The Effect of Ethanol Extract of *Jatropha curcas* on Renal Markers of Chloroform Intoxicated Albino Wister Rats

P.C. Ugwu Okechukwu, 1C.E. Offor, 1U.A. Ihiam, 2A.L. Ezugwu, 1A.J. Uraku, 1C.N. Igwe and 1M.B. Okon

1Department of Biochemistry Ebonyi State University, Abakaliki, Nigeria
2Department of Biochemistry University of Nigeria, Nsukka Enugu State, Nigeria
3Department of Biochemistry Tansian University, Umunya, Anambra State, Nigeria

Abstract: All parts of *Jatropha curcas* has been known to possess valuable medicinal properties. This calls for the need to ascertain the effects of some of this plant extracts on some kidney markers of chloroform intoxicated rats. Twenty five (25) male Wistar albino rats were used in this study. They were randomly distributed into five (5) groups of 5 rats each. Oxidative stress was induced in the rats and this was performed by intraperitoneal injection of chloroform. The rats were fed graded doses of ethanol extract of *Jatropha curcas* through oral intubation method. Group 1 (Negative control rats without Chloroform intoxication) was treated with 0.5ml of normal saline. Group 2 (Chloroform intoxicated rats) were treated with 100mg/kg body weight of ethanol extract of *Jatropha curcas*. Group 3 (Chloroform intoxicated rats) were treated with 200mg/kg b.w. of ethanol extract of *Jatropha curcas*. Group 4 (Positive control rats with Chloroform intoxication) were treated with 0.5ml of normal saline while Group 5 (Standard control rats with Chloroform intoxication) were treated with 5mg/kg body weight of standard drug Chemiron. The results generally indicated that ethanol leaf extract of *Jatropha curcas* was able to ameliorate the toxic effect of chloroform on the kidney of the rats.

Key words: *Jatropha curcas* • Albumin • Bilirubin • Serum creatinine and serum urea

INTRODUCTION

Medicinal plants being an effective source of both traditional and modern medicines are genuinely useful for primary health care [1-3]. World Health Organization (2000) has advocated traditional medicine as safe remedies for ailments of both microbial and non-microbial origin. It was further added that the use of plant extracts with antimicrobial properties may be of importance in therapeutic treatments, whereas in the past few years, a number of studies have been conducted in different countries to prove such efficacies. Therefore it is pertinent to investigate such plant thoroughly to determine their pharmacological properties as well as efficacy of these various plants for antimicrobial activities [3]. In Nigeria *Jatropha curcas* is used alone or with other herbs to treat common diseases such as diabetes, malaria and kidney damages. *Jatropha curcas* is a multipurpose plant with many attributes and considerable potential. It is a tropical plant that can be grown in low to high rainfall areas and can be used to reclaim land, as a hedge and/or as a commercial crop [4-6]. It is a member of the Euphorbiaceae family, a drought resistant multipurpose tree of significant economic importance. *Jatropha* specie was also reported to possess specific spasmyloytic and vasodilator activity [6]. The aim of this study was to investigate the effectiveness of *Jatropha curcas* ethanol leaf extract in the treatment of renal problems in Nigeria.

MATERIALS AND METHODS

Preparation of Plant Extract: Fresh leaves of *Jatropha curcas* were collected from Afor Oba market, Anambra State, Nigeria. The fresh leaves of *Jatropha curcas* were shade dried (to obtain pure active substances) under room temperature for 72 h. The dried sample was ground into powdered form. 200g of *Jatropha curcas* leaf powder was soaked in 1750ml of ethanol and macerate for 24h after which they were squeezed with muslin cloth to get the filtrate. The semi pastry extract was then allowed to evaporate under mild sunlight which was then stored in the refrigerator and used for the study.
Calculating the Percentage Yield: The percentage yield of the extract was determined by weighing the coarse *Jatropha curcas* leaf before extraction and the *Jatropha curcas* ethanol leaf extract after concentration and then calculated using the formula.

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\text{Percentage yield (\%) } = \frac{\text{Weight (g) of the concentrated extract}}{\text{Weight (g) of the ground *Jatropha curcas* leaf}} \times 100
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Experimental Design: Twenty five (25) Wistar albino rats were randomly distributed into five (5) groups of 5 rats each. Oxidative stress was induced in the rats and this was performed by intraperitoneal injection of chloroform (100 mg/kg b/w). The rats were fed graded doses of ethanol extract of *Jatropha curcas* through oral intubation method. The groups and doses administered are summarized below.

**Group 1:** (Negative control rats without Chloroform intoxication): rats were treated with [0.5ml of normal saline].

**Group 2:** (Chloroform intoxicated rats): rats were treated with [100mg/kg b.w. of ethanol extract of *Jatropha curcas*].

**Group 3:** (Chloroform intoxicated rats): rats were treated with [200mg/kg b.w. of ethanol extract of *Jatropha curcas*].

**Group 4:** (Positive control rats with Chloroform intoxification) were treated with [0.5ml of normal saline].

**Group 5:** (Standard control rats with Chloroform treated with graded doses of ethanol extract of *Jatropha curcas* in group 2 and 3 significantly (p<0.05) decreased the levels of urea concentration when compared to group 4 (positive control) rats. The same reduction was also observed in group 5 rats that were treated with standard drug (chemiron).

Collection of Blood Samples: Blood sample were collected from the animal in the media countus (veins in the animal eye) with the use of a capillary tube. The blood was allowed to clot and then centrifuged to obtain serum.

Determination of Total Bilirubin Concentration: Total bilirubin concentration was determined using the method of Jendrassik and Grof (1938).

Determination of Serum Urea Concentration: The concentration of serum urea was determined using the method of Tietz (1994).

Calculated of Serum Creatinine Concentration: The concentration of serum creatinine was determined using the method of Tietz (1994).

**Statistical Analysis:** Data were reported as means ± SEM, where appropriate. Both one- and two-way analyses of variance (ANOVA) were used to analyze the experimental data and Duncan multiple test range was used to compare the mean values obtained after each treatment with control measurements. Differences were considered significant when p ≤ 0.05.

**RESULTS AND DISCUSSION**

*J. curcas* has been a multipurpose perennial plant which has lots of industrial and long history of various medicinal applications. *Jatropha curcas* (Linn) belonging to the family Euphorbiaceae is a shrub that grows 4.5 to 8 meters high. The roots, leaves and seeds of the plant have been widely used in traditional folk medicine in many parts of West Africa, Central and South America [7-10].

The results in Figure 1 showed a significant (p<0.05) increase in urea concentration of group 4 rats when compared to group 1 (negative control) and this indicate that the rats kidney was oxidatively stressed by chloroform intoxication. Urea is a waste product formed from the breakdown of proteins [2]. A high blood concentration of urea (uraemia) indicates that the kidney may not be working properly. In other words, the increased level of urea observed is an indication of azotaemia. High blood urea is associated with increased tissue protein catabolism, excess breakdown of blood protein and diminished excretion of urea [1]. The rats treated with graded doses of ethanol extract of *Jatropha curcas* in group 2 and 3 significantly (p<0.05) decreased the levels of urea concentration when compared to group 4 (positive control) rats. The same reduction was also observed in group 5 rats that were treated with standard drug (chemiron). This shows that ethanol extract of *Jatropha curcas* was able to ameliorate the effect of chloroform intoxication in group 2 and 3 rats treated with 100 and 200mg/kg body weight of the extract. Group 5 rats treated with standard drug (chemiron) were also able to ameliorate the effect of chloroform intoxication on the rats.

The results in Figure 2 showed a significant increase (p < 0.05) in creatinine level of group 4 (positive control) rats when compared to group 1 (negative control) rats and this is an indication that the animals were oxidatively stressed by chloroform intoxication. Creatinine is a waste
Fig. 1: The Effect of *Jatropha curcas* on Urea (mg/dl) level of Chloroform intoxicated rats.

Fig. 2: The Effect of *Jatropha curcas* on Creatinine (mg/dl) level of Chloroform intoxicated rats.
Fig. 3: The Effect of *Jatropha curcas* on Total bilirubin (mg/dl) level of Chloroform intoxicated rats.

Fig. 4: The Effect of *Jatropha curcas* on Albumin (mg/dl) level of Chloroform intoxicated rats.
product made by muscles. It passes into the bloodstream and is usually passed out in urine. A high blood level of creatinine indicates that the kidney may not be working properly. Creatinine is usually a more accurate marker of kidney function than urea. The rats treated with graded doses of ethanol extract of *Jatropha curcas* in groups 2 significantly (p<0.05) decreased the levels of creatinine level when compared to group 4 (untreated group). The same pattern of reduction was also observed in groups 3 and 5 rats treated with 200mg/kg b.w and standard drug respectively.

The results in Figure 3 above shows a significant increase (p< 0.05) in total bilirubin level of group 4 (positive control) rats when compared to group 1 (negative control) rats. The rats treated with graded doses of ethanol extract of *Jatropha curcas* in groups 2 and 3 significantly (p<0.05) decreased the levels of bilirubin level when compared to group 4 (untreated group). The same pattern of reduction was also observed in group 5 rats (treated with standard drug).

The results above in Figure 4 showed that group 4 (positive control) rats significantly (p<0.05) increased in albumin concentration when compared with that of group 1 (negative control) rats. Groups 2 and 3 rats treated with graded doses of ethanol extract of *Jatropha curcas* decreased in albumin concentration when compared with group 4 (positive control) rats. Group 5 rats treated with standard drug followed the same reduction pattern of group 3 rats when compared with group 4 (positive control rats). This agrees with the report of Nwala et al. (2013) [7]. The results in Figure 3 and 4 also revealed the ameliorative properties of *Jatropha curcas* on total bilirubin and albumin elevation due to chloroform intoxication.

**CONCLUSION**

Crude ethanol extract of *Jatropha curcas* has demonstrated from the results above that it could be a potential agent in the treatment of renal problems and this has justified its use in ethnomedicinal practices in Nigeria.

**REFERENCES**