

<http://www.pjbs.org>

**PJBS**

ISSN 1028-8880

**Pakistan  
Journal of Biological Sciences**

**ANSI***net*

Asian Network for Scientific Information  
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

## Effects of Methanolic Leaf Extract of *Adansonia digitata* on Serum Lipid Levels in Normal and Ethanol Fed Rats

Matawalli A. Geidam, Samuel A. Chabiri and Yagana Shettima  
Department of Biochemistry, College of Medical Sciences, University of Maiduguri,  
P M B 1069 Maiduguri, Borno State, Nigeria

**Abstract:** The leaf extract of *Adansonia digitata* is believed to contain interesting therapeutic principles, especially hypolipidaemic properties. In this study normal and ethanol fed rats were administered intragastrically by intubation 0.75 g kg<sup>-1</sup> body weight methanolic extract of the leaves of *Adansonia digitata* for two weeks. The extract was found to lower the lipid levels in rats fed with alcohol and the extract and when compared to rats fed with alcohol only and those fed with no alcohol, the decrease is not significant. The possible hypolipidaemic effect could be attributed to the presence of saponins and fibre in the extract, which has been shown to bind to serum lipids especially cholesterol, thereby easing their excretion from circulation.

**Key words:** *Adansonia digitata*, hypolipidaemia, cholesterol, triglycerides, LDL-cholesterol, HDL- cholesterol

### INTRODUCTION

Following the call by the World Health Organization on the need for developing countries to use medicinal plants in their health care system<sup>[1]</sup>, Scientist have intensified research on various locally available plants especially those used in traditional medicine. Examples of such plants include *Allium sativum* and *Adansonia digitata* amongst others<sup>[2]</sup>.

*Adansonia digitata*, known in English as Boabab, and *Kuwa* in Kanuri the indigenous language, is found everywhere in the Northern part of Nigeria. In Borno State the leaf of this plant forms the major part of their delicacies or meal, because of its relative abundance and the notion that it lowers the risk of coronary heart diseases such as atherosclerosis and other ailments. The purpose of this study is to examine the possible hypolipidemic activity of the methanolic leaf extract of *Adansonia digitata* on normal and ethanol fed rats.

### MATERIALS AND METHODS

**Preparation of plant extract:** The fresh leaves of *Adansonia digitata* were obtained from Jere Local Government area of Borno State, Nigeria. The leaves were washed with water and room dried after being authenticated as the leaf of *Adansonia digitata* by a staff of the Department of Biological Sciences, University of Maiduguri, Nigeria. The dried leaves were subjected to soxlet extraction using methanol as the solvent. The extract was then dried and 4 g of it were dissolved in 40 ml of distilled water. After gentle heating the supernatant was decanted using syringe and needle.

**Experimental protocol:** Twenty four male Albino wistar strain Rats weighing 108-229 g were divided into four groups of 6 rats each according to the schedule below:

- Group I: The animals in this group were fed 3mls of 30% ethanol and 0.75 g Kg<sup>-1</sup> body weight of the extract intragastrically for two weeks
- Group II: The animals in this group were fed with 3mls of 30% ethanol and normal standard feed only for 2 weeks.
- Group III: The animals here were fed 0.75 g extract per kg body weight of rats and normal diet only for 2 weeks.
- Group IV: The animals were fed with the normal standard diet for 2 weeks.

All the rats were allowed water *ad libitum* for the entire period of the experiment. The total number of rats in each group stood at 6. The 24 rats were then fasted for 24 h before their blood samples were taken for analyses. The parameters analysed were total-cholesterol triglycerides, LDL-cholesterol, HDL-cholesterol<sup>[3]</sup>, glucose, by glucose oxidase method as reported by Kaplan *et al.*<sup>[4]</sup> albumin by the method as described by Silverman *et al.*<sup>[5]</sup> and total protein<sup>[6]</sup>.

### RESULTS AND DISCUSSION

The lipid profile of the rats fed 3 ml of 30% ethanol and 0.75 g of extract per kg body weight of rats for 2 weeks averaged; total cholesterol (2.18±0.31 mmol l<sup>-1</sup>) Triglycerides (1.00±0.09 mmol L<sup>-1</sup>) LDL-cholesterol

Table 1: Effects of methanolic leaf extract of *Adansonia digitata* on serum lipid levels and some biochemical parameters in normal and alcohol fed rats

Groups	Glucose (mmol L <sup>-1</sup> )	Total protein (g L <sup>-1</sup> )	Albumin (g L <sup>-1</sup> )	Triglyceride (mmol L <sup>-1</sup> )	Cholesterol (mmol L <sup>-1</sup> )	LDL-cholesterol (mmol L <sup>-1</sup> )	HDL-cholesterol (mmol L <sup>-1</sup> )
Group I	2.76±0.47	68.66± 1.19	26.63±0.52a	1.00±0.09	2.18±0.31a	0.23±0.07a	0.86±0.17a
Group II	4.40±0.98b	69.50± 3.56	29.33±0.79b	1.08±0.06	2.91±0.17b	0.63±0.26b	1.15±0.23b
Group III	3.16±0.28	67.83± 1.68	29.00±0.56b	0.98±0.10	2.91±0.25b	0.85±0.18c	1.01±0.12b
Group IV	2.50±0.27	64.66± 1.82	33.83±0.52b	1.36±0.09a	3.55±0.12c	0.83±0.08c	1.35±0.16c

values are means ± SEM for three determinations.

(0.23±0.07 mmol L<sup>-1</sup>) HDL-cholesterol (0.86±1.9 mmol L<sup>-1</sup>) while the corresponding values of the lipid levels in rats fed with 3 ml of 30% ethanol for the same period averaged thus; total cholesterol (2.91±0.17 mmol L<sup>-1</sup>), Triglycerides (1.06±0.06 mmol L<sup>-1</sup>) LDL-cholesterol (0.62±0.26 mmol L<sup>-1</sup>) and HDL (0.86±0.17 mmol L<sup>-1</sup>). As such there was a non-significant lowering of the lipid levels in experimental rats fed with the extract. When given only 0.75 g of extract per kg body weight of rats in addition to their normal feed, the lipid profile of the experimental rats stood at; cholesterol (2.91±0.25 mmol L<sup>-1</sup>), triglycerides (0.96±0.01 mmol L<sup>-1</sup>), LDL-cholesterol (0.85±0.18 mmol L<sup>-1</sup>) and HDL-cholesterol (1.01±0.12 mmol L<sup>-1</sup>). The corresponding lipid profile in normal rats fed with the normal diet only averaged at cholesterol (3.15±0.12 mmol L<sup>-1</sup>), Triglycerides (1.36 ± 0.09 mmol L<sup>-1</sup>), LDL-cholesterol (0.83±0.08 mmol L<sup>-1</sup>) and HDL-Cholesterol (1.36±0.16 mmol L<sup>-1</sup>). When the two groups were compared the extract was found to lower significantly the level of cholesterol and Triglycerides in the experimental rats while lowering effect on LDL-cholesterol and HDL-cholesterol was non significant. While the significant increase in the level of glucose may be due to the administration of alcohol in the group, the level of albumin and total protein remain fairly constant.

The results of this study thus show that the methanolic leaf extract of *Adansonia digitata* exhibit hypolipidaemic effect in both normal and ethanol fed rats. The mechanism involved could be attributed to the presence of saponins and fibre in the leaf extract. Balmer and Zilver smith<sup>[7]</sup> have shown that fibre significantly binds to cholesterol hence aiding its excretion. Also saponins have also been shown to possess high degree of hypolipidaemic activity<sup>[8]</sup>. The combine activity of these active components of the extract brings about the reduction in plasma concentration of cholesterol and other lipids. Thus reducing the possible occurrence of coronary heart disease such as atherosclerosis.

Comparison was done between the groups and values with different superscript on the same vertical column are significantly different (P<0.05).

In conclusion the results of this study suggest that the administration of the methanolic leaf extract of *Adansonia digitata* may be effective in decreasing the hyperlipidemic effects of Alcohol and high fat diets, thus reducing the possible occurrence of heart diseases.

## ACKNOWLEDGMENT

The authors wish to acknowledge with profound gratitude and appreciation the financial contribution of The Bukar Abba Ibrahim Foundation Damaturu, Yobe state, Nigeria towards the publication of this paper.

## REFERENCES

1. Munir, N.G. and S.S. Abdulaziz, 1988. Hypoglycaemic effect of *Teucrium polium* Journal Ethnopharm, pp: 24:93-99.
2. Sodimu, O., P.K. Joseph and K.T. Augusti, 1982. Certain Biochemical Effects of Garlic Oil on rats maintained on High fat-high cholesterol diet. J. Crude Drug Res., 1: 78-79.
3. Allain, C.C., L.S. Poon, C.S.G. Chan, W. Richmond and P.C. Fu, 1974. Enzymatic determination of serum cholesterol. Clin Chem., 20: 470.
4. Kaplan, A., L.L. Szabo, K.E. Opheim, 1988. Disorders of Carbohydrate Metabolism in Clinical Chemistry, Interpretations and Techniques. 3rd Philadelphia. Lea and Febiger, pp: 63-68.
5. Silverman, L.M., R.H. Christenson and G.H. Grant, 1986. Amino Acids and Proteins in Silverman L.M. (Ed) Text Book of Clinical Chemistry. Philadelphia W.B. Saunders, pp: 614-703.
6. Tietz, N.W., E.L. Pruden and O. Siggard-Anderson, 1970. Fundamentals of Clinical Chemistry with Clinical Correlation. In: Tietz N.W. (Ed) Philadelphia. W.B. Saunders, pp: 614-618.
7. Balmer, J. and O.B. Zilver Smith, 1974. Effect of dietary roughage on cholesterol absorption, cholesterol turnover and steroid excretion in rats. J. Nutr., 104: 1319-1320.
8. Champe, P.C. and R.A. Harvey 1994. Lippincotts Illustrated Review Biochemistry Lippincotts Williams and Wilkins 2nd Ed., pp: 145.