STUDIES ON SOME UMBELLIFEROUS HERBS

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Abstract: Experimental evidences are offered in this article for the popular medicinal use of some umbelliferous herbs.

INTRODUCTION

The Umbelliferae is a large and widely distributed family and was the first to be recognized by the taxonomists because of its characteristic inflorescence and fruits. [According to Hutchinson (1959) the family Umbelliferae is derived from the saxifragaeous stock and regarded as a parallel family with araliaceae in the woody group1.] From the chemotaxonomic view point, the Umbelliferae is difficult to survey exhaustively, since it is a large family with 240-300 genera and over 3000 species, normally arranged in the three subfamilies, Hydrocotyloideae, saniculoidae and apioidae2.

The Umbelliferae is of immense ethnobotanical importance, Plant parts are used both as food as well as beverages, they are used medicinally and also to flavour foods and brinks. It is generally the essential oils present in the oil tubes called vittae in the mesocarp of the fruits, that provide the desired flavour, the majority of the components in the essential oil are monoterpenes formed by mevalonic acid pathway. The only commonly occurring constituents of volatile oil that are not isoprenoid in nature are compounds like anethole termed phenyl propanoids, these compounds, however, do not arise by the mevalonic acid pathway but a completely different route known as shikimic pathway3.

The Umbelliferae have been used for a variety of complaints. Remedies for problems of the gastro-intestinal tract are probably the medicines of greatest importance derived. Umbelliferous drugs are usually considered as grand mothers (Household) remedies.

MATERIALS AND METHOD

The drugs studied were Anethum sowa (Dill), Carum carvi (Caraway), Centella asiatica (Brahmi), Coriandrum (coriander), Cuminum cyminum (cumin), Ferula (asafetida), Foeniculum valugare (fennel) and Trachyspermum ammi (Ajowan). Since these drugs are commonly used, they are prone to be adulterated, also the common names cause a lot of confusion, as sometimes the same is used for more than one species. Hence, samples were collected from the nearby places of south kanara and were examined for their morphological characters by comparison with the authentic samples and subjected these for a routine screening of histological and TLC studies.

Microbiological screening of the essential oils
The essential oils from the fruits of *Anethum sowa* (Dills), *Carum carvi* (caraway), *Coriandrum sativum* (coriander), *Cuminum cyminum* (Cumin), *Foeniculum vulgare* (fennel) and *Trachyspermum ammi* (Ajowan) were tested against various strains of bacteria and fungus *candida albicans*. The antibacterial activity was studied against both aerobic and anaerobic microorganisms. The method employed was filter paper disc method. For the antibacterial activity Muller Hinton agar medium and brainheart infusion agar medium were used for aerobic and anaerobic microorganisms respectively. For antifungal activity, sabouraud’s glucose agar medium was used.

Distillation of the essential oil was carried out by steam distillation, using Neoclevenger’s apparatus.

TLC was carried out using silica gel plates. Solvent system and spraying reagent for all the essential oils under study excepting for that of fennel oil and the methanoilc extract of brahmi are as below,

Solvent system – Toluene : Ethyl acetate (93:7)
Spraying reagent - Vanillin : Sulfuric acid

For Fennel oil

Solvent system - Toluene : Ethyl acetate (93:7)
Spraying reagent - 1) Ethanolic solution of phosphomolybdic acid reagent.  
2) Potassium permanganate – Sulfuric acid reagent

For Brahmi extract

Solvent system - Chloroform: Acetic: Methanol: Water (60:32:12:8)
Spraying reagent - Anisaldehyde : Sulfuric acid

**Microbiological Screening**

Method : Filter paper disc diffusion method
Culture : Lawn culture
Medium : For aerobic microorganisms Muller Hinton agar medium

Ingredients : Beef infusion 300
              Casein hydrolysate 17.5
              Starch 1.5
              Agar 17
              pH adjusted to 7.4 ±0.2

Method: Suspended 38g in 1000ml distilled water; boiled to dissolve the medium completely sterilized by autoclaving at 121°C for 15 min and mixed well before pouring into the Petridishes.

The bacteria to be tested were inoculated into the peptone water and incubated at 37°C. The young culture of this bacterial inoculum was compared approximately after
a period of 4-6 hours within McFarland tube No 5. for the turbidity. This inoculum was taken for testing the sensitivity.

The sterilized media was poured in 20ml quantities into sterile petridishes. Then culture plates were tested for sterility by incubating overnight and 37°C. Overnight cultures were used for inoculating the bacterial inoculum.

Procedure for anaerobic micro-organisms:

Medium : Supplemented brain heart infusion agar

Ingredients :
- Cysteine 0.005%
- Yeast extract 0.5%
- Hemin 1µg/ml
- Vitamin K 0.1 µg/ml
- Blood 5-10%

The dehydrated brain heart infusion agar which contains cysteine and yeast extract were dissolved in distilled water, sterilized by autoclaving at 121°C for 15 min. Medium was cooled, then hemin, vitamin K, and blood were added and mixed before pouring into the petridishes.

Procedure for antifungal activity:

Medium : Sabouraud’s glucose agar medium

Ingredients :
- Glucose 40g
- Peptone 10g
- Pancreatic digest of casein 10g
- Agar 20g
- Distilled water 1000ml

The ingredients were dissolved in water and pH adjusted to 5.4, autoclaved at 121°C for 15 min. The sterilized medium was poured into sterile petridishes. A loop full of the culture was spread evenly over the whole plate with a sterile cotton-wool swab to get a lawn culture. Then filter paper discs dipped in the respective oils were placed on the media. The petridishes were then kept at room temperature for 48 hours and the zones were measured.
Results

By examination of morphological characters and by TLC studies of the essential oils under study, no adulterations was found in any of the samples collected. This may be due to the people’s awareness to consumer’s protection act. The percentage yield of all the essential oils under study after distillation were within the standard limits, the TLC study of all the essential oils along with standards for their respective chief constituents confirmed its presence. The TLC of the essential oil from the leaves of Eryngium foetidum which has similar fragrance ads that of the leaves of Coriandrum sativum showed that is has the same chemical components as that of the leaves of C. sativum in view of same number of spots with same Rf values and colours.

From the microbiological screening it is evident that the activity of the pure oils from Ajowan and Cumin compared fairly well with that of the standard Ciprofloxacin. Among all the oils tested the pure oil of Ajowan showed maximum activity against and anaerobic micro-organisms. This explains its popular use. Same sensitivity patterns were observed also against the fungus candida albicans.

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