

Identification of Ellagic Acid Derivatives in Methanolic Extracts from *Qualea* Species

Ana L. M. Nasser^{a,*}, Camila B. A. Carli^b, Clenilson M. Rodrigues^a,
Danielle C. G. Maia^b, Iracilda Z. Carlos^b, Marcos N. Eberlin^c,
Clélia A. Hiruma-Lima^d, and Wagner Vilegas^a

^a UNESP – São Paulo State University, Instituto de Química de Araraquara, C. Postal 355, 14801-970, Araraquara, SP, Brazil. Fax: 55-16-3301-6692. E-mail: nasser@iq.unesp.br

^b UNESP – São Paulo State University, Faculdade de Ciências Farmacêuticas, C. Postal 502, 14801-902, Araraquara, SP, Brazil

^c UNICAMP – Campinas State University, Instituto de Química, 13083-970, Campinas, SP, Brazil

^d UNESP – São Paulo State University, Departamento de Farmacologia, Instituto de Biociências, 18618-000, Botucatu, SP, Brazil

* Author for correspondence and reprint requests

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The methanolic extract from the barks of the medicinal plant *Qualea parviflora* (Vochysiaceae) was fractionated by column chromatography over silica gel followed by gel permeation over Sephadex LH-20 to give 3,3'-di-*O*-methylellagic acid-4-*O*- β -D-glucopyranoside (**1**), 3-*O*-methylellagic acid-4'-*O*- α -L-rhamnopyranoside (**2**), 3,3',4-tri-*O*-methylellagic acid-4'-*O*- β -D-glucopyranoside (**3**), and 3,3'-di-*O*-methylellagic acid (**4**), together with triterpenes and saponins. We also performed comparative analyses among this species and *Q. grandiflora* and *Q. multiflora* using high-pressure liquid chromatography. The biological assays showed that, when compared to the standard ellagic acid, compounds **1–4** are less cytotoxic but have a lower capacity of stimulating murine peritoneal macrophages to release nitric oxide and tumoural- α necrose factor.

Key words: *Qualea*, Ellagic Acid Derivatives, Liquid Chromatography

Introduction

Qualea parviflora, *Q. grandiflora* and *Q. multiflora* (Vochysiaceae) are trees found on the American Continent and are used as antiseptic, astringent, antidiarrheal and against gastrointestinal disorders (Grandi *et al.*, 1989; Septímio, 1994; Hiruma-Lima *et al.*, 2006). Previous studies on *Qualea* species afforded fatty acids and polysaccharides in the seeds (Mayworm and Salatino, 2002; Mayworm *et al.*, 2000) besides triterpenes and saponins in the barks (Nasser *et al.*, 2006).

As part of our ongoing research on bioactive compounds from Brazilian plants for the treatment of tropical diseases, we have started to work on natural products which can be triggered with the participation of the immunological system. Macrophages are cells of the innate immunological system which have several functions, such as the removal of foreign bodies, the cytotoxicity of tumoural cells, the presentation of antigens and the activation of T-cells with production of cytokines (Adams and Hamilton, 1984).

The activation of macrophages is a key process of the innate immunity for the initiation and propagation of defensive reactions against pathogens. When activated by pathological stimuli or injuries, the macrophages liberate pro-inflammatory cytokines and pro-inflammatory mediators such as tumoural- α necrose factor (TNF- α) and NO. NO is a highly soluble radical, formed through the oxidation of the nitrogen atom of the amino acid L-arginine by means of the inducible nitric oxide enzyme (iNOS) (Nathan, 1992). Both the production of NO and the activation of macrophages are regulated by liberated cytokines which have autocrine function, such as TNF- α , and a paracrine function, such as interferon- γ (IFN- γ) (Kovallousky *et al.*, 2000).

In the present paper we report the isolation of ellagic acid derivatives from the methanolic extract of barks of *Q. parviflora*, as well as the identification of these compounds in *Q. grandiflora* and *Q. multiflora* using high-pressure liquid chromatography analyses (HPLC-UV-PDA). We also