

PJN

ISSN 1680-5194

PAKISTAN JOURNAL OF
NUTRITION

ANSI*net*

308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

Effect of *Acalypha wilkesiana* on Activities of Some Liver Function Enzymes and Body Weight of Normal Rabbits

Omage Kingsley, Erifeta O. Georgina, Josiah J. Sunday,
Uhunmwangho S. Esosa, Nwangwu C. Spencer, Njoya K. Helen and Asuk A. Agbor
Department of Biochemistry, Igbinedion University, Okada, Edo State, Nigeria

Abstract: The effects of *Acalypha wilkesiana* leaves on serum ALT and AST activities and body weight of normal rabbits were investigated. Oral administration of the leaf, in the form of decoction prepared by mixing 5 g of air-dried powdered leaves in 10 ml distilled water, at a dose of 1 g/kg body weight for a period of 8 and 15 days, caused a significant increase ($p < 0.05$) in the activities of serum ALT and a significant decrease ($p < 0.05$) in AST activities in normal rabbits. The treatment also led to a significant reduction ($p < 0.05$) on the body weight of the experimental animals. This effect of the plant is a reflection of the relative safety of the plant in the management of hypertension and its possible use as a weight reduction therapy.

Key words: *Acalypha wilkesiana*, diagnostic enzymes, weight reduction, aqueous concoction

INTRODUCTION

From history, mankind has used plants (herbs) or herbal medicine in attempt to cure disease and relieve suffering. Current estimate suggest that, in many developing countries, a large proportion of the population rely heavily on traditional practitioners and medicinal plants to meet primary health care needs. Although modern medicine may be available in these countries, herbal medicine (phytotherapy) has often maintained popularity for historical and cultural reason (Zhang, 1999). Medicinal herbs are plants which contain substances that can be used for therapeutic purposes, of which are precursors for the synthesis of drugs (Sofowora, 1984). Some herbal plants have been established as remedy for certain diseases. These remedies have been part and parcel of the cultures of origin, but only modified to meet the present need.

Acalypha wilkesiana belongs to the Euphorbiaceae family. The plant is native to the South Pacific Island. It is a fast growing evergreen shrub, which can reach 3 meters of height. The leaves are up to 15 centimeters long, with indented margins and are variously colored in green and bronze, with a pink rimmed edge (Kuntze, 1981). *Acalypha wilkesiana* has been shown to have antibacterial and antifungal properties (Akinde, 1986; Oladunmoye, 2006). In a study, Ogundaini (2005) reported the use of the expressed juice or boiled decoction of this plant in the treatment of gastrointestinal disorders and fungal skin infections. Also, Adesina *et al.* (2000) reported the presence of gallic acid, corilagin, geranin, quercetin 3-O-rutinoside and kaempferol 3-O-rutinoside in the leaves of this plant. Traditionally, the leaves of this plant are eaten as vegetables in the

management of hypertension. Thus, the aim of this study is to evaluate the effects of this plant on some serum enzymes and body weight of normal rabbits.

MATERIALS AND METHODS

Ten adult New Zealand rabbits weighing between 0.8 and 1.4 kg were obtained from a local breeder in Benin City. They were kept in standard cages in the animal house and fed on guinea growers' mash throughout the duration of the research work. The animals were supplied with water in standard cans and allowed to acclimatize to the new environment for a period of one week. The rabbits were then randomized into two groups (test and control) of five animals each.

Acalypha wilkesiana leaves were obtained from a horticultural garden in Benin City. Taxonomic identification of the plant was established in the department of pharmacognosy, University of Benin. The leaves were air-dried, pounded into powdery form and weighed. The aqueous concoction was prepared by mixing 5g of the air-dried powdered leaves in 10ml of distilled water. The baseline plasma levels of AST and ALT and their body weight were determined prior to administration of the concoction. 1g/kg body weight of the leaf was administered in the form of a decoction to the test animals, while the control animals received equivalent volume of water orally each day. Mash and water were given *ad-libitum*. After treatment, blood samples were collected after fasting on days 8 and 15 for the determination of AST and ALT levels. Also, their respective body weights were obtained. The determination of AST and ALT was done by the spectrophotometric methods.

Table 1: Effect of aqueous leaf preparation of *Acalypha wilkesiana* on serum ALT activity

Day of analysis	ALT activity (IU/L)	
	Control	Test
0 (Baseline)	41.20±7.50	40.80±3.76
8	70.80±8.18	72.20±8.35*
15	59.80±5.06	68.60±8.36**

ALT activity are expressed as mean±SEM, n = 5, *p<0.10 compared to control, **p<0.05 compared to control

Table 2: Effect of aqueous leaf preparation of *Acalypha wilkesiana* on serum AST activity

Day of analysis	AST activity (IU/L)	
	Control	Test
0 (Baseline)	36.60±6.00	29.20±00.49
8	14.60±3.89	40.40±15.89*
15	34.80±2.00	24.80±04.21*

AST activity are expressed as mean±SEM, n = 5, *p<0.05 compared to control and baseline

Table 3: Effect of aqueous leaf preparation of *Acalypha wilkesiana* leaf on body weight

Day of measurement	Body weight changes	
	Control	Test
0 (Baseline)	1078.60±106.58	939.48±19.85
8	1095.60±105.92	930.62±20.82
15	1148.80±102.77	926.98±25.61*

Body weight changes are expressed as mean±SEM, n = 5, *p<0.05 compared to baseline

RESULTS AND DISCUSSION

Diagnostic enzymes are enzymes that are used in diagnosing or differentiating between certain or specific diseases. When enzymes are present in the blood, they are usually found in low concentrations, but when there is damage in an organ, the enzymes present in the organ (within the cells) leak out into the blood. In certain organs, there are some specific enzymes that are exclusively located in them, i.e. they cannot be found in other organs. In most cases, an enzyme or a particular enzyme is present in many tissues.

Alanine Aminotransferase (ALT), is a transaminase enzyme, found in serum and in various bodily tissues, but is commonly associated with the liver. Significantly elevated levels of ALT often suggest the existence of other medical problems such as viral hepatitis, congestive heart failure, liver damage, biliary duct problems, infectious mononucleosis, or myopathy (Kumar and Clark, 2001). In our study, oral administration of aqueous leaf preparation of *Acalypha wilkesiana* at a dose of 1 g/kg body weight was shown to cause a slight increase (p<0.10) on the ALT activities of the test animals as compared to the control, after 8 days of treatment. After day 15, the increase in the ALT activities of the test animals became significant (p<0.05), when compared to the control (Table 1). This suggests that the plant has an increasing effect on the ALT activities of the experimental animals. However,

elevated levels of ALT do not automatically mean that medical problems exist, because, Paul (2009) reported that fluctuations in ALT activities is normal over the course of the day and ALT activities can also increase in response to strenuous physical exercise. Thus, the increment in the activity of ALT may not be enough to spell problem for the tissues.

Aspartate Aminotransferase (AST) is an enzyme found mostly in the heart and the liver and to a lesser extent, in other muscles. When the heart, liver or muscle cells are injured or diseased, they release AST into the blood. In this study, the decoction had a slight reducing effect on the AST activities of the test animals. Though there was a significant increase (p<0.05) after day 8 of treatment when compared to control and baseline, but this was shown to reduce after day 15. When compared to the control and baseline, after day 15, the test animals were shown to have significantly lower (p<0.05) values of AST (Table 2). This suggests that the plant has a lowering effect on AST activities. Both AST and ALT activities are reliable tests for liver damage. In most types of liver diseases, the ALT level is higher than AST and the AST/ALT ratio will be low. But there are few exceptions where the AST/ALT ratio is usually increased i.e. in alcoholic hepatitis, cirrhosis and with muscle injury. ALT is found predominately in the liver, with clinically negligible quantities found in the kidneys, heart and skeletal muscle. AST is found in the liver, heart, skeletal muscle, kidneys, brain and red blood cells. As a result ALT is a more specific indicator of liver inflammation than the AST, as AST may also be elevated in diseases affecting other organs, such as the heart or muscles in myocardial infarction, also in acute pancreatitis, acute hemolytic anemia, severe burns, acute renal disease, musculoskeletal diseases and trauma. Fluctuations of ALT levels are normal over the course of the day and persistent increase over a long period of time may indicate possible liver problem. Thus, within the period of our investigation, the increase in ALT activity observed may not be enough to connote a problem. But we recommend a further study, over a longer period of time on this plant, to ascertain its long term effect on the serum parameters. During the period of investigation, there was slight weight loss among the test group, while the control group had significant weight gain. The weight loss in the test group became significant (p<0.05) after day 15 (Table 3). This may be as a result of loss of appetite or effect of the plant on the body fat metabolism, or its effect on glucose metabolism of the animals. This however, remained to be rationalized. Thus, within the period of investigation, it is obvious that the plant had a significant increasing effect on ALT activities and a significant lowering effect on AST activities. It was also shown to cause a significant reducing effect on the body weight of the experimental animals. This portends the relative safety of the plant and it's possible use for weight reduction.

REFERENCES

- Adesina, S.K., O. Idowu, A.O. Ogundaini, H.O. Oladimeji, T.A. Olugbade, G.O. Onawunmi and M. Pais, 2000. Antimicrobial constituents of the leaves of *Acalypha wilkesiana* and *Acalypha hispida*. *Phytotherapy Res.*, 14: 371-374.
- Akinde, B.E., 1986. Phytochemical and Microbiological Evaluation of the Oils from the Leaves of *Acalypha wilkesiana*. In: Sofowora A. Editor. *The State of Medicinal Plant Research in Nigeria*. University of Ibadan. Press, Nigeria, pp: 362-363.
- Kumar, P. and M. Clark, 2001. Liver, Biliary Tract and Pancreatic Diseases; Investigation. In: *Clinical Medicine*. 4th Edn., W.B. Saunders Publishers Limited, pp: 292-293.
- Kuntze, O., 1981. Botanist II. Type Specimens of Plants from his *Plantae Orientali-rossicae*. *Brittonia*, 33: 246-249.
- Ogundaini, A.O., 2005. From Greens into Medicine. Taking a Lead from Nature. Inaugural Lecture Series 176. O.A.U. Press Limited, Ile-Ife, Nigeria, pp: 12-15.
- Oladunmoye, M.K., 2006. Comparative evaluation of antimicrobial activities and phytochemical screening of two varieties of *Acalypha wilkesiana*. *Trends Appl. Sci. Res.*, 1: 538-541.
- Paul, T.G., 2009. Mildly Elevated Liver Transaminase Levels in the Asymptomatic Patient. *American Family Physician*.
- Sofowora, A., 1984. Medicinal plants and Traditional Medicine in Africa. Johnwiley, New York, pp: 256-257.
- Zhang, X., 1999. W.H.O. Monographs on Selected Medicinal Plants. Vol. 1. W.H.O. Graphics, pp: 1.