

Essential oil composition of *Murraya exotica* from the plains of northern India[#]

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Received 26 August 2003; Revised 11 August 2004; Accepted 9 August 2004

ABSTRACT: The essential oil composition of *Murraya exotica* leaves and flowers from CIMAP Research Farm, Lucknow, were analysed by GC and GC–MS, which resulted in the identification of 56 and 72 constituents, representing 99.8% and 99.2% of the oils, respectively. The leaf oil showed (*E*)-nerolidol (27.8%), α -zingiberene (10.0%), β -caryophyllene (9.7%), (*E,E*) farnesol (8.9%) and δ -elemene (5.1%) as the major constituents, while the flower oil showed (*E,E,E*)- α -springene (23.8%), (*E*)-nerolidol (18.7%), (*E,E*) α -farnesene (13.2%), methyl palmitate (6.8%) and germacrene B (5.9%) as the major constituents. Copyright © 2005 John Wiley & Sons, Ltd.

KEY WORDS: *Murraya exotica*; Rutaceae; essential oil composition; (*E,E,E*)- α -springene; nerolidol; β -caryophyllene; (*E,E*) farnesol; (*E,E*) farnesene

Introduction

Murraya exotica^{1,2} L. (family Rutaceae) is a handsome evergreen shrub or small tree 3–4 m in height with a spreading crown and short, often crooked, trunk, found almost throughout India and the Andaman Islands up to 1500 m. The plant is commonly grown in gardens for its glossy green foliage and large clusters of fragrant flowers. It is a popular hedge plant and is well adapted for topiary work. Propagation may be done by seeds, cuttings or layering.³

The leaves are stimulant and astringent. The leaves and bark are reported to be used for diarrhoea and dysentery in The Philippines³ and China.⁴ The powdered leaves are applied to cuts. The leaves and root bark are sometimes used against rheumatism, cough and hysteria, and the twigs are used for cleaning teeth. The leaves possess antibiotic activity against *Micrococcus pyogenes* var. *aureus* and *Escherichia coli*.³ The roots of *M. exotica* were used in China as a pain killer⁴ and as an antifertility agent.^{5,6} Recently El-Sakhawy *et al.*⁷ reported strong antifungal activity against *Candida albicans* and modest antibacterial activity.

M. exotica has been the subject of several phytochemical studies, which revealed the presence of alkaloids, coumarins, flavanoids, carotenoids^{8–10} and essential oil. In 1974 Gupta and Chandra characterized 11 constituents in *M. exotica* flower oil from India, in which β -

pinene (25.6%) and citral (7.2%) were the major constituents. In 1979, Der Joan¹² reported five compounds: 1,8-cineole, hydroxy citronellal, iso-eugenol, geranyl acetate and dimethyl anthranilate. In 1988 Li *et al.*² reported the presence of 19 constituents in the leaf oil of *M. exotica* from China. Of 19 constituents, six were identified, of which caryophyllene (50.0%), humulene (7.1%), α -cadinene (5.1%) and α -curcumene were the major constituents. El-Sakhawy *et al.*⁷ reported 29, 34 and 31 constituents in flower, leaves and fruit essential oils of *M. exotica* from Egypt, having 88.9%, 62.5% and 80.5% of α -pinene.

In our recent report¹³ on the essential oil composition of *M. koenigii* from the eastern, southern, northern (plain and hills) states of India, significant differences were observed. Similar observations by other researchers showed that the chemical composition of the essential oil from other *Murraya* species may vary with the locality,¹⁴ which prompted us to carry out the detailed analysis of leaf and flower essential oils of *Murraya exotica* from the northern plains of India.

Experimental

Plant Materials

The fresh leaves and flowers of *M. exotica* were collected from our CIMAP research farm, Lucknow, in the months of March and October 2001, respectively, and identified by one of us (SCS), Botany Division CIMAP Lucknow. A voucher specimen has been deposited in the Herbarium Division of our Institute.

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[#] CIMAP Communication No. 2003-38 J.