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Research Paper :

Chemical composition of Indian Ajowan (*Carum copticum* L.) seed oil in Kanpur region of North India

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ABSTRACT

The hydro-distilled oil obtained from Ajowan seeds (*Carum copticum* L.) of local market of Kanpur was analysed by GC and GC-MS, which led to the identification of 13 compounds representing 93.4% of the total oil. Thymol, the main constituent was found in the range of 39.9 % followed by p-cymene 23.5 %, γ-terpinene 19.7 % and β-pinene 6.6 %. The oil yield was 4.8 % (v/w).

Key words : Carum copticum, Seed oil, Chemical composition, p-cymene, β-pinene, γ-terpinene

Ajowan, botanically known as *Carum copticum* L. syn *Trachyspermum ammi* (Linn.) Sprague (Family Apiaceae) yields an essential oil which is a major source of thymol in India. The plant is a native of Egypt. It is cultivated around the Mediterranean Sea and in South-west Asia extending from Iran to India. In India, it is grown in Madhya Pradesh, Gujarat, Maharashtra, Uttar Pradesh, Rajasthan, Bihar and West Bengal. It is also found growing wild in certain parts of India. Seeds are employed either alone or in mixture with other spices and condiments. It is used in pickles, biscuits, confectionery and beverages. An important use of seeds in medicine as a remedy for indigestion. Externally, a paste of the crushed fruit is applied for relieving colic pains. It is also used in the preparation of lotions and ointment.[1]

There have been numerous studies available on the chemical composition of the Ajowan seed oil. The oils from CIMAP Research Farm, Lucknow and local market of Lucknow and Chennai were analyzed by GC and GC-MS. The major constituent of this oil were thymol (36.5-41.1), p-cymene (20.9-27.2) and γ-terpinene (25.9-35.7%).[2] The seed oils obtained from Pakistan contained the following range of constituent: α-pinene (0.33-0.63%), camphene (0.56-0.63%), β-pinene (1.24-1.56%), δ-3-carene (0.42-0.80%), limonene (0.25-2.25%), γ-terpinene (18.70-20.35%), p-cymene (20.80-23.78%), thymol (45.20-48.50%), and carvacrol (4.50-6.80%).[3] Kumar *et al.* (2008) analyzed the hydro-distilled oils obtained from ajowan seed (*Carum copticum*) commercially available in local market of Delhi, Uttarakhand, Bihar and Uttar Pradesh by GC and twelve components were identified using reference standard by comparing the retention times representing 99.1, 98.0, 98.7 and 99.6%, respectively. Thymol was in the range of 48.9-68.6 followed by p-cymene 13.8-26.8 and γ-terpinene 13.2-19.6%. The thymol percentage from Uttarakhand was higher amongst others which have almost similar type of climate. The oil yield from Uttarakhand was highest (5.36% v/w).[4] Practically, no work has been done on the chemical composition of seed oil from Kanpur region of northern India which was required to be carried out from commercial point of view. Keeping the above facts under consideration, the present investigation was undertaken.

MATERIALS AND METHODS

The Ajowan seeds were identified by Taxonomy Division of Dayanand Girls, P.G. College, Kanpur. The semi-crushed seeds were hydrodistilled in a Clevenger type apparatus for 6 hrs yielding oil in 4.8 % (v/w). The oils were dried over anhydrous sodium sulphate and stored in a sealed glass vials in refrigerator.

GC and GC-MS analysis:

Quantitative analysis of the essential oil of *Coriandrum sativum* was carried out using a Shimadzu GC-2010. Nitrogen was used as carrier gas at 6 psi inlet pressure with FID and AB inno-wax column (60 m x 0.25 mm id, film thickness (0.25 µm). Injector and detector temperatures were 260^0 and 280^0C, respectively. Column temperature programmed from 50^0 to 180^0C at 3^0C/min with hold time of 2 min and from 180^0 to 250^0C at 5^0C/min with hold time 20 min, respectively. The flow rate of