ELSEVIER

Fitoterapia 78 (2007) 502 – 505

FITOTERAPIA

www.elsevier.com/locate/fitote

Hypoglycemic and antidiabetic activities on the stem bark aqueous and ethanol extracts of *Musanga cecropioides* in normal and alloxan-induced diabetic rats

A.A. Adeneye [a,*], O.P. Ajagbonna [b], O.W. Ayodele [c]

[a] *Department of Pharmacology, Lagos State University of Medicine, P.M.B. 21266, Ikeja, Lagos State, Nigeria*
[b] *Department of Veterinary Physiology and Pharmacology, Faculty of Veterinary Medicine, Usman Danfodiyo University, P.M.B. 2346, Sokoto, Nigeria*
[c] *Biochemistry Department, Faculty of Science, Lagos State University, Ojo Campus, Lagos, Nigeria*

Received 4 May 2006; accepted 11 May 2007
Available online 3 July 2007

Abstract

Daily oral administration of the aqueous and ethanolic extracts of *Musanga cecropioides* stem bark in normal and diabetic rats at doses of 250, 500 and 1000 mg/kg/day , for 14 days significantly lowered the fasting plasma glucose levels in normal and alloxan-induced diabetic rats in dose-dependent fashion. The ethanol extract induced more significant antidiabetic effect than the aqueous extract.

Keywords: *Musanga cecropioides*; Hypoglycemic; Antidiabetic; Stem bark

1. Introduction

Musanga cecropioides, also known as the Umbrella tree is locally called Ágbáwó or Ágá (in Yoruba dialect); *ónru* in Igbo; *otutu unó* in Efik; *Oghohen* in Bini; *Ukporwe* in Ijaw and *Egbesu* in Itsekiri [1]. The plant is an erect, rapidly growing tree ubiquitous to deciduous tropical West African rainforest. It grows up to 20 m tall with umbrella-shaped crown, straight and cylindrical trunk, girth up to 2 m and stilt root of up to 3 m above ground level [1].

Different parts of the plant have been claimed for the management of different diseases in folkloric medicine [2]. In Cameron, the red–brown juice from its stem bark is used to induce lactation in pregnant and nursing mothers [2]. In Nigeria, the leaves and latex are also used in the management of suspected cases of hypertension [3]. Contraceptive property has been claimed for the extract of bud sheaths [4]. The oxytocic, antihypertensive, antidiabetic traditional uses of the leaves in some parts of Africa have been reported [5–8].

Recently, we reported in rats the dose-related hypotensive effect and the relevant mechanisms of action by the plant stem bark aqueous extract through angiotensin converting enzyme inhibition [9]. However, the hypoglycemic and antidiabetic potentials of this local herb has not been scientifically evaluated despite the extensive use of the boiled and ethanolic

* Corresponding author. Tel.: +234 803 583 5589.
E-mail address: adeneye2001@yahoo.com (A.A. Adeneye).

0367-326X/$ - see front matter © 2007 Elsevier B.V. All rights reserved.
doi:10.1016/j.fitote.2007.05.001

decoction of the plant stem bark in the management of diabetes mellitus in traditional medicine. The present study was, therefore, designed to evaluate the dose-dependent hypoglycemic and antidiabetic effects of the aqueous and ethanol extracts of the stem bark in normal and alloxan-induced diabetic rats as well as elucidating its possible mechanism(s) of action.

2. Experimental

2.1. Plant

M. cecropioides R.Br. Apud Tedlie (Cecropiaceae), stem bark collected from the deciduous forest of Ijebu-Igbo in Ijebu North Local Government Area of Ogun State, Nigeria, in the first week of December, 2005. A voucher specimen was deposited in the Herbarium of the Pharmacognosy Department of College of Medicine, University of Lagos, with reference number: PCLHCEC 01.

2.2. Aqueous extract preparation

200 g of the powdered stem bark were boiled in distilled water for 1 h. The cold decoction was filtered through a Whatman No.1 filter paper and the solution was evaporated to dryness in an aeration oven (Genlab Ltd., Widnes, England) at 50 °C. The deep brown solid residue (MCW) (yield 12.5%) was stored in a refrigerator at 4 °C.

2.3. Ethanol extract preparation

100 g of the powdered stem bark were soaked in absolute EtOH (NAAFCO Scientific Supplies, London). After 25 h the mixture was filtered in through a Whatman No.1 filter paper. The filtrate was evaporated to dryness with an evaporating dish of known weight (Bourgeat Model-EN 631 2/3, France). The solid residue (MCE) (yield 12.5%) was stored in a refrigerator at 4 °C.

2.4. Animals

Throughout the experiment, experimental rats were processed in accordance with the international ethical guidelines for laboratory animal use and care as found in the U.S. guidelines [10].

Male Wistar rats (100–130 g) aging 10–12 weeks were obtained from the Animal Houses of the University College of Medicine and College of Medicine, University of Lagos, Idi-Araba, Lagos, and the Nigerian Institute of Medical Research, Yaba, Lagos.

The rats were housed in metal cages in the metabolic laboratory with constant temperature of 23–26 °C, 12/12 h light/dark cycle and maintained with free access to water and standard rat chows (Neimeth Livestock Feeds, Ikeja, Nigeria) ad libitum. Sixteen hours before the experiment, food was withdrawn but water remained available ad libitum.

2.5. Hypoglycemic effect in normal rats

Animals were divided in four groups of six rats each and treated orally for 14 days as follow: group I, the control, was fed 10 ml/kg/day of distilled water; groups II, III, and IV were administered 250, 500 and 1000 mg/kg/day of MCW and MCE, respectively, using rat gastric tube under the sample experimental conditions and sham-handling.

2.6. Hypoglycemic effect on alloxan induced diabetes in rats

After 16 h overnight fast, the experimental animals were made diabetic by single intraperitoneal administration of cold, freshly prepared solution of alloxan (Sigma Chem. Co., St. Louis, USA) at a dose of 120 mg/kg dissolved in 2 mM citrate buffer (pH 3.0.). After one week, animals with fasting blood glucose of 300 mg/dl or more were considered diabetic and were employed in the study. The rats were divided randomly into 10 groups of 6 rats each and treated as follow: groups I (control normal rats), II (control diabetic rats), III, IV and V were orally treated for 14 days with 250, 500 and 1000 mg/kg/day of MCW and MCE, respectively. Metformin 20 mg/kg/day was used as a reference.