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Evaluation of Hepatocurative Effect of Aqueous Extract of *Calotropis Procera* (Tunfafiya) Leave on Acetaminophen Induced Albino Rat

[1]UTHMAN K. S. AND [2]RHAPHEL O.
Science Laboratory Technology (SLT) Deparment, School of science and technology,
Federal polytechnic Kaura Namoda, Zamfara State, Nigeria.

Abstract:- The hepatocurative effect of aqueous extract of calotropis procera (tunfafiya) leave on acetaminophen induced albino rat was investigated. Twenty four (24) albino rats were grouped into four groups, six rats (6) per group, group 1(positive control) was the normal and group 2 was the negative control which was induced but not treated. Group 3 and 4 were induced and treated with 200mg/kg and 400mg/kg respectively. Six parameters were tested which include aspartate transaminase(AST), alanine transaminase(ALT), total bilirubin(TB), direct bilirubin(DB), Albumin(ALB) and Total protein(TP). The mean value obtained in group 3 and 4 were significantly high ($p<0.05$) for AST, ALT and Bilirubin, however, the mean value for Albumin and Total protein were lower ($p<0.05$) as compared with the control, but there was significant reduction in the mean value of AST, ALT and Bilirubin when treated with the aqueous extract of calotropis procera with remarkable increase in the Albumin and Total protein, when compared with the negative control. This signifies the heptocurative properties of C. procera.

Keywords:- *Calotropis procera, Acetaminophen.*

I. INTRODUCTION

Medicinal plants are believed to be the most efficient source of traditional way of preventive and or curative medicine being the richest bioresource of traditional medicine, modern medicine, food supplement and as chemical entities for synthetic drug (Sumner, 2000). Many countries have little regulation on traditional medicine. But world health organization coordinates a net work to ensure safe and rationale usage (Ahmad *et al*., 2007).

Research has documented that, People in non industrialized societies usually prepare using traditional medicine to orthodox one, mainly because they are readily available and cheaper than the orthodox medicine (Ayres *et al*., 1983). It has been estimated by food and Agricultural organization that over 50,000 species of medicinal plant are used world over(Iwu ,1993). The anti-inflammatory, antibacterial, antipyretic and antioxidant activities of some plants with medicinal properties such as *V*ernonia amygdalina, *Calotropis procera* and *Garcinia kola* (*Kolaviron*) have been well documented (Ghafourunissa, 1995).

Calotropis procera known as tunfafiya in Hausa is commonly available in all parts of Nigeria but more rich in the Northern part of the country(Doumas *et al.,* 2005). *Calotropis procera* is a recurrent grayish green, forested shrub with wide ovate plump leaves that grows wild in the tropics and warm temperate regions(Monserrat *et al.*, 1995). It has a broad white sap which oozes from a cut stem and derived its common name, giant milk weed, from the stem when a leaf is plucked off. Thus, it belongs to a family referred to as milkweed family (Obi *et al.,* 2004).

- *Taxonomy of Calotropis Procera*

The taxonomic position of the genus, *Calotropis* among the flowering plants is as follows.
Phylum - Angiospermae
Class - Dicotyledonae
Subclass - Sympetalae
Order - Gentianales
Family - Asclepiadacaea
Subfamily - Cyanchoideae
Genus - Calotropis
Species - *Calotropis procera*

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(Howard et al., 1989)
Fig 1:- The plant, *Calotropis procera* (Asclepiadaceae)

❖ *Therapeutic Use of Calotropis Procera*

Aside documented toxicity of the latex of *C. procera.* The plant has been reported to be of high medicinal value. Many countries have recorded medicinal effect of C. procera, including India, where root and bark extract was used to treat certain diseases of human. Various ailments such as headache, conjunctivitis, skin diseases catarrh, and wound dressing, were also remedied with the juice from the leaves of the plant, whereas the root extract has been used for the treatment of venereal diseases like syphilis and gonorrhea (Al-Robai., *et al*.,1993).

The latex, vegetation and root bark of this plant are used in Indian folk medicine mainly for digestive system disorders but also for the management of asthma, cough, catarrhal inflammation of the upper respiratory tract and skin diseases (Singh *et al*., 2000).

Conventionally, *C. procera* bark is used to treat cholera, extracting guinea worms and upset stomach. The plant is known to enhance bile secretion and has calming effect on the intestinal muscles. Ethanol extract of *C. procera* when applied to skin ulcers, showed 60% cell drop. The fond leaves of *C. procera* are as well used to alleviate migraine(Khan.*et al*., 1989) It is also used as a remedy for black scars of face, boils, cold, cough, asthma, ear-ache, eczema, skin eruptions, inflammatory lesions, pains, rheumatism, syphilis, leprosy and oedema(Kumar and Arya, 2006). It has also been used as an antiseptic for skin infection (Mossa *et al.*, 1991) laxative, eardrops and antifertility agent (Kumar and Basu 1994)

Aqueous extracts of *C. procera* roots has been studied to have an effect on oestrous cycle and oestrogenic functionality in rats. Both extracts have been shown to interrupt the normal oestrous cycle by 60 and 80%, respectively, of rats treated (Roy *et al.*,2005) Dose level of 250 mg/kg provide strong anti implantation with hundred per cent inhibition and uterotropic activity which was suggestive that the extract could be used as a potent contraceptive(Basu and Chaudhari 1991)

❖ *Pharmacologicaland Phytochemical Properties of Calotropis Procera*

A collective research by Mossa *et al*.(1991), Al-Robai *et al*.(1993) and Hussein *et al*.(1981) confirmed the presence of some secondary metabolite such as alkaloids, flavonoids, cardiac glycosides, tannins, triterpenes steroids and uscharin in the whole part of *C. procera*, and evaluation studies on the safety of the extract was carried out and revealed that the use of a single dose (up to 3 g/kg) the extract does not produce any visible toxic symptoms or mortality (Abaelu *et al*., 1991).

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II. MATERIALS AND METHODS

➢ *Study Area*

This research work was conducted in the Department of Science laboratory Technology, Federal polytechnic Kaura Namoda Zamfara State,Nigeria

➢ *Source of Animals*

The animals used in this research work were sourced from Zaria Kaduna State, Nigeria the weight of the rats was (145 to 190 g). They were fed with the product of vital feed, Jos, Plateau State. Plant material was gotten from the local community in Kaura Namoda.

➢ *Animal treatment*

Twenty four albino rats were grouped into 4 groups of six rats each. They were acclimatized for 2 weeks on rats' rations only. Group 1 (control) was exclusively given 100% rats' mash only, at the same time the other groups(group2, 3 and 4) were given rats' rations, supplemented with acetaminophen(employed to induce liver toxicity. The animals were given their normal feed for six weeks alongside with 200mg/kg and 400mg/kg aqueous extract for group 3 and 4 respectively.

➢ *Sample Collection*

The rats were subjected to an overnight fast after which, blood was collected by tail puncture into sterile containers without anticoagulant. The serum was harvested for analysis

➢ *Laboratory Analytical Techniques*

Biochemical parameters were analysized to determine the serum concentrations of total protein, albumin, conjugated and total bilirubin. The activities of liver enzymes (AST and ALT) was also determined using diagnostic kits (Randox company). Total protein was determined by the Biuret method (Peters, 1968), albumin by the bromocresol green method (Doumas *et al.*, 1971), bilirubin was estimated by the method described by Jendrassik and Grof (1938). Alanine and aspartate aminotransferases were determined based on the spectrophotometric method of hydrazone formed with 2, 4 dinitrophenyl hydrazine (Reitman and Frankel, 1957).

➢ *Statistical analysis*

The data were analyzed using SPSS (version 21.0, Inc., Chicago, IL, USA), and presented as mean±SD. Data Between the control and test group were compared using Student *t*-test. A p-value of < 0.05 was considered statistically significant.

III. RESULTS AND DISCUSSION

The serum concentrations of the liver parameters vary appreciably ($p<0.05$) between the test rats and the control. Increased in the concentration of the activities of ALT and AST, was observed in the negative control which was induced with acetaminophen but not treated with the extract. Similarly test rats treated with 200mg/Kg and 400mg/Kg responded remarkably by decreased in enzyme activity correspondingly compared with negative control (Table 1). This is in line with the work of Innocent *et al.*, 2016. Which reported that, liver enzyme levels are typically raised in severe hepatotoxicity, but decreases with administration of the hepatoprotective agent. However, hyperbilirubinemia was also realistic in the negative control which completely disappeared when treated with the extract. Total protein and albumin; concentrations were considerably low ($p>0.05$) in the negative control as compared with the positive control signifying acute hepatotoxicity. Yet the levels tend to increase to normal values in the test rats that were treated with the extract.

However, this result is at variance with that of Imafidon and Okunrobo 2012, where total protein, albumin, were significantly greater than before in all the test rats compared with the control

S/NO	Parameters	Positive Control	Negative control	Test+200mg/Kg extract	Test 400mg/Kg
1	ALT activity IU/l	44.6±2.3	232.6±8.4	116.2±3.2	45.5±1.9
2	AST activity IU/l	84.2±3.3	340.3±6.4	212.7±4.3	70.9±2.1
3	Total Bilirubin µMol/l	3.6±1.2	14.9±2.1	7.5±1.4	2.9±1.3
4	Direct Bilirubin µMol/l	0.9±0.3	5.6±0.4	2.7±0.6	1.12±0.2
	Total protein g/l	18.5±0.4	9.43±3.3	14.5±2.5	17.6±0.9
	Albumin g/l	11.3±0.7	7.5±2.3	9.54±1.2	10.8±0.7

Table 1:- Effect of acetaminophen induction on the liver parameters of albino rats

Results presented as mean ± SD * Significant at $p<0.05$ compared with control using student *t* test.

KEY
Positive control= not induced at all
Negative control= induced with acetaminophen but not treated
Test= induced and treated with the extract at different mg/Kg

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