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Effects of Aqueous Extracts of *Hyyptis suaveolens*. Poit on Liver Function in an Experimental Rabbit Model

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Abstract: Oral administration of crude aqueous of *Hyptis suaveolens*. Piot to male experimental rabbits at doses 100, 500, and 1000 mg kg^{-1} body weight resulted in a non-dose dependent weight loss relative to control animals receiving distilled water. Serum protein concentration increased from 9.38 ± 0.53 g dL^{-1} to 17.68 ± 1.85g dL^{-1} in the highest dose group. Alkaline phosphatase activity increased in all the test groups (control group 29.9 ± 5.20, while groups II, III and IV had 83.38 ± 52.96, 69.23 ± 26.99 and 83.03 ± 4.23 activity U/L respectively). Serum alanine amino transaminotransferase activity (ALT) was found to be 27.75 ± 4.24, 32.67 ± 6.15, 41.13 + 5.48 and 33.50 ± 3.18 for groups I, II, III and IV respectively while serum aspartate amino transferase activity decreased in all the test groups. Our findings suggest that the use of extracts of *hyptis suaveolens* in high doses in ethnomedicinal preparation may be accompanied by weight loss and toxic effects on the liver.

Key words: *Hyptis suaveolens,* aqueous extracts, liver function

INTRODUCTION

The use of crude plant extract in ethnomedicinal practice for the treatment of common ailments has continued to gain wider acceptance both in Urban and rural populace in the tropics especially in Nigeria. This has led to the introduction of Tradomedical fairs popularizing these medicines as well as the claims of the producers. There is equally a growing concern about the effects of these extracts on vital organ of the body especially the liver. Reports on the antihepatotoxic effects of some of these extracts abound. Ethanolic extracts of root bark of *Combrentum dolichopetalum* and leaves of *Morinda lucida* have been demonstrated to have anti-hepatotoxic effects[1]. Several workers have documented the uses of various plants in ethnomedicine including *Hyptis suaveolens.*[2,3]. *Hyptis suaveolens* is a strongly aromatic plant that grows on roadsides waste places and cultivated land across the region from Senegal to Southern Nigeria[4]. It has close resemblance with *Ocimum gratissimum*, but unlike *Ocimum gratissimum* it is not cultivated.

It is used in ethnomedicine as an anticatarrhal, anticutaneous, parasitic, stimulant, carminative, sudorific, Lactogenic and as an infusion taken in fever[2-4].

The leaf extract is applied as an antihelminthic[2] and as a poultice applied to cancers and tumours in the Americas[5].

The reports however do contain safe levels of use such as dosages.

The present study is aimed at investigating the effect of various concentration of the leaf extract of *Hyptis suaveolens* on the liver with a view to determining its safe levels of use.

MATERIALS AND METHODS

Source of plant materials: *Hyptis suaveolens* (Bush tea) plants were collected in the early rainy season (May) from roadsides around Golden guinea Breweries PLC, Umuahia, Nigeria. They were identified by Prof. H. O. Edeoga. A professor of taxonomy in the department of biological Sciences in the department of Biological Sciences of Michael Okpara University of Agriculture, Umudike.

A voucher specimen was retained for reference purposes in the Department of Biochemistry of the same University.

Preparation of plant extracts: Fresh leaves of *Hyptis suaveolens* were washed (rinsed) and then air dried to a constant weight at room temperature. A 200 g portion was soaked in 1000 mLS (1L) of glass distilled water in conical flask with constant stirring at room temperature over a 24 h period. The content of the flask was the filtered through a muslin cloth over a funnel.

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The filterate was refiltered through a whatman No. 1 filter-paper (inserted into a funnel). The filterate was evaporated to dryness over a low temperature water bath. The solid residue left was weighed and stored in a refrigerator at 4°C until required for use.

Animals: Sixteen (16) adult male experimental rabbit were grouped into four cages. They were housed in a wooden disinfected hutch. The animals were exposed to 12 h light and dark cycles and fed growers mesh *ad libitum* for seven (7) days.

The animals were then subjected to different dosages of the aqueous extract: Viz Group I: control received an equivalent volume of water.

Group II 100 mg kg^{-1} body weight of extract, Group III 500 mg kg^{-1} body weight of extracts Group IV 1000 mg kg^{-1} body weight of extract. Administration of extract was done *per os* for three (3) days. Deaths in this the periods were recorded along with daily body weight measurements. Animals were sacrificed on the fourth (4th) day by dazing and blood was collected by cardiac puncture. The liver was promptly excised and weighed. Blood was allowed to cloth and the serum was separated for furthe analysis

Serum analysis: Total serum protein was determined using the biuret method[6]. Serum alanine amino transferase activity and Serum aspartate aminotransferase activity were measured using commercial kits supplied by Randox Laboratories ltd U. K. The principle is based on the colourimetric measurement of hydrazone formed with 2,4 dinitrophenyl hydrazine[7] The hydrazone was measured at 540 mm.

Alkaline phosphatase activity was assayed colourimetrically using kits supplied by Randox laboratory Ltd. The principle is based on the rate of hydrolysis of P-nitrophenol to phosphate and P-nitrophenol by the serum enzyme. The rate of liberation of P-nitrophenol was measured at 405 nm.

RESULT

Administration of the extract resulted in varying degrees of weight loss in the test animals (Table 1). Mean relative liver weights increased in all the test groups relative to control.(Table 1).

Table 1: Effect of aqueous extracts of hyptis suaveolens on body weight gain/loss and relative organ weight of experimental rabbits

Group	Dose (mg kg^{-1} body weight)	Body weight gain/loss (g)	Mean relative liver weight
Control I	-	+20.15±1.20	0.024+9.90X10^{-3}
Group II	100	-59.53+11.74	0.033±1.74X10^{-2}
Group III	500	-69.80±50.77	0.033±1.41X10^{-3}
Group IV	1000	-50.00±0.00	0.034±0.00

Total Serum protein, Serum alanine amino transferase activity increased in all the test groups, while Serum, aspartate amino trnsferase activity decreased in a dose dependent manner in the test groups. Serum alkaline phosphatase activity increased in all the test groups (Table 2). Other observation includes death of two animals each on second day of extract administration in the groups receiving 500 and 1000 mg kg^{-1} body weight of extract. Also the groups receiving the extract had massive hair loss.

DISCUSSION

The appreciable weight loss observed in groups receiving aqueous extracts of *Hyptis suaveolens* suggests that individuals using the extract as infusion especially in some region of West Africa[8] may experience weight loss. The hair loss observed suggest that the some component of the extract may interfere with the hair protein synthesizing machinery of the experimental animal. This will need to be further investigated. Relative liver weight increases may be indicative of induced of liver microsomal enzymes. Induction of liver microsomal drug metabolizing enzyme is often accompanied by increase in relative liver weight[7]. Liver weight normally reduces with decreases in body weight so that mean relative liver weight remain within normal limits[8]. Stimulation of hepatic growth as reflected in mean relative liver weight may be a reflection of induction of Phase one drug metabolizing enzyme systems of the smooth endoplasmic reticulum. Serum alanine amino transferase activity is a liver specific enzyme whose elevation is often associated with parenchymal liver damage. This elevation along the elevation serum alkaline phosphatase suggests some degree in toxic liver damage at the doses administered[9]. Our results suggest that the use of the aqueous extracts at dose levels 100 mg kg^{-1} body weight and above may

Table 2: Effects of aqueous extracts of *Hyptis suaveolens* on Serum protein and some liver enzymes in experimental rabbits

Group	Dose (mg kg^{-1} body weight)	Total serum protein (g dL^{-1})	Serum ALAT activity (U L^{-1})	Serum ASAT activity (U L^{-1})	Serum ALK.PHOS. Activity (U L^{-1})
Control I	-	9.38+0.53	27.75+4.24	92.75+6.72	29.90+5.20
Group II	100	12.50+1.41	32.67+6.15	86.00+51.99	82.38+51.96
Group III	500	12.25+0.00	41.13+5.48	86.50+38.89	69.23+26.99
Group IV	1000	17.68+1.87	33.50+3.18	76.25+5.30	83.03+4.23

Zbe toxic to its users.Table 1.0: Effects of aqueous extracts of *Hyptis suaveolens* on body weight gain/loss and relative organ weights of experimental rabbits.

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