and other proteins. It plays a role in bone formation and mineralisation, and in the integrity of the connective tissue of the cardiovascular system. Copper deficiency is rare, but may lead to hypochromic and microcytic anaemias, leucopenia, neutropenia, impaired immunity and bone demineralisation. Deficiency may also be caused by Menke's syndrome (an X-linked genetic disorder in which copper absorption is defective); this disease is characterised by a reduced level of copper in the blood, liver and hair, progressive mental deterioration, defective keratinisation of the hair and hypothermia [13].

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CONCLUSION

The ethanol extract of Sunflower seed possesses antioxidant properties due to the antioxidant vitamins and minerals present.

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