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STUDY ON THE ACUTE TOXICITY EFFECT OF ETHANOIC EXTRACT OF *DIOSCOREA VILLOSA* TUBER ON WISTAR ALBINO RATS IN IFITEDUNU, ANAMBRA STATE.

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Abstract

Lorke's method was used to study the acute toxicity effect of ethanoic extract from the *Dioscorea villosa* tuber on Wistar albino rats. The study involved intra-peritoneal administration of different doses of the extract to the groups of the male albino rats. Signs accompanying toxicity and possible death of animals were monitored for two weeks to ascertain the lethal dose (LD_{50}) of the extract.The animals weight was checked at every three days intervals. At the end of the two weeks study, all the animal in all the dose groups were sacrificed. The safety usage of the ethanoic extracts from the *Dioscorea villosa* tuber is emphasized. There were no possible changes in behaviors and no mortality after 24hours observation in two phases. The LD50, being greater than 5000 mg/kg b.w., is thought to be safe as suggested by Lorke (1983).

Keywords: *Acute toxicity, Dioscorea villosa, albino rats*

Introduction: Yam**,** a species in the genus *Dioscorea* (family Dioscoreacea) is a major home meal in West Africa especially Nigeria **(***Amanze et al.,*2011). Although yams play a significant role in ensuring food security (Zannou *et al.,* 2009). Only seven out of the six hundred species are predominantly utilized in West Africa (Jayakody *et al.,*2007). Wild yam is a perennial crop with non fleshy but dried, narrow and crocked roots bearing horizontal branches of long creeping runners (Ewell *et al.,* 2013)Wild yam is also known as colic root, twining and tuberous vine and is native to North America and Anina. Wild yam species contains diosgenin and have medicinal properties similar to those of other plants. Due to their powerful antifungal properties, they have been traditionally used for the treatment of inflammation, muscle spasms and Asthma. (Tabish, 2008). The aim of this work is to evaluate the toxic potential of this plant with the view to endorse or refute the safety usage of its aqueous extract in traditional medicine.

Materials and Methods- The plant *Dioscorea villosa* was obtained from Ifitedunu in Dunukofia Local Government of Anambra State.

Preparation of Ethanoic extract of *Dioscorea villosa*

Dioscorea villosa was collected, washed, peeled and chopped into pieces to enhance drying. It was dried under room temperature and pulverized to powder. 1.5kg of the powdered yam was weighed and soaked in 4.597L of 70% ethanol for 48hrs to ensure complete extraction. After 48hrs, the mixture was sieved using muslim cloth and filtered with whatmann filter paper. The filterate was concentrated using water-bath at 50^0C.

Experimental Animals: Thirteen male wistar albino rats for the study of size 90-110g were used throughout the experiments. The animals were procured from Chris Experimental Animal Farm and Research Laboratory Mgbakwu, Awka. Standard environmental conditions were maintained in the experiment. All animals are fed with commercial pelleted rats chow (purchased from Eke Awka, Anambra state) and water was allowed *ad-libitum* under strict hygienic conditions.

Experimental design for Acute toxicity Study: The acute toxicity study was conducted in accordance with Lorke's method (Lorke, 1983). The study was conducted in two phases using a total of sixteen male rats. In the first phase, nine rats were divided into 3 groups of 3 rats each. Groups 1, 2 and 3 animals were given 10, 100 and 1000 mg/kg body weight (b.w.) of the extract, respectively, to possibly establish the range of doses producing any toxic effect. Each rat was given a single dose after at least 5 days of adaptation. In addition, a fourth group of three rats was set up as control group and animals in the group were not given the extract.

In the second phase, further specific doses (1600, 2900 and 5000 mg/kg b.w.) of the extract were administered to three rats (one rat per dose) to further determine the correct LD50 value. The extract was dissolved in Phosphate buffered saline (PBS) solution and given via intraperitoneal route. All animals were observed frequently on the day of treatment and surviving animals were monitored daily for 2 weeks for signs of acute toxicity. Recovery and weight gain were seen as indications of having survived the acute toxicity. At the end of 14 days, all surviving rats were sacrificed. The mean body weight was calculated and compared with those of the control group.

Statistical Analysis: The statistical analyses were carried out using statistical package for social sciences (SPSS) Values in all groups were compared using the analysis of variance (ANOVA).

RESULTS

Table 1 Acute toxicity studies and weight of *Dioscorea villosa* (LD_{50})

First phase

S/N	Dose (mg/kg)	Observation	Mortality
1.	10	It was normal	Nil
2.	10	It was normal	Nil
3.	10	It was normal	Nil

S/N	Dose(mg/kg)	Observation	Mortality
1	100	It was normal	Nil
2.	100	It was normal	Nil
3.	100	It was normal	Nil

S/N	Dose(mg/kg)	Observation	Mortality
1.	1000	It was normal	Nil
2	1000	It was normal	Nil
3.	1000	It was normal	Nil

Second phase

S/N	Dose(mg/kg)	Observation	Mortality
1	1600	It was normal	Nil
2.	2900	It was normal	Nil
3.	5000	It was normal	Nil

Table 2 Weight gain of the wistar albino rats

Experiment	Dose (mg/kg b.w)	Weight gain (g)
Phase 1	10	32.84±4.05
	100	27.32±3.65
	1000	12.73±2.76
Control	0	30.75±12.05
Phase 2	1600	7.38
	2900	3.9
	5000	2.9

Discussion:

In Table 1, Oral acute toxicity of *Dioscorea villosa* extract was studied using wistar albino rats as animal model. The study was conducted in two phases. In the first phase, three groups of rats (3 per group each) of different weights were administered with oral doses of 10ml/kg, 100ml/kg and 1000ml/kg body of *Dioscorea villosa* extract respectively. In the second phase, three groups of rats weighing 97g, 92g and 103g were involved and the dosage of the extract was increased to 1600, 2900 ml and 5000ml/kg body weight respectively were equally observed as in the first phase for toxicity signs and possible deaths. There were no possible changes in behaviors and no mortality after 24hours observation in two phases. The LD50, being greater than 5000 mg/kg b.w., is thought to be safe as suggested by Lorke (1983).

Again, the absence of death among rats in all the dose groups throughout the two weeks of the experimental seems to support this claim. Furthermore, the dose-dependent weight loss observed, were not found to be statistically significant ($p>0.05$) when compared with the control group (Table 2).

Conclusively, we adduce that *Disocorea villosa* is good for consumption due to the symbolism of yam as the king of crops manifested in its use in ceremonies such as new yam festivals, marriages and in fertility

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