



Effect of Feeding Various Concentrations of Shea oil on Some Biochemical Parameters in Normal Albino Rat

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ABSTRACT

The effect of feeding various concentration of Shea oil on some Biochemical parameters was studied. Twenty five (25) adult rats weighing between 150g to 240 g were divided into five (5) groups of 5 rats each. Group I Control was given growers Marsh and water ad libitum. Groups II, III, IV, V were given 250mg, 500mg, 1000mg, 1500mg (wet weight) of Shea oil respectively in addition to growers marsh and water ad libitum. The feeding and intubation lasted for 28 days after which the rats were sacrificed and blood samples were collected. The blood samples were assayed for Biochemical parameters; lipid profile, Glucose, Total protein and Albumin using and effect is dose standard methods. The results showed significant decrease in the Lipid profile and Albumin ($P < 0.05$) when the test groups were compared to the control and effect is dose dependent. Insignificant decrease was observed when comparison was made between test groups ($P > 0.05$). The results also showed insignificant decrease and increase in Total protein and Glucose respectively when comparison was made between the test groups and control and within the test groups only. In conclusion, Shea oil has hypolipidemic effect which is dose dependent and can be used in therapeutic treatment of lipid related problems such as arteriosclerosis, coronary heart disease and obesity.

KEY WORDS: Shear butter oil, Hypoglycemia, Normal health Ra

INTRODUCTION

Since time immemorial, varieties of plants and their produce have been used by human as food or drugs in treatment of disease [1]. Shea butter tree (*Vitallaria paradoxa*) also known as *karite* butter is a plant that is locally abundant in Nigeria in the derived savannah Zones, particularly near towns and village [2, 3]. It is rich in oil and replaces oil palm as source of edible oil in Northern Nigeria. Shea butter is the fat extracted from the kernel of Shea fruits. It is becoming increasingly popular as component of cosmetic formulation or addition to its long standing use as cocoa butter substitute in the chocolate industry [4, 5]. Shea butter oil is thoroughly used as cooking fat in Africa and serves as a suitable base for tropical medicine used locally to relieve inflammation of the nostril, skin burn, dermatitis, rheumatic and joint pains. There are no reports of allergic reaction owing to consumption of shear butter nuts or its produce [6]. The consumption of plants and their produce have been associated with reduced risk of disease like Alzheimer disease, cancer, lipid peroxidation and other free radical driven disorder as well as malaria. Medical potentials of locally available plants and their produce was from the claim of some herbalist, native and ancient that some plants and their produce have medical value but they lack enough empirical proofs to justify these claims [7]. Scientific evaluations of medicinal plant is important in discovery of novel drugs and also help to access risk associated with the use of conventional drugs of herbal origin [8]. Many researchers effort has been directed towards the provision of empirical proofs to back up the use of many tropical plants in trado-medicinal practice. Such research works include; protection of rates by extracts of some common Nigerian trees against acetaminophen (paracetamol) induced hepatotoxicity, Phyto-chemical and antimicrobial screening of the crude extracts of the root, stem bark and leaves of *vitallaria paradoxa* [3].

Aims and Objective

To investigate the effect of feeding various concentrations of Shea butter oil on some biochemical parameters of normal Albino rat

MATERIALS AND METHODS

Weaned albino rats were obtained from the animal house of the Department of Biochemistry, University of Maiduguri. The grower's marsh used was a product of vital feeds Plc containing 54%

carbohydrate, 10% protein, 3 tured rats were selected for the experiment. The shear butter oil was obtained from Adamawa state, Nigeria, West Africa.

Animal Feeding Regime

The rats were grouped into 5 groups of 5 rats each. The rats were treated as follows;

GROUP I (Normal control)

The rats were feed on grower's marsh and water only ad libitum.

GROUP II

The rats were given 0.25ml (equivalent to 250mg) of the Shea oil, growers marsh and water ad libitum

GROUP III

The rats were given 0.5mls (equivalent to 500mg) of the oil, growers marsh and water ad libitum.

Group IV

The rats were given 1ml (equivalent to 1000mg) of the oil, growers marsh and water ad libitum.

GROUP V

The rats were given 1.5mls (equivalent to 1500mg) of the oil, growers marsh and water *ad libitum*.

The oil was administered orally by intubation using intubation tube. The process of intubation and feeding lasted for 4 weeks (28 days) after which the rats were sacrificed and blood sample was collected

Estimation of Biochemical Parameters

Estimation of Serum Total Protein [9]

PRINICPLE

Proteins contain a number of peptide bonds. These peptide bonds form blue chelate complexes when the protein is treated with moderate alkaline medium. The intensity of the color formed is directly proportional to the concentration of peptide bonds (proteins). The reaction is called **Biuret reaction** because analogous reaction took place between the cupric ion and the organic compound

$$\text{Concentration of Total Protein (U/L)} = \frac{\text{Absorbance (A) sample}}{\text{Absorbance (A) standard}} \times \text{Concentration of standard}$$

Estimation of Serum Albumin

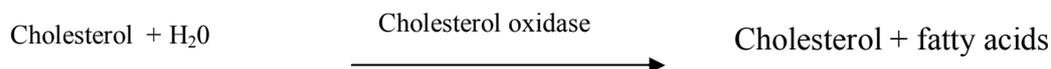
Based on serum Albumin quantitative binding to Bromocresol green indicator to form a complex which is determined at 578nm.

$$\text{Concentration of Albumin (U/L)} = \frac{\text{Absorbance (A) sample}}{\text{Absorbance (A) standard}} \times \text{Concentration of standard}$$

Estimation of total Cholesterol

Principle

The cholesterol is determined after enzymatic hydrolysis and oxidation. The indicator quinoneimine is formed from hydrogen peroxide and 4-amino antipyrine in the presence of phenol and peroxidase.



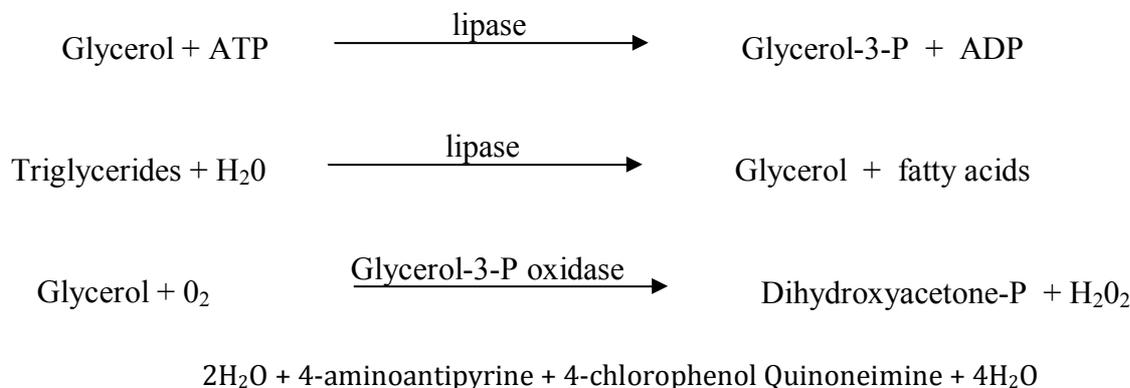
Calculation

$$\text{Concentration of Total cholesterol (Mmol/L)} = \frac{\text{Absorbance (A) sample}}{\text{Absorbance (A) standard}} \times \text{Concentration of standard}$$

Estimation of Triglyceride [10]

Principle

Triglycerides are hydrolyzed by lipase to glycerol and free fatty acids. The glycerol participate in a series of enzymatic reaction, resulting in formation of red quinoneimine color.



Calculation

$$\text{Concentration of TG} = \frac{\text{Absorbance (A) sample}}{\text{Absorbance (A) standard}} \times \text{Concentration of standard}$$

Estimation of HDL Cholesterol

Precipitant Method

Principle

Low density lipoprotein (LDL and VLDL) and chylomicrons fractions are precipitated quantitatively by addition of phosphotungstic acid in the presence of magnesium ions. After centrifugation, the cholesterol concentration in the HDL (high density lipoprotein) fraction which remains in the supernatant determined.

Cholesterol CHOD PAP Assay

Measure the absorbance of the sample and standard against reagent blank within 60min.

$$\text{Concentration of HDL-cholesterol (mmol/L)} = \frac{\text{Absorbance (A) sample}}{\text{Absorbance (A) standard}} \times \text{Concentration of standard}$$

Estimation of Blood Glucose

The blood glucose was estimated at the point of sacrifice of the rats (before clotting of blood). The estimation was done using On Call plus Glucometer.

$$\text{Concentration in mmol/L} = \frac{\text{Concentration(mg/dl)}}{18}$$

RESULTS AND DISCUSSION

Table-1: Results Showing Effect of Feeding Various Concentrations of Shea oil on some Biochemical Parameters

GROUPS PARAMETER	I	II	III	IV	V
ALBUMIN (U/L)	35.3 ± 1.5	30.7 ± 0.57*	30.7 ± 0.5*	31.7 ± 1.53*	30 ± 1.0*
TOTAL PROTEIN (U/L)	75.0 ± 1	70.3 ± 1.5	62.3 ± 11.3	71.3 ± 1.5	68.0 ± 3
HDL(mmol/L)	1.5 ± 0.2	1.1 ± 0.2**	1.1 ± 0.1**	1 ± 0.1 **	1 ± 0.0**
TG (mmol/L)	2.9 ± 0.1	2.4 ± 0.5	2.4 ± 0.1	2.3 ± 0.1*	2.3 ± 0.05
TOTAL CHOL (mmol/L)	5.5 ± 0.9	3.9 ± 0.5**	3.8 ± 0.3**	3.7 ± 0.1**	3.7 ± 0.05**
LDL (mmol/L)	3.4 ± 0.5	2.5 ± 0.5*	2.5 ± 0.5*	2.3 ± 0.1*	2.2 ± 0.1*

GLUCOSE(mmol/L)	3.1 ± 1	4.4 ± 1	4.6 ± 0.2	4.5 ± 0.2	4.0 ± 0.8
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Mean ± standard deviation n=3

Values with different superscript horizontally are statistically different.

DISCUSSION

The results showed a very significant decrease in HDL, Total Cholesterol and LDL when the test groups are compared to the control ($P < 0.05$), with insignificant decrease when comparison was made within the test groups ($P > 0.05$). The significant decrease in lipid profile (hypolipideamic effect) might be due to the presence of Saponins in the oil. Saponins have been reported to form complexes with cholesterol and bile in the intestine thereby indirectly decreasing the cholesterol level in the blood [11]. The hypolipideamic effect might be due to Linoleic acid in the oil. In addition to exerting a pronounced hypocholesteroleamic effect, it appeared that high levels of dietary Linoleic acid facilitated the maintenance of elevated levels of plasma phospholipids under the conditions in which the plasma also contained high concentrations of cholesterol [12]. The result showed a significant decrease in the Albumin level as compared to the control group ($P < 0.05$) and insignificant decrease when comparison was done within the test groups. The decrease might be as a result of utilization of Albumin in the transport of free fatty acids resulting from lipolysis from adipocytes [13]

The results also showed insignificant increase in blood glucose as compared to the control groups ($P > 0.05$). This might be due to presence of carbohydrate in the oil. The result also showed insignificant decreased in total protein as compared to the control ($P > 0.05$).

LDL lowering property of the oil is consistent with the reports of LDL reducing effect of Safflower oil (Regeine *et al*, 2008), LDL reducing effect of *nigella sativa* [14].

The result is inconsistent with reports of total cholesterol and LDL increasing effect of coconut oil and butter [15].

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