

## Short Communication

# Effects of *Phyllanthus amarus* on litter traits in albino rats

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Accepted 28 March, 2008

**The results revealed that ethanol extract of the whole plant of *Phyllanthus amarus* reduced the litter size and weight of albino rats at birth, especially at high doses. Doses administered intraperitoneally were 100, 150 and 200 mg/kg bw. Treatments significantly ( $P < 0.05$ ) affected the litter size and litter weight at birth.**

**Key words:** *Phyllanthus amarus*, litter size, litter weight, albino rat.

## INTRODUCTION

*Phyllanthus amarus* is a broad spectrum medicinal plant that has received world wide recognition (Srividhya et al., 1995). This plant has recently attained the status of a miracle plant because of its ability to cure several ailments as claimed by its proponents. It is used for the treatment of malaria, jaundice and diabetes. It also induces abortion. Whole plant of *P. amarus* is usually soaked in hot water or cooked in locally brewed alcohol and drunk as tea. Some people take it as an enema depending on what is being treated.

*P. amarus* is a small annual plant that grows 30 - 40 cm in height and is found through out the tropics and sub-tropics. In Nigeria, it is called "Oyomokeisoamankedem" in Efik, 'Ngwu' in Igbo, and "Iyin Olobe" in Yorubas. Other common names for it include: 'Chanca piedra', 'quebra piedra' (stone breaker), 'ya - taibai' and 'carry me seed'. Lui and Huang (2001) reported that in Brazil and other South American countries, a concentrated extract (water/glycerin) of *P. amarus* in 2 - 3 g tablets or capsules are sold over the counter as drug for various therapeutic purposes.

In clinical research over the years, the plant has demonstrated liver protective, anti-inflammatory, antioxidant, chemoprotective, hypolipidaemic, analgesic, hypotensive, antispasmodic, antimutagenic and hypoglycemic activities (Roa and Alice, 2001). The contraceptive effect of the herb has also been reported by Rao and Alice (2001). The active ingredients in *Phyllanthus* include the lignans phyllanthine, phyllanthanol, phylochrysin, phylltetralin and hypophyllanthine (Thyagarajan et al, 1998). Bioflavonoids, quercetin, quercitol, quercitrin, rutin and the alkaloids, glycosides, saponins and catechins are

also found in *Phyllanthus* (Khanna and Srivastava, 2002).

The objective of this study is to establish the dose dependent and non-dose dependent effects of the whole plant ethanol crude extract of *Phyllanthus amarus* on the litter traits of albino rats.

## MATERIALS AND METHODS

This experiment was conducted at the animal house of the Department of Zoology, University of Calabar, Calabar. Twenty-four (24) sexually matured colony bred female wister albino rats were used in this study. The rats which weighed between 120-150 g were kept under optimum laboratory conditions (ambient temperature of  $25 \pm 3^\circ\text{C}$ ; relative humidity: 50-55%; 12:12 dark: light cycle) and given food (growers' mash - Vital feeds, Calabar) and water *ad libitum* (Arrington, 1976).

The plant *P. amarus* was harvested from the University of Calabar botanical garden and its identity confirmed in the Department of Botany of the same University. The harvested plant specie was air dried for three days at room temperature and then pulverized. 10 g of the powder was soaked in 10 ml of 95% ethanol and allowed to stand for 48 h. This solution was sieved using Whatman's No. 1 filter paper and allowed to stand for another 48 h. It was then dried in a hot air oven at a temperature of  $50^\circ\text{C}$ , to evaporate the ethanol completely. The stock solution was then used to prepare the three different doses- 100, 150 and 200 mg/kg bw - to be administered.

The rats used were housed in groups of 6 rats per treatment and allowed to acclimatize for 2 weeks, at the end of which they received the plant extract intraperitoneally every morning, before receiving their normal chow, for a period of 15 days. 100 mg/kg bw was administered to rats under Group I, 150 mg/kg bw to the group of rats under Group II and 200 mg/kg bw to rats under Group III. The group of rats used as control received 0 mg/kg bw. The first day after the administration of the doses, the female rats were co-habited with normal male rats and allowed to mate for 3 days at a ratio of 2:1. Kindling occurred after a gestation period of 21 days.

**Table 1.** Litter size at birth in wister albino rats administered different doses of *Phyllanthus amarus*.

Experiment	Dose (mg/kg bw)			
	100 (Group I)	150 (Group II)	200 (Group III)	0 (control, Group IV)
1	5.5	5.0	4.5	10
2	6.0	5.2	-	9.3
3	7.0	-	5.4	8.5
Mean*	6.2ab± 0.42	3.4a± 0.7	3.3a± 0.1	9.3b± 0.45

\*Values are mean ± SE.

Means followed by same case letters indicate no significance difference (P> 0.05).

**Table 2.** Litter weight (g) at birth in wister albino rats administered different doses of *Phyllanthus amarus*.

Experiment	Dose (mg/kg bw)			
	100 (Group I)	150 (Group II)	200 (Group III)	0 (control, Group IV)
1	47.0	45.08	45.0	56.6
2	55.0	35.0	-	58.0
3	48.02	-	40.1	60.0
Mean*	50.0ab±0.32	26.69a±0.7	28.36a±0.45	58.2b±0.42

Values are mean ± SE.

Means followed by same case letters indicate no significance difference (P> 0.05).

The litter sizes were recorded and the birth weights of the pups taken immediately using a Mettler balance. This process was repeated two more times to obtain results for three consecutive parities.

#### Data analysis

Experimental design for the study was the Complete Randomized Design (C.R.D.), with the linear model:

$$Y_{ijk} = \mu + T_i + e_{ij}$$

Where Y = observed result,  $\mu$  = population mean (constant),  $T_i$  = treatment combination and  $e_{ij}$  = expected error.

All data collected were analyzed using Analysis of Variance (ANOVA) and Students' T- test.

## RESULTS AND DISCUSSION

Table 1 shows the results of average litter size at birth. There was a decrease in litter size with increase in the dose of herb extract administered in all the treatment groups except the control. In the control group, average litter size varied from 8 – 10. Meanwhile in Group I (100 mg/kg bw) litter sizes were 5 – 7. In Group II (150 mg/kg bw), litter size averaged 5 in number. Rats in the third parity did not kindle at all. In Group III (200 mg/kg bw), average litter size ranged from 4-5 and the rats in the second parity did not kindle at all.

Table 2 shows the results of the litter birth weights. Litter birth weights also decreased with increase in dosage administered. Litter birth weights in Group I varied

between 47 and 55 g while Group II rats weighed between 35 and 45 g on average (for those that kindled). In Group III average litter weights ranged from 40 and 45 g. The highest birth weights range of 56 - 60 g were obtained in the control group with rats that did not receive the extract.

Differences in the dosage of the extract administered significantly affected the results obtained in this study. It showed a trend that corresponds with result reported by Ghosh and Bhattacharya (2004) on anti-implantation activities of *Thespsasia* seed extracts on female rats. Litter sizes could be said to be dose dependent as it decreased with increase in doses administered. It is assumed that the ethanol extract of the herb must have interfered with the reproductive cycle of the female rats to an extent that implantation was somehow affected, resulting in the reduced sizes across parities. Dosage variation also significantly affected litter weights at birth. Female rats treated with high doses had pups with less weight as compared to those treated with lower doses of the extract. This shows that the administered herb had an effect on the general metabolic milieu of pups during gestation.

#### Conclusion

The result of this study has shown that the extract *P. amarus* significantly affected the litter traits of wistar rats. Local care givers and traditional medicine practitioners need to be educated on the adverse effects of the herb *P. amarus* so that more attention will be given to its dosage and administration.

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