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Note

Fatty acid composition of mustard (*Brassica nigra*) seed oil by gas-liquid chromatography

A. K. BASU

Rishi Bankim Chandra College, West Bengal (India)

AMITAVA GHOSH and J. DUTTA

Bose Institute, Calcutta-9 (India)

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Mustard seed oil is used extensively in cooking, and it is therefore interesting to know the fatty acid composition of the oil. This paper reports on the determination of the fatty acid composition of mustard seed oil by GLC.

EXPERIMENTAL

Dried mustard seeds were ground and extracted with chloroform-methanol (1:1). The bulk of the solvent was removed by distillation, and the last traces were removed by using a rotary evaporator. The oil was obtained in a yield of about 39% and was brown in colour. The iodine value (Wijs' method) of the oil was found to be 126.7. Saponification of oil, extraction of fatty acids and formation of methyl esters were carried out according to Hilditch and Williams¹. All operations were carried out in an inert atmosphere (nitrogen). The mixed methyl esters were fractionated after forming inclusion compounds by complexing with urea and using counter-current distribution as described by Summerwell². The methyl esters were regenerated by treating the urea adduct with 1% HCl and extracting three times with peroxide-free diethyl ether. In this manner, ten fractions were obtained. The purity of the methyl esters of individual fractions was tested by TLC, and the impure methyl esters were purified on preparative thin-layer plates³. A portion of each fraction was hydrogenated on the micro-scale using PtO₂ as catalyst. The analyses were carried out on an F & M Model 700 R dual-column gas chromatograph with a flame ionization detector using a 10% DEGS column on Gas-Chrom Z (Applied Science Lab., State College, Pa., U.S.A.) at 180° and a 3% SE-30 column on the same support at 210°. Nitrogen was used as the carrier gas.

RESULTS

The compositions calculated by the method of triangulation from the chromatograms are presented in Table I. The amount of unsaturated acids present is about

81% of the total acids, indicating that the oil is a good semi-drying oil. The presence of about 41% of erucic acid is unique among the known seed oils.

TABLE I

COMPONENT ACIDS OF MUSTARD SEED OIL

| <i>Component acid</i> | <i>Content (% w/w)</i> |
|-----------------------|------------------------|
| C ₁₄ | 1.48 |
| C ₁₆ | 5.31 |
| C _{16:1} | 0.23 |
| C ₁₈ | 1.33 |
| C _{18:1} | 11.70 |
| C _{18:2} | 16.86 |
| C _{18:3} | 2.50 |
| C ₂₀ | 9.23 |
| C _{20:1} | 7.73 |
| C _{20:2} | 0.62 |
| C ₂₂ | 0.39 |
| C _{22:1} | 40.97 |
| C _{22:2} | 1.03 |
| C _{22:3} | 0.29 |
| C ₂₄ | 0.39 |
| C _{24:1} | 1.90 |

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