

activity. The most active compounds of the series were 6, 11, 12 and 16 to 18.

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References

1. S. A. GREENFIELD, M. C. SEIDEL and W. C. VONMEYER, *Ger. Offen.*, 1, 966, 806 (1974); *Chem. Abs.*, 1975, 82, 150485u.
2. W. KRAEMER, K. H. BUECHEL, W. BRANDES and P. E. FROBERGER, *Ger. Offen.*, 2, 334, 352, (1975); *Chem. Abs.*, 1975, 82, 170967f.
3. G. TANAKA, *Japan Kokai*, 74, 95, 973 (1974); *Chem. Abs.*, 1975, 82, 156320h.
4. T. I. WAKINS and D. M. WRIGHTON, *Ger. Offen.*, 2, 530, 287, (1976); *Chem. Abs.*, 1976, 84, 135677f.
5. B. BOEHNER, W. MEYER and D. DAWES, *Swiss.*, 573, 206, (1976); *Chem. Abs.*, 1976, 84, 180232t.
6. L. GSELL and W. MEYER, *Ger. Offen.*, 2, 739, 084, (1978); *Chem. Abs.*, 1978, 88, 190844r.
7. J. G. HORSFALL and S. RICH, *Contributions Boyce Thomson Institute*, 1951, 16, 316.
8. K. C. JOSHI and A. B. SEN, *J. Sci. Food Agric.*, 1952, 11, 526.
9. U. SRIVASTAVA, R. H. KHAN and S. C. BAHTEL, *J. Antibact. Antifung. Agents (Japan)*, 1979, 7, 8.
10. CHIMETRON S.A., *Fr.*, 1, 476, 543, (1967); *Chem. Abs.*, 1968, 69, 96725p.
11. L. CONTI, *Chem. Abs.*, 1964, 61, 4253e.
12. R. B. PATHAK, (Miss) B. JAHAN and S. C. BAHTEL, *J. Antibact. Antifung. Agents (Japan)*, 1980, 8, 12.
13. J. G. HORSFALL, *Bot. Rev.*, 1945, 11, 357.
14. U.S.D.A. Circular No. 198 (1931).

Chemical Examination of Essential Oil of *Tagetes minuta* Linn.

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PLANT—*Tagetes minuta* Linn. (Family Compositae).

Isolation procedure—Steam distillation (Yield 0.8%).

Physical constants—Sp. gravity 0.8731, n_D^{25} 1.5896, $(\alpha)_D^{25} +4.67$, acid value-2.3218, ester value 53.69, ester value after acetylation 134.87 and carbonyl value as $C_{10}H_{16}O$ -27.08%

Previous work—Few workers¹⁻³ have reported the chemistry of essential oil from flowering tops and separated phenolic and non-phenolic terpenes of the oil.

Different constituents of the oil were separated by Kiesel gel column using the solvent benzene-ethyl acetate (95:5). The identified terpenes have been listed in Table 1. Ir spectra were obtained on Perkin-Elmer

TABLE 1

Compounds	Yield	Methods of identification
Aromendrene	23.90	ir. nmr, n_D^{25} 1.4647, Co-TLC, and GLC.
α -Pinene	0.96	ir, n_D^{25} - 1.46627, nopinic acid ⁺ , Co-TLC and GLC.
β -Phellandrene	1.04	ir, n_D^{25} - 1.4787, Co-TLC and GLC.
d-Limonene	9.60	ir, n_D^{25} - 1.4746, Co-TLC and GLC.
Ocimene	13.10	ir, n_D^{25} - 1.4857, Co-TLC and GLC.
β -Myrcene	16.40	ir, n_D^{25} - 1.4889, Co-TLC and GLC.
Caryophyllene	0.36	ir, Co-TLC and GLC.
p-Cymene	0.43	ir, Co-TLC and GLC.
Tagetone	15.10	ir, Methyl isobutyl ketone adducts.* Co-TLC and GLC.
d-Carvone	6.10	ir, Co-TLC and GLC.
Linalool	3.60	ir, n_D^{25} - 1.4624, Co-TLC and GLC.
Linalylacetate	4.30	ir, n_D^{25} - 1.6327, Co-TLC and GLC.
Eugenol	0.47	ir, Co-TLC and GLC.

* All the melting points of derivatives were compared with the melting points given by Guenther.

NOTES

457 and nmr measurements were made on Varian A-60D. The presence of the isolated terpenes was also confirmed by glc which was carried out on gas chromatograph model -900 B equipped with FID detector and UCCW 982 10% 1.8 m column.

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References

1. K. L. HANDA, M. M. CHOPRA and M. C. NIGAM, *Perf. Essen. Oil Rec.*, 1963, 54, 372.
2. D. J. J. DEVILLIERS, C. F. GARBERS and R. N. LAURIE, *Phytochemistry.*, 1971, 10, 1359.
3. Y. N. GUPTA and K. S. BHANDARI, *Indian Perfumer.*, 1975, 19, 29.
4. E. GUENTHER, *The Essential Oil*, (D. Van Nostrand Co., Inc., N.Y.), 1975, Vol. II.