

## PHCOG MAG.: Research Article

# *In-vivo* antimalarial activity of aqueous root extract of *Barringtonia acutangula* in mice

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### ABSTRACT

This study scientifically investigated the antimalarial activity of an aqueous root extract (ARE) of *Barringtonia acutangula* (L.) Gaertn. (Lecythidaceae), claimed to be used in malaria therapy in indigenous medicine in Sri Lanka. Three doses of the ARE (400, 800 and 1200 mg/kg), chloroquine or distilled water (DW) was orally administered for 3 consecutive days and the schizonticidal activity was examined in the *Plasmodium yoelii* murine model. The ARE exhibited dose dependent schizonticidal activity, the highest being recorded at 800 mg/kg dose. Oral administration of ARE at 800 mg/kg dosage significantly ( $p < 0.05$ ) suppressed the parasitaemia by 60.88 % compared with the control. However, the ARE was 40 % less potent than chloroquine in the *P. yoelii* murine model. The ARE was well tolerated by mice over a period of 30 days showing no overt signs of toxicity, stress and hepatic (in terms of serum SGOT, SGPT levels), renal (in terms of serum creatinine, urea,  $\text{Na}^+$ ,  $\text{K}^+$  levels) and haematological toxicity. Slightly but a significant ( $p < 0.05$ ) reduction in food and water intake was observed during 2<sup>nd</sup> and 3<sup>rd</sup> week of the experiment. In conclusion, the ARE of *B. acutangula* is orally active, relatively non-toxic and possesses antimalarial activity justifying the claims of indigenous medicine of Sri Lanka.

**KEY WORDS:** Sri Lanka; *Barringtonia acutangula*; antimalarial activity; *in vivo*; *Plasmodium yoelii*

### INTRODUCTION

Malaria is a life threatening disease responsible for 1-2 million deaths each year (1). Despite much effort, the incidence of malaria continues to increase at a significant rate (2). This situation has been compounded by the emergence and spread of drug resistant strains of *P. falciparum* and *P. vivax* in much of the malarious parts of the world (3). The declining efficacy of classical medication in relation to the rapid extension of drug resistant strains of malaria parasites has led to the need for novel efficient anti malaria agents (4). A principal approach to chemotherapeutic research against malaria consists of investigating the traditional plant based antimalarials (5).

The plant kingdom represents a virtually untapped reservoir of novel chemical compounds, many of them extraordinary biodynamic. Eighty percent of the world's population relies on herbal medications to manage disease (6). In Sri Lanka, about 35% of the population relies on indigenous systems of health care (7).

*Barringtonia acutangula* (L.) Gaertn. (Lecythideae) (English: Indian Oak, Sinhala: Diyamidella, Tamil: Adambu) is a small evergreen plant (2.7- 3.6 m in height). This plant occurs throughout India, Sri Lanka, and North Australia (8).

It has a brownish grey bark with glabrous young parts.

The leaves are simple, alternate and stipulate, and are 7.5 -12.5 cm long. Leaves are oval shaped, bright green in colour with tapering bases and contain a reticulate venation pattern. Their petioles are 0.6-1.2 cm long. Flowers are regular, bisexual and about 2.5 cm in diameter (9). Petals are cream coloured and stamens are dark bright crimson. Tacemes are 22.5- 30 cm long sepals and fused into a calyx tube adnate to the ovary. Ovaries are inferior to the flowers in long pendulous racemes, fragrant, with bright red stamens. Fruits are bluntly quadrangular and 2.5- 4.0 cm long (9).

Phytochemically, the bark and the root of *B. acutangula* contain saponins, tannins and triterpenes, and phenolic compounds (9). The juice of the leaves is used for diarrhoea (9). The water extract of the bark provides a scorpion venom antidote (10) and is also used on wounds (9). The powdered seeds are inhaled as snuff for relief in headache and externally applied for insect stings (9). The water extracts of roots and barks are employed as a febrifuge for malaria as these supposedly possess similar properties to the cinchona bark (9).

However, the claimed activities of this plant have not been scientifically investigated so far. Therefore, this study was undertaken to validate the claim of