COMPOSITION OF THE STEAM VOLATILE OIL FROM *CALOPHYLLUM INOPHYLLUM*

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Steam volatile oil from the flower of ***Calophyllum inophyllum*** *was examined by the GCMS technique. Twenty-five chemical components were detected, 17 of which, accounting for approximately 75% of the oil, were identified 1,2,3,4,4*a*-hexahydro-1,6-4-(I-methylethyl) napthalene was found to be the most abundant component (24.5%). Other major constituents were* a*-cubenene,* b*-bourbonene,* b*-selinene, calarene,* b*-farnesene,* a*-fernesene,* d*-cadinene,* b*-sesquiphellandrene, octadecanal, hexadecene and farnesol.*

INTRODUCTION

Calophyllum inophyllum is a member of the family Guttiferae which consists of 40 genera and 1000 species. Several *Calophyllum* species have been recorded in Malaysia. Among them, C. *inophyllum* is the most widespread and has superior timber qualities (Burkill, 1935; Wong, 1982).

Studies on the chemical composition of the heartwood of C *inophyllum* showed the presence of several xanthones, jacareubin, 6-deoxyjacareubin, 1,7-dihydroxyxanthone, 1,5,6-trihydroxyxanthone, 6(3-methylbut-2-enyl)-1,5-dihydroxyxanthone, 2-(3-methylbut-2-enyl)-1,3,5-trihydroxyxanthone, 2-(3-methylbut-2-enyl)-1,3,5,6-tetrahydroxy-xanthone, 1,6-dihydroxy-5-methoxyxanthone and 2-(3-hydroxy-3-methylbutul)-1,3,5,6-tetrahyd-roxyxanthone (Al-Jebory and Locksley, 1971; Goh and Ibrahim, 1969). However, there has been no report of chemical studies on the essential oil of C *inophyllum.*

As part of our continuing interest in the chemotaxonomy of medicinally important flora of Malaysia, we report in this paper our work on the chemical composition of essential oil from the flower of C *inophyllum.*

MATERIAL AND METHODS

C inophyllum was collected from Morib, Selangor Darul Ehsan. A voucher specimen was deposited at the Herbarium of the Department of Botany at UKM. Fresh flowers of the plant was steam distilled in all glass Dean and Stark apparatus modified to give lower phase return for 4 h. The distillation yielded 0. 1% oil on the fresh weight basis. The oil collected was pale yellow in colour and gave refractive index and specific gravity values of 1.4573 and 0.9702 (at 30°C) respectively.

GCMS analysis was performed on a Hewlett-Packard instrument, equipped with Wiley Library search spectral data system, under the following conditions: Carbowax-20 M fused silica capillary column (30 in x 0.25 min id); temperature programming (60°C - 3°C/min - 200°C); helium as carrier gas, ion-source temperature 180°C and electron energy 70eV.

Identification of compounds were accomplished by comparing the retention time of the peaks with those of authentic compounds run under identical conditions, and confirmed by comparing the NIS fragments of the peaks with 15,000 library search spectral data system.

RESULTS AND DISCUSSION

Steam distillation of the flower of C *inophyllum* gave a pale yellow oil with a pungent smell at 0. 1% yield. Analysis of the oil by capillary GC resolved the oil constituents into 25 components, of which 17 had been identified by comparison against the GCMS database facility (Table 1). The major constituent of the oil was found to be a napthalene derivative, l,2,3,4,4a,7-hexahydro-1,6-dimethyl-4-(l -methylethyl)napthalene, which accounted for 24.50% of the oil. Other components identified were ∝-cubebene, β-selinene, calerene, β-farnesene, δ-scadinene, β-bourbonene, zingiberene, copaene, murelene, sesquiphellandrene, octadecanal, hexadecene and farnesol.

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Table 1. Composition of the Essential Oil from C *inophyllum*

Peak No.	**Retention Time**	**Assignment**	**Area %**
1.	14.38	α-Cubebene	6.83
2.	15.23	β-Bourbonene	3.01
3.	18.07	Napthalene derivative	24.5
4.	18.94	Zingiberene	0.46
5.	20.36	β-Selinene	5.28
6.	20.65	Calarene	6.44
7.	21.32	β-Farnesene	6.53
8.	21.64	$C_{10}H_{16}$	2.35
9.	21.89	$C_{15}H_{24}$	7.69
10.	22.14	Copaene	0.77
11.	22.52	α-Muurolene	0.82
12.	22.90	$C_{15}H_{24}$	2.12
13.	23.41	α-Farnesene	3.76
14.	23.75	δ-Cadinene	4.74
15.	24.08	$C_{15}H_{24}$	2.61
16.	24.34	β-Sesquiphellandrene	2.12
17.	26.56	Napthalene derivative	0.09
18.	33.48	Nerolidol	0.95
19.	36.53	Octadecanal	2.02
20.	37.05	$C_{15}H_{26}O$	0.59
21.	38.28	$C_{15}H_{24}$	1.68
22.	40.21	$C_{11}H_{18}O$	0.59
23.	42.53	$C_{30}H_{50}$	5.66
24.	43.63	Hexadecene	2.18
25.	55.64	Farnesol	2.59