

Cey coll

547.7

POV

TERPENES AND ESSENTIAL OILS FROM
SRI LANKA PLANTS

Presented by

V. PUVAHESARAJAH B.Sc.

being a thesis presented in part fulfilment
of the requirements for the award of the
degree of

PERMANENT REFERENCE

FOR USE IN THE
LIBRARY ONLY

MASTER OF SCIENCE

in the

University of Sri Lanka

360954 0

November 1978.

Department of Chemistry
Peradeniya
Sri Lanka

SYNOPSIS

Essential oils of some Ocimum species growing in different agroclimatic areas of Sri Lanka have been analysed. The plants collected belonged to three botanical entities; Ocimum gratissimum, Ocimum canum, and Ocimum sanctum.

All samples of O. gratissimum belonged to the eugenol type, their essential oils containing 50-76% eugenol. Large amounts of eugenol are imported annually into Sri Lanka by the Perfumery Industry. Organised cultivation of O. gratissimum along with cinnamon and cloves (whose essential oils also contain eugenol) is recommended to save valuable foreign exchange. Nine constituents have been identified for the first time from the oils distilled from the eugenol type O. gratissimum. They are: α -pinene, β -pinene/sabinene, cineol, β -caryophyllene, α -humulene, camphor, citronellol, eugenyl acetate and substantial amounts of γ -terpinene/p-cymene. The oil yield and the eugenol content were found to increase with increasing plant maturity. Mature inflorescences are a better source of oil and eugenol than leaves and stems. The oil yield and eugenol content of O. gratissimum decreased somewhat during the rainy season.

The O. canum in Sri Lanka belonged only to the camphor and citral types. Methyl cinnamate type O. canum has not yet been located. Eventhough the Indian species were mainly of citral type,

the camphor type appears to be the main chemo-type of O. canum in Sri Lanka. Large amounts of camphor are imported into Sri Lanka and this is used mainly for religious ceremonies. The present study shows that the oil from O. canum (camphor type) growing wild in the Eastern Province of Sri Lanka could be used as an alternate source of camphor. An organised cultivation and pilot plant extraction of camphor would be a worthwhile exercise for the Research Division of the Minor Export Crops. Camphor and the oil percentages were found to vary markedly and there appears to be no correlation between them. The presence of β -phellandrene, cineol, linalool, methyl eugenol and cinnamyl alcohol in the essential oils of O. canum (camphor type) is being reported for the first time. A new strain of chemo-type of O. canum collected from Sibile District contains borneol/cadinene as the major constituent in the essential oil.

The citral chemo-type of O. canum has been located growing along the Eastern coast of Sri Lanka. Even though the occurrence of this chemo-type in Sri Lanka is relatively rare the oils from this type were rich in citral and it is worthwhile cultivating this chemo-type. In some of the samples studied about 90% of the oil was found to be citral. Thus O. canum (citral chemo-type) oil could augment the citral supply from lemon grass oil for the Perfumery Industry.

During the course of this study we have identified and characterised three new strains or chemo-types of O. sanctum. This information is new and it has not been reported earlier. The oils had α -pinene, β -caryophyllene, and methyl eugenol as their respective major constituents. The green and purple varieties collected from Akkaraipattu had considerable amounts of methyl eugenol and consequently had a sweet carnation type scent.

The antibacterial properties of some Ocimum oils have been evaluated using four different types of bacteria and promising results have been obtained.

Perfumery concretes and absolutes of the flowers of Mesua ferrea have been prepared and their physico-chemical properties have been determined. Chemical analyses of the concretes were carried out. Friedelin, lupeol, sitosterol, and oleanolic acid have been isolated from the concretes for the first time. α -Pinene, β -pinene, camphene, γ -terpinene, limonene and β -caryophyllene have been identified from the steam distillates of the perfumery concretes for the first time.

Attempts were made to work out ideal conditions for the conversion of naturally occurring eugenol to the more desirable perfumery base, isoeugenol. The isomerisation was accomplished in good yield using a fusion method and employing locally available sodium hydroxide.