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Vasorelaxant action of aqueous extract of the leaves of *Persea americana* on isolated thoracic rat aorta

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Abstract

The present study investigated the vasorelaxant action of the aqueous leaves extract of *Persea americana* on isolated rat aorta. The results showed that the extract produced significant vasorelaxation and that the effect is dependent on the synthesis or release of endothelium-derived relaxing factors (EDRFs) as well as the release of prostanoid. The extract also reduced vasoconstriction probably by inhibiting Ca^{2+} influx through calcium channels.

Keywords: *Persea americana*; Vascular relaxation; Rat aorta; Nitric oxide

1. Introduction

Persea americana Mill (Lauraceae) is a deciduous plant, which is widely distributed throughout tropical and subtropical Africa. The fruit of the plant is commonly known as avocado pear. In Nigeria, the leaf is known in common names as Ewé pia (Yoruba), Ikבŋ eben mbakara (Efik), Akwukwo Ube oyibo (Igbo), and Ganyen piya (Hausa). The root, bark, fruit, and leaf are used extensively in traditional medicine for the treatment of various ailments. In Congo Brazzaville, a decoction of the stem bark is taken to relieve cough;

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while in Mexico, it is used as an aphrodisiac, emmenagogue, to prevent miscarriage, to speed up postpartum recovery, and in the treatment of haemorrhage between menstrual periods [1,2]. The leaves are used in Brazil and Jamaica for the treatment of high blood pressure [3,4]. In Nigeria, several ethnic groups use the leaves of *P. americana* in the treatment of hypertension. Adeboye et al. [5] have confirmed that the administration of the leaf extract of *P. americana* on anaesthetized normotensive male Sprague–Dawley rats produced a significant reduction in blood pressure.

However, the possible mechanisms by which *P. americana* lowers blood pressure have not been worked out. This study investigates the effects of the aqueous leaf extract of *P. americana* on endothelium-intact or -denuded aortic rings. In addition, the effects of L-NAME or methylene blue or indomethacin on *P. americana* extract activity were investigated. Finally, the effects of *P. americana* on aortic rings precontracted with noradrenaline or potassium chloride were investigated.

2. Experimental

2.1. Plant

P. americana leaves, collected in the University of Lagos Staff Quarters, Akoka, Lagos State, Nigeria, in June 1997 in the early hours of the morning, in accordance with the practice of traditional medicine practitioners, were authenticated by Dr. O. Ugboaja, Forestry Research Institute of Nigeria (FRIN), Ibadan. A voucher specimen has been deposited in the FRIN Herbarium (no. FHI 106099).

2.2. Plant extract

P. americana leaves dried at 40 °C for 5 days were ground into fine powder and stored in an amber bottle. Fine powder material (840 g) was Soxhlet-extracted with distilled water and filtered. The solution (pH 5.4) was lyophilized, giving 143.7 g of extract (17.11% wt/wt). A new stock solution was prepared on each day of the experiment.

2.3. Animals

Sprague–Dawley rats of either sex weighing 250–300 g were used for the studies. The animals were obtained from the Laboratory Animal Center of the College of Medicine, University of Lagos, Lagos, Nigeria. They were kept in a well-ventilated animal house and received standard animal chow (Pfizer Feeds Nigeria, PLC) and water ad libitum. Prior to experimentation, they were fasted overnight with access to water ad libitum.

2.4. Drugs

Noradrenaline, acetylcholine hydrochloride, N^G-nitro-L-arginine methylester (L-NAME), indomethacin were from Sigma Chemical Company (St. Louis MO, USA). Methylene blue and potassium chloride were from British Drug Houses, UK.