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Analysis of Heavy Metal Content in Cannabis Leaf and Seed Cultivated in Southern Part of Nigeria

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Abstract: The distribution of heavy metals content in cannabis leaf and seed were assayed / carried, using an atomic absorption spectrometers model Perkin Elmer 3110. The heavy metals determined in both samples mean arsenic, cadmium, chromium, iron, nickel, lead mercury and manganese. The results obtained revealed that metal levels in cannabis leaf exceeded those of cannabis seed except in manganese, which had the highest metal content among all the metals determined. The results further showed that As, Cd., Cr, Fe, Ni, Pb and Hg levels in cannabis leaf exceeded those of the cannabis seed. Therefore cannabis leaf seems to be more dangerous to health than the seeds.

Key words: Drugs, smoked, snuffed, samples, mild climate

Introduction

Cannabis sativa (Indian Hemp Plant) plant, which grows in the mild climate, in many parts of the world, is mentioned in a Chinese herbal, dating from about 2700 B.C (Omoruan, 1989). The crude drug can be obtained from leaves, flowers, seeds and stem of hemp. The female plant yield more than the male. It can be smoked in cigarettes or pipes and can be snuffed or added to food.

The home of the production of Cannabis sativa in Delta Nigeria is found in the south- south of Delta State (Muoboghare, 2003) According to Olojoba (2003) study on oil pollution and Health hazards induce crisis of the Nigea-Delta region of Nigeria. She concluded that the increase in products of the substance (Indian hemp plants), has lead to the continuous and hostile crisis in the region for decades now. Also that it has led to rising religious and ethnic clashes. The need of testing cannabis for heavy metal is pertinent.

The effects of cannabis sativa vary, depending on the strength and amount of the drug consumed. Also it depends on the setting in which it is taken. Aworh *et al.* (1998), asserted that the government has been sponsoring some radio and television programmes like some psychodrama talk on smoking-related problems. This is likely to give awareness on the issue of drug trafficking to sensitizes, as well as stressing the health hazards of tobacco smoking commitment by the labour pasty, of banning smoking advertising by the year 2000 was one of the measures reducing market for drugs like cannabis sativa in the country.

Statistics from world health organization (WHO, 1999) show that smoking has emerged as the latest, tragedy that has befallen mankind. The implication is that, if not controlled (smoking of tobacco), may displace the

dreaded Acquainted immune Deficiency Syndrome (AIDS) in a couple of years as the single most potent harbinger of mortality in the world. According to Aworh *et al.* (1998) passive smoker is faced with a 16 percent increase in the relative risk of lung Cancer. Environmental Tobacco Smoke (ETS) according to Olojoba (2003), tobacco smoke has a serious effect on the body.

Heavy metals such as leads, cadmium, nickel and mercury had been found in cannabis (Nwajei, 1994). Cigarettes have an average uranium content exceeded 0.07ppm, average 0.28ppm in one brand to 0.88ppm in the worst case (Arruda, 1992). Tobacco consumption had been linked to high incidence and gravity of cardiac disease (Kasimu, 1982). It has been argued that cannabis consumption is dangerous to health and some people term it to be drug abuse. This drug is predominately produced and consumed by people in the troubled Nigea-Delta region of Nigeria therefore, the main thrust of this study was to find the levels of toxic metals in cannabis; to compare the levels of toxic heavy metals in the seed and the leaf of cannabis

Scope of the study: Cannabis sativa used for this study was cultivated in Delta State of Nigeria, where the climate is mild with six to nine months of rainfall and ample sunshine. Unlike those cultivated up the Northern Nigeria where rainfall is mild and plenty of sunshine. Bulks of the production of this drug are cultivated in the Niger-Delta region of Nigeria. The villages were they are cultivated have it as their main occupation this area in Nigeria are now for it cannabis cultivation. The name of the area-"Abbi" is synonymous to this drug to Deltans. This was the reason for the choice of this area for study. Water and humus soil are favorable conditions for the production of this drug.

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Table 1: The mean values and 95 percent confidence limit of heavy metals in cannabis leaf and seed.

Samples	Cannabis leaf	Cannabis Seed
As	13.60±0.048	7.48±0.02
Cd	4.40±0.03	2.40±0.02
Cr	17.41±0.25	15.2±0.25
Fe	24±0.3	7.80±0.03
Ni	10.40±0.03	6.80±0.02
Pb	1.58±0.02	0.420±0.003
Hg	19±0.3	6.16±0.03
Mn	28±0.2	102.5 ±0.32

Materials and Methods

Fresh sample (5000 Gms) of cannabis leaves and seeds were collected in washed plastic containers from the cultivated area. The samples were kept in the sun and dried for three days in flat white plastic the white plastic material was plastic. The plastic materials were screened to be metal free in order to avoid contamination. After drying, they were returned to cleaned plastic containers and kept in the refrigerator. 5000gm of each sample (cannabis leaves and seeds) was weighed and crushed to smooth particle in a mortar with pestle. The samples were placed in digested flask. There after, equal ratios of acid mixture (HNO₃, HCCO₄ and HF) were added with constant stirring. The digests were placed on hot plates for some minute before they were transferred to the fume cupboard where they were kept overnight. On cooling, the digests were filtered and made up to the mark in 100ml volumetric flasks using deionize water. The sample solutions were returned to refrigerator in the laboratory until they were analyzed using Atomic Absorption Spectrophotometers (AAS) Model Perkin Elmer 3110.

Results and Discussion

The results obtained from the analysis of cannabis leaf and seed samples are presented on Table 1. All the results are in Ug/g dry weight. A critical study of the above results has revealed except manganese, exceeded those of cannabis seed Arsenic (AS) level in cannabis leaf (13.60±0.048Ug/g dry weight). This may be due to the fact that the leaves stored the toxic metal. Arsenic may also be trapped from the atmosphere by the cannabis leaves.

Cannabis (Cd) level in cannabis leaf (4.40±0.02 Ug/g dry weight) is about twice that of the cannabis seed (2.40±0.02 Ug/g dry weight). These results exceeded 1.45±0.6 mg/kg cadmium dry weight obtained in cigarettes (Kasimu, 1982). The cannabis leave must have absorbed cadmium from soil and atmosphere. According to Ighalo (1994), the soil texture in the Niger-Delta region in Nigeria has been highly polluted by the oil been exploited by the oil company.

Chromium (Cr) level in cannabis leaf (17.4±0.025 Ug/g dry weight) exceeded that of cannabis seed (15.2±0.25

Ug/g dry weight). These high levels of chromium may have adverse effects on smokers of cannabis. These high levels of chromium can also be attributed to the humus nature of soil around the cultivated area. Iron (Fe) level in cannabis leaf is about three times higher than that obtained in cannabis seed, (leaf 24±0.3 Ug/g dry weight and seed: 7.80±0.03 Ug/g dry weight). Iron is not found to be critical metal, but relatively high value could be dangerous.

Nickel (Ni) level in cannabis leaf (10.40±0.03 Ug/g dry weight) exceeded 6.80±0.02 Ug/g dry weight obtained in cannabis seed. These values exceeded 0.2Ug/g dry weight recommended by the world Health organization (W.H.O.). High level of nickel metal in cannabis may have serious health effect on cannabis smokers.

Lead (Pb) levels in both samples are high (cannabis leaf 1.58±0.02 Ug/g dry weight and cannabis seed 0.420±0.003 Ug/g dry weight). They exceeded 0.00515 ppm of National Air Quality Standard. Lead in cannabis leaf is about four times higher than that of the cannabis seed. The presence of lead in cannabis sativa may be attributed to oil wells locations around the cultivated area. Long term accumulation of lead poison may cause death to smokers and non-smokers.

Mercury (Hg) level in cannabis leaf (19±0.3Ug/g dry weight) is about three times higher than the value obtained in cannabis seed [(6.16±0.03) Ug/g dry weight]. These values exceeded 0.025 mg/m Nwajei recommended health base limit permissible concentration of mercury in cannabis sativa, though smoking is dangerous to health.

Nigeria and particularly the Niger-Delta region of Nigeria, is a drug-oriented society (Nwajei, 1994). We are used, constantly to buying the magic formula that will provide relief from our ailments imagined or real. We respond by swallowing, sniffing and smoking lot of dangerous substances to provide relief for the many pains, aches and stresses, especially among those who wish to keep awake or become bold in making speeches (stage fright). Our present day youths have capitalized on carrying out their nefarious acts of killing, stealing and destruction of private and public properties under the influence of drugs (Nwajei, 1994).

It is clear, from this study, that the implications of addictive habits of smoking and chewing the leaf or seed of cannabis sativa. The effect on the human brain is made manifest in the heavy content of this plant especially those cultivated in southern Nigeria. Indulgence in the use and abuses of this substance can endanger the individual involved. It has caused many students their studies and life's

Conclusion and suggestions: The results obtained in this study revealed that As, Cd., Cr, Fe, Ni, Ph and Hg levels in cannabis leaf exceeded those of the cannabis seed. Manganese levels in both samples

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were the highest among other metals studied. Generally, the levels of toxic metals may be attributed to the nature of the drug and area of cultivation.

Health practitioners, teachers, counselors the clergy as well as parents should see this as a task that must be done to create the awareness in the minds of the society, the health implications of cannabis sativa - a dangerous drug.

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