

Genetic Resources of Some Essential Oil Plants in Southern Turkey

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1. Introduction

The demand for Medicinal and Aromatic plants has been increasing. Although many efforts have been made to domesticate and cultivate the wild plants needed, most of the product in the market has still been collected from the natural locations. One of the reasons for intensified collecting of wild plants worldwide, according to the International Trade Centre, is the increasing commercial attention paid to the product which indeed means a threat to the natural flora.

Among the endangered species are bulbous plants and root drugs, leaf and blossom drugs. This applies not only to species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora, but also to species regarded as “not in danger”.

Wild plants are collected as before even in violation of this Convention. When officinal drugs are no longer available, alien (to the species) drugs invade the markets, for the moment unnoticed by consumers (e.g. *Heterotheca* instead of *Arnica*).

Regulations intended to protect nature and endangered species of wild fauna and flora cannot be enforced as long as alternatives to wild collecting are not available. One is to cultivate wild medicinal plants, including not only those which are explicitly protected or regarded as in danger, but any species whose natural site can be assumed to be over-exploited or whose natural spontaneous flora is damaged.

Cultivation of such species, however, is a field not sufficiently explored so far; instructions for cultivation are available for few plants only. Cultivation projects frequently fail merely because of problems in getting seeds or seedlings.

Cultivation is not only a means of complying with legal regulations on the protection of endangered species, but also one of providing the needed raw material for pharma- and food industries. In recent years, demands could not longer be satisfied from wild plants.

Prompted by the new drug laws, pharmaceutical and food industry is demanding uniform, high-quality raw material, i.e. “standardized” drugs. These quality requirements are met only by plants adapted by selection and breeding and grown under defined conditions.

Among the medicinal plants, those containing essential oil are of particular interest. Essential oils and plants containing such components have at all times been used for spicing, aromatizing, as drugs, perfumes and smoking agents (1). Their preserving and antiseptic properties no doubt also played some role - no matter whether people have been aware of them or not.

Advances in analytical methods in the recent decades (2,3) provided deeper insight into the correlations between composition of a essential oil and its effect on microorganisms, animals and humans (4,5) and gave rise to a systematic search for chemo types (6) and active substances in essential oils (7).

Most recently, essential oils have gained new attention due to the trend towards drugs and aroma compounds of plant origin and regulations restricting the use of synthetic preservatives which are suspected of causing damage to health.

In the present work, many proveniences of wild medicinal plants containing essential oil were collected at their natural sites of growth and checked for their suitability for cultivation under agricultural and quality or pharmaceutical aspects. The plants, all from the Cukurova region, include *Mentha*, *Origanum*, *Thymus*, *Melissa*, *Salvia*, *Rosmarinus*, and *Thymbra*.

2. Material, Method and Results

In this research essential oil plants such as *Mentha*, *Origanum*, *Melissa*, *Thymus*, *Salvia*, *Rosmarinus* and *Thymbra* wild species are searched in the Cukurova region; the Taurus Mountains at north, the Amanos mountains and Antakya at south, the Göksu deltoid at west and K.Maras and the Ahirdagi at east and a total of 109 origins of 7 taxa or species were screened on their suitability to domestication and their essential oil content and the composition of essential oils.





















Because of the great genetic variety of wild medicinal plants, mere selection according to pharmaceutical compounds and the contents of these has been found to be a successful means of providing suitable initial material. The plants were further assessed regarding sites of growth, uniformity, resistance to pests and diseases, and yields. As one cannot expect to find all desirable characteristics combined in one plant, breeding will be a second step following selection.

To select proveniences suitable for cultivation, the plants' ecological variability was determined as well. This included type of soil, nutrients, and climate at the site of wild growth. The plants were also mapped according to geographic and plant-sociological findings.

Plant material collected after first selection in natural environment was propagated and field trials which were conducted at two locations differing ecologically (Adana: altitude 23 m and Pozanti: altitude 1200 m representing of plain and mountain conditions, respectively) proved that plants from several origins were suitable to be produced on a large scale.

Mentha-, *Origanum-*, *Melissa-* and *Thymus-* origins in particular especially provided promising compositions of essential oils. Differences in the drug yield, essential oil content, essential oil composition and essential oil yield depended on origin, development period and location of test plots.

In the first year the program consisted of wide range of tests including origins, ecological and ontogenetical examinations of various species. The following trials were limited and intensified. The ontogenetical tests led to give clear evidence of the most advantageous time to harvest in order to retrieve of maximum of drug yields and essence. Besides *Mentha*-, *Thymus*-, *Origanum*- plants of wild origins cultivated species or origins were included to provide standard basis for the evaluation of the wild origins.

The results state the agronomical and pharmaceutical properties such as drug yield, leaf ratio, dry matter content, compound, content and yield of essential oil, growth and resistance to pests and diseases of the different plants that were collected from flora and introduced material with foreign origins and to which extent they are suitable to be grown in the plains and mountain conditions of Cukurova area.

After a period of reproduction some high yielding wild origins and some interesting combinations of essential oil can be immediately conveyed in Turkey. Most of all tested materials were maintained under ex – situ conservation in collection garden, to be used for selection and breeding for further studies and also to make up a gene reservation (8).

In addition to the designed research some selected samples of essential oils of different *Origanum* and *Mentha*- origins were tested on antimicrobial activity in cooperation with the Faculty of Medicine of the University in Adana. Even low concentrations of essential oils showed this activity (9).

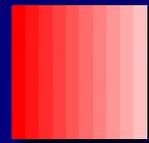
3. Conclusions

Consequently, a great deal of plants which are entirely defined both essential oil content and components and agronomic characters were conserved in a collection garden under ex – situ conditions to be used in selection and breeding studies and also to make up a gene reservation.

Importance of medicinal and aromatic plants to medicine, food and cosmetic industries is well doubtless, and quality in this plants has gained consideration. Hence breeding studies was initiated.

In also our country, by taking into consideration the Vavilov's concept in "the Theory of the Centers of Origin of Cultivated Plants", it should be aware of benefits of using the existent species diversity, various plant species and types should be collected as was done in this presented study and studies for the purposes of selection and breeding should be started.

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Thank You