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ESSENTIAL OIL OF *PIPER MARGINATUM*

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The decoction of leaves of *Piper marginatum* Jacq. (Piperaceae) called "caapeba cheirosa" is used by natives of the Amazon against liver and vesicle diseases and as a tonic with carminative and antispasmodic action (1). Leaf extracts of *P. marginatum* have been shown to have a significant cercaricidal activity (2). In the

TABLE 1. Constituents of the Essential Oils of *Piper marginatum*

Peak	Compound	Oil[a] (%)		
		Leaves	Stems	RRT[b]
1	α-Thujene[c]	Trace	—	0,403
2	α-Pinene[c]	0,84	0,68	0,419
3	Sabinene	Trace	Trace	0,490
4	β-Pinene[c]	0,80	0,60	0,497
5	Myrcene[c]	0,56	0,38	0,526
6	α-Phellandrene[c]	0,57	0,52	0,550
7	Δ^3-Carene	1,17	3,33	0,562
8	α-Terpinene[c]	0,73	0,45	0,575
9	*p*-Cymene[c]	0,59	0,41	0,590
10	Limonene[c]	0,42	0,43	0,598
11	*cis*-Ocimene[c]	1,32	0,33	0,620
12	*trans*-Ocimene[c]	2,31	0,68	0,641
13	γ-Terpinene[c]	1,87	1,27	0,661
14	α-Terpinolene[c]	1,11	0,85	0,720
15	Linalol[c]	0,60	0,08	0,745
16	Alloocimene	0,25	0,07	0,805
17	Estragol[c]	0,29	0,09	0,946
18	Safrole[c]	0,51	0,10	1,124
19	Tridecane[c]	—	0,03	1,146
20	δ-Elemene	1,83	1,40	1,220
21	α-Copaene	2,47	1,71	1,294
22	β-Bourbonene	0,57	0,27	1,309
23	β-Elemene	1,60	0,94	1,323
24	Methyleugenol[c]	1,02	1,48	1,346
25	β-Caryophyllene[c]	4,01	5,57	1,376
26	α-Humulene	1,34	0,59	1,435
27	Myristicin[c]	0,23	9,23	1,445
28	γ-Muurolene	0,05	0,74	1,476
29	γ-Elemene	3,75	—	1,514
30	δ-Cadinene	0,48	0,79	1,558
31	3,4-Methylenedioxypropiophenone[c]	8,01	8,92	1,583
32	Elemol	0,80	0,38	1,603
33	Elemicin[c]	1,32	1,53	1,616
34	Nerolidol[c]	0,23	0,07	1,626
35	Isoelemicin[c]	0,07	1,37	1,641
36	Dillapiol[c]	0,73	1,14	1,728
37	2-Hydroxy-4,5-methylenedioxypropiophenone[c]	1,10	1,35	1,744
38	δ-Cadinol	—	0,15	1,761
39	β-Eudesmol	0,46	0,32	1,771

[a]Relative to quantitation report of the data system.
[b]Retention time relative to methyl pelargonate (IS).
[c]Identity confirmed by ms and gc comparisons with authentic compounds.

volatile oil and EtOH extracts of leaves of *P. marginatum*, the presence of safrole, piperonal, 3,4-methylenedioxy-, 2-hydroxy-4,5-methylenedioxy-, and 2-methoxy-4,5-methylenedioxypropiophenones has been noted (3,4). From the BuOH extracts were isolated the flavonoids vitexin and marginoside (5).

Analyses of the steam-distilled essential oils from the leaves and the stems of *P. marginatum* by capillary column gc/ms confirmed the presence of safrole, 3,4-methylenedioxypropiophenone, 2-hydroxy-4,5-methylenedioxypropiophenone, and other arylpropanoids, in addition to many monoterpenoids and sesquiterpenoids. Piperonal and 2-methoxy-4,5-methylenedioxypropiophenone were not detected as reported previously (4). The composition profile of the arylpropanoids found in the oil may be of some biological importance. Many of the identified compounds, including the major constituent myristicin, besides elemicin and dillapiol, show biological activity (6,7).

Relative concentrations of 39 individual peaks and their retention data are shown in Table 1. Peaks whose identity was confirmed by comparison of both mass spectrum and gs retention data with those of authentic compounds are so indicated. Other identifications were made by comparison of mass spectra with those in the data system library and in the literature. The whole gas chromatogram presented 76 peaks.

EXPERIMENTAL

The aerial parts of the plant were collected near the city of Itacoatiara, State of Amazonas, during the dry season. Voucher specimen (No. 93.904) was deposited in the INPA Herbarium in Manaus. Air-dried leaves and stems were subjected to steam distillation according to current techniques (8). The obtained oils were centrifuged together with anydrous Na_2SO_4 and produced a yield of 0.7 and 0.1%, respectively.

The volatile oils were each analyzed by glc on a Carlo Erba (FID) instrument, using a 30 m×0.25 mm fused silica capillary column containing a 0.25 μm film of SE-54. Hydrogen was used as carrier gas, adjusted to a linear velocity of 33 cm/sec (measured at a 150°); split flow was adjusted to give a 20:1 ratio, and septum sweep was a constant 10 cc/min. Splitless injection of 2 μl of a 1:1000 n-hexane solution was followed by a delay of 30 sec before beginning purge. Injection was done with an oven at 50°. After 3 min initial wait, temperature was programmed at 6°/min to 230°.

The oils were submitted to gc/ms separation on a Finnigan 4021 quadrupole mass spectrometer, which includes on INCOS data system, coupled to a gc equipped with an identical 30m SE-54 fused silica capillary column. Injection and oven-programming temperature were the same as above except a 4°/min gradient was used. The ms was in EI mode at 70eV. The quadrupole filter was scanned from 34 to 343 daltons once every second, and resulting spectra were stored on disc latter recall.

Full details of the isolation of the volatile oils and identification of the compounds are available on request to the senior author.

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