

Chamazulene from *Matricaria chamomilla* by Resorption and Steam Distillation

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Summary: *Matricaria chamomilla* L. is indigenous to Europe and was acclimatized in Peshawar. The dried flowers on resorption and steam distillation furnished volatile oil containing chamazulene.

Introduction

The flowers of *Matricaria chamomilla* L. have been used medicinally in Southern and Eastern Europe. The pharmacological studies [2,3] have shown that extracts prepared from the flowers, elicit spasmolytic, anti-inflammatory and carminative actions. *Matricaria chamomilla* has been shown to contain various chemical species [4], based on either proazulene or bisabolene. The flowers containing proazulene on steam distillation yield blue oil which is used in perfumes and cosmetic products. Due to the therapeutic and economic importance of the flowers, the plant was acclimatized and extraction of volatile oil from the dried flowers was accomplished by known procedures. The oil was found to contain more than one constituents. For ascertaining the compound responsible for the blue colour, resorption of the flowers in sunflower oil was tried and through this technique blue oil containing chamazulene was recovered.

Results and Discussion

From the TLC profiles of the blue oil separated by steam distillation and solvent extraction, it appeared that oil extracted in both cases were consisted of more than one constituent. In contrast blue oil recovered by resorption and steam distillation showed the presence of a single constituent that could not be separated on repeated TLC development. An observation that we can make therefore is that among the methods employed for extraction of volatile oil, only resorption has selectively extracted the precursor, proazulene that decomposed into chamazulene during steam distillation. These results further suggest that the flowers themselves do not seem to contain the chamazulene in free form, but as the precursor matricarin [6].

The oil derived by resorption was a deep blue liquid of strong and characteristic odour and bitter

aromatic flavour. The absorption max. 370 nm, of the blue oil was similar to chamazulene [7]. When sealed and stored in refrigerator, the oil was found stable. However at room temperature and under the influence of light and air, the oil showed evidence of decomposition. The deep blue colour of the oil gradually changed to green yellow and finally to brown during storage which lasted for two months.

Biodegradation of plant products under the normal conditions of storage has been reported [8]. No attempt was made to ascertain the mechanism of degradation and constituents of the degraded oil.

All that we conclude with any certainty from this work is that the acclimatized *Matricaria chamomilla* belongs to the chemical species containing proazulene and that the blue oil is labile under normal storage conditions.

Experimental

Materials

Flowers were collected at the second week of March 1989 from the experimental garden at PCSIR Peshawar. Sun-flower oil of commercial quality was purchased from the local market. Precoated silica gel GF 254+366 plates were obtained from Merck, Darmstadt FRG. Solvents and chemicals were BDH Laboratory grade reagents. The UV-visible spectra were recorded on a Varian DMS-200 instrument in methanol solution.

Methods

Flowers plucked manually were air dried and sifted through 6 and 10 mm mesh screen. Stalks were separated and powdered material consisting of disc and ray florets were used. Extraction of

volatile oil [5] was achieved by (a) Steam distillation (b) Solvent extraction and (c) Resorption. 100 g. powdered material was macerated in 200 ml water and was steam distilled for 2 hrs. The distillate was collected and on standing the dispersed oil was collected. The distillate was washed with 50 ml carbon tetrachloride. Solvent removal furnished the remaining oil. The oil fractions were combined and dried in a vacuum oven over anhydrous sodium sulphate. The yield of blue oil was 0.42%.

Solvent extraction of 100 g. powdered material was achieved with 500 ml hexane, at room temperature for 24 hrs. After filtration and rinsing the combined extracts, on solvent removal furnished a residue containing matricarin. The same was suspended in 50 ml water and steam distilled for 1 hr. At the end, the oil fractions were combined and dried. The yield of blue oil was 0.40%.

Resorption of 100 g. powdered material in 500 ml sun-flower oil was carried out at room temperature for 24 hrs. After filtration, the oil extract was saturated with a mixture of chloroform and methanol. On standing separation of layers occurred. The chloroform - methanol layer was separated and dried under reduced pressure. The residue was suspended in water and steam distilled for 1 hr. The oil layer was separated and dried over anhydrous sodium sulphate. The yield of blue oil was 0.3%.

Thin layer chromatography of oil fractions was carried out using precoated fluorescent silica gel plates. Samples dissolved in carbon tetrachloride were applied and plates developed in a solvent system consisting of benzene-chloroform 25:75. The plates were examined in UV and visible light. UV - visible spectra of oil fractions showed absorption max. at 370 nm.

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