

Full Length Research Paper

Use of *Jatropha gossypifolia* stem latex as a haemostatic agent: how safe is it?

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The stem latex of *Jatropha gossypifolia* is routinely used by local and some urban dwellers in Southern Nigeria to stop bleeding from nose, gum and injured skin. Safety of its use was investigated in different groups of wistar albino rats using different doses of the latex. Different numbers of incisions were made on the thighs of different groups of animals and different doses of the stem latex applied. The procedure was repeated on daily basis for 18 days. The control group was not incised. The animals were sacrificed and the effect of the stem latex on blood biochemistry and haematology were assessed using standard techniques. There were no statistical significant differences ($P>0.05$) in the result of biochemical and haematological parameters obtained for the control and experimental animals. The findings of this study showed that the stem latex of *Jatropha gossypifolia* has no harmful effects.

Key words: Safety, *Jatropha gossypifolia*, stem latex, biochemical, haematological, parameters.

INTRODUCTION

Jatropha gossypifolia belongs to the family "Euphor-biaceae", other species are *Jatropha curcas*, *Jatropha glandulifera*, *Jatropha tanjorensis*, *Jatropha multifida*, *Jatropha podagrica* and *Jatropha intergerrina*. It is a bushy, gregarious shrub of about 1.8 m in height. The leaves are 3 - 5 lobed, palmately, 20 cm glandular hairs. The flowers are red-crimson of purple in corymbs, with greenish seed in capsule (Morton, 1981; Oudhia 2001). The leaves of *J. gossypifolia* are used for intermittent fevers, carbuncles, eczema, itches, sores on the tongues of babies, swollen mammae, stomachache, and venereal disease (Balee, 1994). The leaf decoction is used for bathing wounds (Morton, 1968). The leaf extract has been used as an anticoagulant for biochemical and haematological analyses (Oduola et al., 2005). The bark contains the alkaloid jatrophine and a lignan (jatroiden) is found in its stem (Robineau, 1991; Horstem et al., 1996). The stem latex has been shown to possess coagulant activity and its mechanism of action as haemostatic agent found to be by precipitation of coagulant factors (Oduola et al., 2005).

Traditionally, herbs have been considered to be nonto-xic and have been used for treating various problems by the general public "and/or" traditional medicine doctors world wide, while the literature has documented severe toxicity resulting from the use of herbs on many occasions, still the potential toxicity of herbs has not been recognized by the general public or by professional groups of traditional medicine (Jou-fang, 1994; 'O' Hara et al., 1998). Patients are often unaware of important similarities and differences between medicinal herbs and approved medications, some mistakenly think of herbs as natural alternative to chemicals, failing to recognize that herbs are composed of bioactive chemicals some of which may be toxic. Also, patients are often unaware that about 25% of modern pharmaceutical drugs have botanical origins, such as digoxin from foxglove, morphine from poppies, aspirin from willow bark and tamoxifen from the pacific yew tree (Tyler, 1994).

In southern Nigeria, the stem latex of *J. gossypifolia* is routinely used by herbalists, rural dwellers and some people in urban centers to stop bleeding from nose, gum and skin without consideration for its safety. The stem latex is usually applied on the injured skin, bleeding gum or nose before it stops the bleeding, it may get into the

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Table 1. Effect of application of stem latex of *J. gossypifolia* on incised skin of rats on liver function tests.

Parameters	Control	Group 1	Group 2
Total bilirubin ($\mu\text{mol/l}$)	14.36 \pm 2.11	14.01 \pm 2.35	14.29 \pm 2.18
Conjugated bilirubin ($\mu\text{mol/l}$)	4.25 \pm 0.68	4.21 \pm 0.93	4.13 \pm 0.73
Total Protein (g/l)	71.46 \pm 6.42	70.97 \pm 6.16	71.33 \pm 6.56
Albumin (g/l)	39.24 \pm 2.35	39.01 \pm 2.43	38.97 \pm 2.23
ALT (IU/l)	24.63 \pm 3.22	23.56 \pm 3.11	24.35 \pm 3.30
AST (IU/l)	13.25 \pm 1.32	12.93 \pm 1.21	13.13 \pm 1.28
ALP (IU/l)	101.27 \pm 6.32	100.11 \pm 6.13	102.89 \pm 6.37

n = 10.

body system and cause adverse reaction if it possess any. The therapeutic effects and the mechanism of action of the stem latex of *J. gossypifolia* as a haemostatic agent has been documented (Oduola et al., 2005), its safety remains largely unknown even though no known adverse effects among the users has been observed. The present study is therefore designed to evaluate its safety in rats treated with the stem latex after making small incision on their skin by assessing some of the functions of the liver, kidney and bone marrow.

MATERIALS AND METHODS

Method of collection of stem latex

The stem of growing *Jatropha gossypifolia* plants was cut and fluid coming out collected into a clean sterile container.

Animals

Male and female Wistar albino rats (180 – 200 g) obtained from the animal house of the Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife were used for the study. They were kept in rat cages with free access to water and dry rat pellet (purchased at Ogo Oluwa Enterprises, 4 Aderemi road, Ile-Ife, Nigeria).

Category of animals

The rats were grouped into three with ten rats in each group; control, group 1 and group 2.

Group 1

The hair on a thigh was shaved gently with a clean sterile razor blade, care was taken to avoid blade cutting the skin. The shaved portion was sterilized using 70% methylated spirit. A small incision was made with a clean sterile surgical blade on the shaved skin and a drop (a drop = 50 μl) of the latex applied into the incised area. This procedure was repeated daily for 18 days.

Group 2

The same procedure was carried out for rats in this group except that both thighs were shaved, incised and a drop (50 μl) of the latex applied to each thigh, so that a total of 2 drops (100 μl) were applied. This procedure was repeated on a daily basis for 18 days.

Control group

This group served as the control. The procedure was not carried out on the group. At the expiration of 18 days latex exposure, the animals were weighed and blood collected by cardiac puncture under ether anaesthesia. 6.0 ml of blood was collected from each rat, 2.0 ml dispensed into dipotassium ethylenediamine tetra acetic acid (K_2EDTA) for haematological analysis and 4.0 ml dispensed into lithium heparin specimen bottles for biochemical analysis. The biochemical and haematological analyses were performed using standard techniques (Norbert, 1986; Dacie, 2001). The animals were later sacrificed by cervical dislocation.

Statistics

The mean and standard deviation and the level of significance for the differences between means were computed by students test SPSS 6.

RESULT

The mean \pm S.D. values of liver function tests of rats treated with stem latex of *J. gossypifolia* (groups 1 and 2) and control group were presented in Table 1. The results obtained for groups 1 and 2 were not significantly different ($P>0.05$) from those obtained for control group.

Table 2 shows the effect of application of stem latex of *J. gossypifolia* on incised skin of rats on the kidney function tests. The results obtained for groups 1 and 2 showed no statistical significant difference ($P>0.05$) from those obtained for control group.

Table 3 shows haematological response to the effect of application of *J. gossypifolia* stem latex in rats. The results obtained for the experimental animals were not significantly different ($P>0.05$) from those obtained for control animals.

DISCUSSION

The herbalist and rural dwellers use the stem latex of *J. gossypifolia* in stopping bleeding from skin, bleeding nose and gums without safety considerations. The efficacy and mechanism of its action as a haemostatic agent has been established (Oduola et al., 2005). Although there have been no known adverse reaction to the stem latex in the

Table 2. Effect of application of stem latex of *J. gossypifolia* on incised skin of rats on renal function tests.

Parameters	Control	Group 1	Group 2
Na ⁺ (mmol/L)	129.56±5.23	130.13±5.65	128.97±5.55
K ⁺ (mmol/L)	5.02±1.11	4.99±1.07	5.00±1.12
HCO ₃ ⁻ (mmol/L)	23.21±2.97	22.87±2.85	23.56±2.65
Cl ⁻ (mmol/L)	99.35±6.14	98.96±6.12	100.23±6.35
Urea (mmol/L)	7.13±1.23	7.03±1.19	7.09±1.20
Creatinine (μmol/L)	111.23±10.24	113.28±10.53	110.38±9.97

n = 10.

Table 3. Effect of application of stem latex of *J. gossypifolia* on incised skin of rats on some haematological parameters.

Parameters	Control	Group 1	Group 2
PCV (%)	42.37±1.85	42.99±2.01	42.85±1.96
WBC (x10 ³ /mm ³)	4.92±0.26	4.91±0.29	4.93±0.41
Platelets (x10 ³ /mm ³)	223.46±19.12	225.13±20.41	224.22±19.53
Neutrophils (%)	42.36±3.95	41.97±3.99	43.25±4.01
Lymphocytes (%)	55.14±5.95	57.31±6.06	55.61±5.62
Eosinophils (%)	2.10±0.18	1.85±0.12	1.91±0.19
Monocytes (%)	1.01±0.09	1.05±0.06	1.03±0.07
Basophils (%)	0	0	0

n = 10.

users, data on its safety record is not available.

From the present study, the latex has no effect on the liver function tests in rats as there were no significant differences {p>0.05} between the study and control groups (Table1) The liver is the principal organ involved in bio-transformation of exogenous substances, and therefore is involved in a lot of enzyme synthesis that enable it to carry out its function. Liver enzymes are usually raised in acute hepatotoxicity but tend to decrease with prolonged toxication due to damage to the liver cells (Cornelius, 1979). The conjugating and synthetic ability were assessed by total and conjugating bilirubins, total protein and albumin, since all these parameters were not affected as seen from the results, it indicates that the latex is not hepatotoxic.

Part of the functions of the kidney are maintenance of electrolytes balance and excretion of nitrogenous waste. Since there was no significant difference (P>0.05) for the values obtained for Na⁺, K⁺, Cl⁻, HCO₃⁻, urea and creatinine between the study and control group (Table 2), it is an indication that renal function was not impaired. Normal levels of urea and cretinnine is an index of normal renal function (Lawrence and Amaedo, 1996).

From Table 3, the haematological parameters were not affected, there was no significant difference (P>0.05) between the control and study groups. The PCV, WBC (total and differential) and platelets counts were not incre-

ased or decreased, and no inclusions in the red cells or white cells were seen during differential cell count.

In conclusion, the *Jatropha gossypifolia* has no adverse effect on the functions of the liver, kidney and bone marrow. This observation is in agreement with the belief of users of this plant that the plant is safe. Traditionally, it has been argued that because most test animals are mammals, and humans and mammals, tests on animals provide adequate warning of danger to humans (Gold, 1998), the finding of this study can be extrapolated to humans that the use of stem latex as a haemostatic agent is safe.

The process of purification and characterization of the active ingredients in the latex is in progress.

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