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# Hypoglycemic and hypocholesterolemic activities of the aqueous leaf and seed extract of *Phyllanthus amarus* in mice

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**Abstract**

The effect of the aqueous leaf and seed extracts of *Phyllanthus amarus* at oral dose of 150, 300 and 600 mg/kg was investigated for their antidiabetic and anti-lipidemic potentials. The extract produced a dose-dependent decrease in the fasting plasma glucose and cholesterol, and reduction in weights in treated mice. The results suggest that the extract could be enhancing peripheral utilization of glucose but the mechanisms on how this works remain unclear.


*Keywords:* *Phyllanthus amarus*; Hypoglycemia; Hypocholesterolemia

## 1. Introduction

In drug discovery and development, medicinal herbs have consistently been considered the leading source of pharmaceuticals, employed in the treatment of various human diseases due to their high chemical diversity and broad biological functionality [1]. Diabetes mellitus and obesity remain the most common disorders of carbohydrate metabolism. The WHO Expert Committee on diabetes recommended further evaluation of the folkloric methods of managing this disease because of the high mortality and morbidity arising from its attendant complications and problems associated with the use of conventional antidiabetic agents. Several indigenous medicinal plants are employed in the traditional management of diabetes mellitus but there is a need to conduct pharmacognostic and pharmacological studies to ascertain their therapeutic values [2]. One of such plants is *Phyllanthus amarus*. *P. amarus* Schum. and Thonn. (Euphorbiaceae) is a small, erect annual herbal shrub whose stem has a green smooth capsule, and grows up to 10–50 cm high and blooms with flowers of 5 white sepals and apical acute anther.

The fruit has a green capsule, smooth and fruiting pedicels measuring 1–1.5 mm and dilated at the apex; the seeds are longitudinally rugose [3]. The plant is locally known as Iyin-Olobe (Yoruba) in South–West Nigeria. The plant has been attributed with antihypertensive, antidiabetic, analgesic, antiinflammatory, antimicrobial, hepatoprotective and antidiarrheal properties by local herbalists. The hypoglycemic and hypocholesterolemic values of the plant leaves

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Table 1
Effect of the *P. amarus* aerial part aqueous extract on body weight gain in mice

| Group | Dose of extract (mg/kg) p.o. | Mean initial body weight (g) (day 0) | Mean final body weight (g) (day 21) |
|---|---|---|---|
| I | 0 | 24.5±2.9 | 27.5±2.9 |
| II | 150 | 25.0±1.8 | 21.8±2.0 |
| III | 300 | 26.8±1.5 | *19.3±2.0 |
| IV | 600 | 24.0±2.5 | *16.8±1.9 |

Data are expressed as mean±SD, $N=6$ mice in each group, *significant values at $P<0.05$ when compared to the control.

and seeds have not been scientifically evaluated despite its large local use by traditional healers. The present study was, therefore, designed to evaluate these in normoglycemic mice.

## 2. Experimental

### *2.1. Plant*

*P. amarus* young whole plant (500 g), collected from the deciduous forest within the Ojo Campus of the Lagos State University in Ojo Local Government Area of Lagos State, Nigeria in July 2005 was authenticated by Mr. T. I. Adeleke of the Pharmacognosy Department, College of Medicine, the University of Lagos, Nigeria. A voucher specimen (No. PCL Eup P02) was deposited in the Herbarium of the Department of Pharmacognosy of the College.

### *2.2. Preparation of aqueous extract*

Leaves and seeds (150 g) air-dried at r.t. were ground to powder. The powdered sample (85 g) was boiled in 1.5 l of distilled water for 60 min. The decoction was filtered and the filtrate evaporated at 50 °C to dryness giving a deep-brown residue (yield: 21.5% $^{w}/_{w}$). The extract was stored at 4 °C. Doses of the extract: 150, 300 and 600 mg/k b.w. of mice, were prepared using normal saline (Unique Pharmaceuticals, Sango-Otta, Ogun State) as the vehicle.

### *2.3. Animals*

Male Swiss mice weighing 25–30 g were used. They were housed in a standard environmental condition and fed with standard rodent diet (Livestock feeds, Ikeja, Lagos State, Nigeria) and water ad libitum. The study was approved from the Ethical Committee of the Lagos State University College of Medicine, Ikeja, Lagos.

### *2.4. Bioassay*

Animals were randomly allocated to four groups of six animals each. Group I, the control, was fed 0.2 ml of normal saline while groups II, III and IV were orally dosed daily for 21 days with 150 mg, 300 mg and 600 mg/kg of the extract

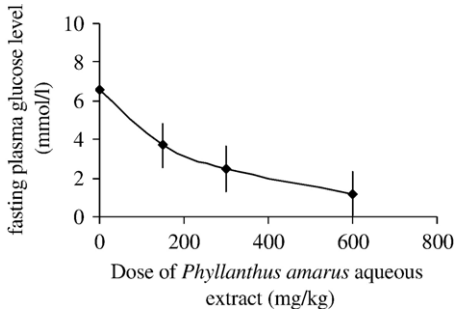


Fig. 1. Effect of the *P. amarus* aerial part aqueous extract on the fasting plasma glucose levels in mice. *$P<0.05$. $N=6$.