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PHYTOCHEMICAL AND ACUTE TOXICITY STUDIES OF METHANOL SEED EXTRACTS OF *PARKINSONIA ACULEATA* L

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ABSTRACT

Phytochemical and acute toxicity test were evaluated using methanol seed extracts of *Parkinsonia aculeata.* Phytochemical analysis was conducted using standard procedure, the chemical ingredients detected were Alkaloids, Glycosides, Saponins Glycosides, Volatile Oils, Cardiac glycosides, Flavonoids, Terpenes, Steroids and absent of Tannins and Anthraquinones which were detected qualitatively. Quantitative analysis has also revealed the percentage compositions of the active ingredients as Alkaloids (3.80%), Flavonoids (1.80%), Glycosides (0.80%) and Steroids (3.9%). Acute toxicity studies were done using up and down procedure of Organization for Economic and Cultural Development (OECD, 2001) guidelines for oral toxicity test. This has indicated that the median lethal dose (LD_{50}) of the seed extracts was greater than 5000mg/kg of the rats. The study has shown that, seed extract of *P. aculeata* was safe and non-toxic.

Keywords: *Phytochemical, Acute toxicity, methanolic, Parkinsonia aculeate.*

INTRODUCTION

Scientific validations are being made globally to get the evidence traditionally used herbal plants. There still existence of number of tropical trees with tremendous medicinal potential and non-toxic, but with non empirical poof to mechanisms of efficacy (Raju *et al.,* 2008). Free radically and oxidative injury is critically involved in various aetiological conditions such as cancer, neurological disorders, arthritis, inflammation and liver disease. Many Indian ethno-botanic traditions proposed a rich repertory of medicinal plants used by population that are not toxic for treatment of liver diseases that are not toxic (Hikino, 1983). However, there were not enough scientific investigations on the conferred to these plants. Chemicals and drugs such as CCl_4 and paracetamol catabolized radicals induced lipid peroxidation, damage to the membrane of liver cells and organelles, causing swelling and necrosis of hepetocytes and

result to the release of cytosolic enzymes into the blood (Singh *et al.,* 1998). A large number of medicinal plants have been found to be safe (Sibel and Canan, 2005; Raju *et al.,* 2008; Formica and Rejelson, 1995; Rice-Evans *et al.,* 1997).

Parkinsonia aculeata (L) belong to the family of *fabaceae* with the specialized leaf arrayed in alternative order. The stem bark and leaf were reported to have used in the Northern Nigeria for the treatment of hepatopathy bacterial diseases, typhoid fever and diabetes (Leite *et al.,* 2007).To the best of our knowledge, there is no scientific report available in the support of acute toxicity studies of seed extracts of *Parkinsonia aculeata* on albino rats. The acute toxicity of the plant reported in this study would provide scientific evidence of its claimed medicinal properties.

MATERIALS AND METHODS

Chemicals

All chemicals used were of analytical grade.

Sample Collection

The seed of *Parkinsonia aculeata* were collected from Kwalkwalawa Area of Wamakko Local Government, Sokoto State, Nigeria. The plant was botanically authenticated at the Herbarum Botany Unit, Department of biological Services, Usmanu Danfodiyo University, Sokoto – Nigeria. A voucher specimen of the plant was deposited for reference.

Preparation of plant extract

The seed were open air-dried under shade pulverized into coarse powder using wooden pestle and mortar and stored until required for use. A two hundred grams (200g) of the powdered seed were extracted with two liters of 95% methanol water (2000ml) at room temperature for 24 hours. The extract was filtered with Whatman's Filter Paper (No. 1) and concentrated under reduced pressure. The yield of the extract was 9.5% (w/w).

Animals Used for the Research

Wistar strains of albino rats of either sex weighing 150-250g were purchased from animal house, Department of Biological Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria. They were kept in wire mesh cages in a well ventilated room, allowed access to feed food and water and kept for one week acclimatize.

The animals maintained on standard animals feeds (Bendel Feeds and Flour Mills, Edo State, Nigeria) and clean tap water adlibitum, before and after daily administration of the plant extract 9.30 to 10.3ɣh. Experiment was performed according to ethical guidelines (Guntapalli, 2006).

Experimental procedure

Acute oral toxicity studies were conducted with albino rats after acclimatization using (OECD) up and down procedure of Organization for Economic and Cultural Development (OECD, 2001). Five (5) animals were selected randomly for limit test dose at 5000mg/kg body weight of the extract in a single dose. An observation was made from the first 8 hours, 24 hours and upto 48 hours for signs of toxicity such as food and water refusal, salvation, weakness, depression and death. When one (1), two (2) or none of the test animals died, the median lethal dose (LD_{50}) is greater then 5000mg/kg.

Phytochemical Analysis

The methods of (Harbone, 1998; Sofowora, 1991; El-Olemyl, 1994) were employed.

Results

Phytochemical analysis (qualitative) test of methanol seed extracts of *P. aculeata* has confirmed the presence of secondary plant metabolites tested such as alkaloids, steroids, glycosides, saponins, volatile oils, cardiac glycoside, flavonoids, saponins glycosides, terpernes and absent of tannins and anthraquinones as indicated in table I below.

Table I: Phytochemical constituents (qualitative) of methanol seed extract of *P. aculeata*

ALK	TAN	STR	GLY	SAP	VLO	CGS	FL	SAG	TER	ATQ
+	ND	+	+	+	+	+	+	+	+	ND

Key: + = Presence
ND = Not detected
ALK = Alkaloids, TAN = Tannins, STR = Steroids, GLY = Glycosides, SAP = Saponins, VLO = Volatile oils, CGS = Cardiac glycosides, FL = Flavonoids, SAG = Saponins glycosides, TER = Terpene, ATQ = Anthraquinones.

Phytochemical analysis (quantitative) of methanol seed extract of *P. aculeata* has revealed the percentage composition of the active principle tested as alkaloids 3.80%, flavonoids 1.80%, glycosides 0.32%, saponins 0.80% and steroids 3-90% as indicated in the table II below.

Table II: Phytochemical constituents (quantitative) of methanol seed extrct of *P. aculeata*

Chemical ingredients	Composition % (w/w)
Alkaloids	3.80
Flavoinoids	1.80
Glycosides	0.32
Saponins	0.80
Steroids	3.90

Acute toxicity

Oral administration of methanol seed extract of *P. aculeata* at a single dose of 5000mg/kg body weight of rats produced no adverse effect on the test rats such as changes like excitements, restlessness, refusal of food and water, etc. There was no death recorded during the periods of observation as shown in table III below.

Table III: Acute toxicity properties of seed extracts of *P. aculeata* on Wistar albino rats.

Group	Dose (mg/kg)	No. of animals	No. of death
A	5000	1	0
B	5000	1	0
C	5000	1	0
D	5000	1	0
E	5000	1	0
F	5000	1	0

DISCUSSION

The phytochemical constituents detected were alkaloids, saponins, cardiac glycosides, terpens, steroids, saponins glycosides, flavonoids, glycosides, volatile oils and absent of tannins and anthraquinones. These active ingredients were reported to have toxicity at higher concentrations as reported by (Singh *et al.,* 1998).

Acute toxicity test at 5000mg/kg of the seed extracts of *Parkinsonia aculeata* produce no mortality after 48 hours observation. The median lethal dosage (LD_{50}) of the aqueous seed extracts was greater than 5000mg/kg body weight, (OECD, 2001). The extract did not produce or showed any grossly negative behavioral changes such as excitement, restlessness, respiratory distress, convulsion, coma or death (Hassan *et al.,* 2010). Absent of mortality during 48 hours of observation of the rats had indicated that the methanol seed extracts of *P. aculeata* is relatively safe (Allain *et al.,* 1974). The resent study has demonstrated that the methanol seed extracts of *P. aculeata* has no toxicity at higher concentration.

CONCLUSION

Phytochemical and acute toxicity studies of seed extracts of *P. aculeata* had indicated that the plant is safe and non-toxic. The non toxic properties of the plant may be due to the presence of phytochemical constituents.

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