# Chemical Constituents of *Eupatorium chinense* L.

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*EUPATORIUM* L. (Compositae) represents a large genus of herbs, shrubs and undershrubs with varied biological properties[1]. *Eupatorium chinense* L. is one of the few species found in countries like China and India. The paper presents a report of analysis of a species of Indian origin identified as *E. chinense* L. (compositae) which appears to be different from that of *E. chinense* varieties reported earlier[2]. The plant has shown mild diuretic property in the preliminary screening.

## Experimental

The air-dried aerial parts (700 g) were extracted with $Et_2O$-MeOH-petrol (1 : 1 : 1) and the resulting extract (14.6 g) was dissolved in MeOH and chilled by keeping in a refrigerator overnight. The solids fraction-I (fatty materials separated) was filtered out (~3.4 g) and the soluble fraction-II obtained was concentrated to get an extract (~11.2 g). Fraction-I was separated by column chromatography (silica gel 60 ; Merck) using petroleum ether (PE), PE/$Et_2O$ (95 : 5, 90 : 10, 85 : 15, 80 : 20, 75 : 25, 50 : 50, 25 : 75), $Et_2O$, $Et_2O$/MeOH (90 : 10 and 80 : 20) to get 11 fractions (100 ml each) which were monitored by tlc (silica gel, 20 cm × 20 cm plates × 1.5 mm thickness) using appropriate solvent systems, PE/$Et_2O$, 9 : 1 (A), 4 : 1 (B), 3 : 2 (C), 1 : 1 (D), 2 : 3 (E), $C_6H_6$/$Me_2CO$, 9 : 1 (F) and 8 : 2 (G).

The compounds isolated by preparative tlc were identified from their ir (Perkin-Elmer 299B), mass (VG Analytical Organic Mass spectrometer, 70 eV) and $^1H$ nmr (Bruker WM 400) spectra in comparison with the reported ones[3].

## Results and Discussion

$^1H$ nmr spectra of first column chromatographic fractions 1 – 3 showed only signals due to long-chain hydrocarbons. Fractions 4 – 5 afforded a white solid (~1.0 g), tlc of the fractions (solvent system B) afforded one minor spot 1 ($R_f$ 0.92) and another intense spot 2 ($R_f$ 0.89). The former was identified as squalene and the latter as taraxasterol palmitate.

*Squalene :* Compound **1** was identified as squalene, δ 1.35, 1.75, 2.10, 5.11 and *m/z* (rel. int.) 81 (100), 137 (38), 95 (25), 93 (20), 70 (19), 121 (16), 136 (13), 410, $[M]^+$ calcd. for $C_{30}H_{50}$ (11).

*Taraxasterol palmitate :* Compound **2**, colourless needles, m.p. 102° ; $[\alpha]_D^{26}$ +71 (*c* 0.356) ; $\nu_{max}$ (KBr) 1 722 (CO), 1 633 (C=C) and 863 (=$CH_2$) ; δ 0.76, 0.86, 0.93, 0.97, 1.03, 1.25, 2.29, 4.45, 4.62 ; *m/z* (rel. int.) 664, $[M]^+$ calcd. for $C_{46}H_{80}O_2$ (68), 408 (29), 189 (100), 57 (62), 55 (54), 109 (55) suggested it to be taraxasterol palmitate. The findings agreed with reported values[4].

Hydrolysis of compound **2** yielded colourless needles, m.p. 226°, which gave $^1H$ nmr signals characteristic of taraxasterol. The side-chain acid obtained on methylation and mass spectral analysis was found to be palmitic acid.

Fraction 6 – 8 afforded a major compound **3** ($R_f$ 0.76 in solvent system C) which gave green fluorescence in uv light. The compound was identified as methyl ripariochromene A.

*Methyl ripaiochromene A :* Compound **3**, colourless needles. δ 1.49, 1.56, 2.59, 3.88, 3.97, 5.61, 6.30, 7.25 ; *m/z* (rel. int.) 203 (7), 247 (100) and 262 $[M]^+$ calcd. for $C_{15}H_{18}O_4$ (16) suggested its identity as methyl ripariochromene A[5].

Fractions 9 and 10 also showed a spot corresponding to compound **3** and two additional faint spots ($R_f$ 0.64 and 0.55) which have not been identified.

The methanol soluble fraction-I was found to consist almost exclusively of methyl ripariochromene A (3).

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