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## ***Production, Trade and Future Perspective of Medicinal and Aromatic Plants in Turkey***

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**ABSTRACT:** In order to solve the problems encountered in the culture of medicinal and aromatic plants, to take the research as a whole, to organize these studies and to provide coordination among the working people and institutions, in 1990, National Research Project of Medicinal and Aromatic Plants was initiated by Republic of Turkey Ministry of Agriculture and Forestry. The main purpose of these studies is to develop the registered varieties by cultivating new plant species for the production of standard and high quality raw materials required by different industries in medicinal, aromatic and dye plants in Turkey. Research institutes located in different regions of Turkey, start by selecting the appropriate type of culture to their ecology, engages in breeding and variety development work. Improvement studies have been made more efficient by integrating with quality studies to determine the active substances in plants. As a result of these studies, 41 cultivars of medicinal and aromatic plants belong to 15 species have been registered till now. The production areas of these species are increasing every year. In 2018, 300.000 tons of medicinal and aromatic plants were produced in approximately 100.000 hectares of land. 50.000 tons of this production was exported and 265 million US dollars of revenue was generated. In the following process, it is aimed to continue the culture, breeding, cultivation and quality studies and to develop new varieties and increase the production and usage areas of these varieties. On the other hand, in order to get more shares from the world herbal medicine market which is expected to reach 5 trillion USD in 2050, it is planned to give priority to the export of processed products instead of raw material export.

**Keywords:** Turkey, medicinal and aromatic plants, production, trade.

### ***Türkiye’de Tıbbi ve Aromatik Bitkilerin Üretimi, Ticareti ve Gelecek Perspektifi***

**ÖZ:** Tıbbi ve aromatik bitki kültüründe karşılaşılan sorunları çözmek, araştırmayı bir bütün olarak ele almak, bu çalışmalarını düzenlemek ve çalışan insanlar ve kurumlar arasında koordinasyonu sağlamak amacıyla 1990 yılında T.C. Tarım ve Orman Bakanlığı tarafından Tıbbi ve Aromatik Bitkiler Ulusal Araştırma Projesi başlatılmıştır. Bu çalışmaların temel amacı, Türkiye’deki tıbbi, aromatik ve boya bitkilerinde farklı endüstrilerin ihtiyaç duyduğu standart ve kaliteli hammaddelerin üretimini için yeni bitki türleri yetiştirilerek tescilli çeşitlerin geliştirilmesidir. Türkiye’nin farklı bölgelerinde bulunan araştırma enstitüleri ekolojilerine uygun kültür bitkilerini seçerek ıslah ve çeşit geliştirme çalışmalarına yapmaktadırlar. Bitkilerde aktif maddelerin belirlenmesi için kalite çalışmaları agronomi çalışmaları ile bütünleştirilerek ıslah çalışmaları daha verimli hale getirilmiştir. Bu çalışmalar sonucunda şu ana kadar 15 türe ait 41 çeşit tıbbi ve aromatik bitki çeşidi tescil edilmiştir. Bu türlerin üretim alanları her yıl artmaktadır. 2018 yılında yaklaşık 100.000 hektar alanda 300.000 ton şifalı ve aromatik bitki üretilmiştir. Bu üretimin 50.000 tonu ihraç edilmiş ve 265 milyon ABD doları gelir sağlanmıştır. Bundan sonraki süreçte kültür, ıslah, yetiştirme ve kalite çalışmalarının sürdürülmesi ve yeni çeşitler geliştirilerek bu çeşitlerin üretim ve kullanım alanlarının artırılması hedeflenmektedir. Öte yandan, 2050 yılında 5 trilyon ABD dolarına ulaşması beklenen dünya bitkisel ilaç pazarından daha fazla pay alabilmek için ham drog ihracatı yerine işlenmiş ürünlerin ihracatına öncelik verilmesi planlanmaktadır.

**Anahtar Kelimeler:** Türkiye, tıbbi ve aromatik bitkiler, üretim, ticaret.

## INTRODUCTION

Medicinal and aromatic plants have been used for centuries to provide food, flavor, medicine and healing. For this reason, some plants such as cumin, poppy and anise have been cultivated since prehistoric times. Although more than 40% of the drugs listed at the beginning of the 20<sup>th</sup> century were of vegetable origin, this rate was lower than 5% in the mid-1970s. However, especially after the 1990s, the new use of medicinal and aromatic plants, the demand for natural products to increase; the volume of use of these plants is increasing every day. Nowadays, it is estimated that the market of medicinal plants has a figure of about 60 billion dollars annually (Zhang, 2013).

Despite the extraordinary developments in the modern medicine, medicine and chemical industry, alternative treatment methods and treatment with medicinal plants are still up-to-date, and even in recent years they have been increasingly interested in developed countries. A population of more than 150 million people in Europe is benefiting from alternative treatment methods. In Germany, which has led the way, people spend 10 billion euros annually on traditional treatment methods; 5 billion of it in his pocket (Anonymous, 2007). On the other hand, close to 2.5 billion people in underdeveloped and developing countries especially low income cannot benefit from known modern medicines and are treated with herbs, especially Traditional Chinese Medicine (TCM), Ayurveda, Tibetan medicine, Unani medicine, Acupuncture, Shaman medicine. (Heide, 1991; Zhang, 2001; 2013).

The aim of this study is to state the current status of medicinal and aromatic plants sector in the world and in Turkey and to suggest needs to be done for the future.

### Potential of Medicinal Plants in Turkey and the World

It is considered that all plant species in the world can be 320,000. 3,000 as a source of food, 25,000 for treatment purposes, 5,000 for industrial purposes, 15,000 as ornamental plants, the rest are used for other purposes. Although there are more unused plants, it is foreseen that as many as 25,000

of them are considered for medicinal purposes and 10,000 as food sources (Anonymous, 2000a).

On the other hand, it is stated that the number of flowering plants in the world is 422,000 and 72,000 of these species are used for medical purposes (Table 1) (Schippmann *et al.*, 2002; 2006). The distribution of plant species on earth is not equal, but also differs in geographical regions of the same generation. The tropical regions are the richest species in terms of species diversity and the number of species decreases as they move towards the poles. The richest species in terms of species are the northern part of South America and the Indonesian archipelago (Anonymous, 2000a; Arslan, 2004; Arslan, 2014; Anonymous, 2019a).

Herbal medicinal products are getting global importance because of their health benefits. There demand is going to increase because of increased interest of consumers in natural products as they are considered safer and more cost effective than synthetic drugs in many cases (Peet, 1999). According to World Health Organization (WHO) about 80% population of most developing countries like Asia, Africa, Latin America etc. still rely on traditional herbal medicines for their primary health care needs (Bhowmik *et al.*, 2009).

International trade in medicinal plants and their products was US\$ 60 billion in the year 2000, with average annual growth rate of 7% and was expected to reach US\$ 5 trillion by 2050 (Anonymous, 2000b). China and India are the top exporting countries and Hong Kong, Japan, USA and Germany are the leading importers. Supply of medicinal plants in world is originated from developing countries. Medicinal plant plays a vital role in the health care needs of three quarter of the world's population living in developing countries. Use of medicinal plants is being steadily increased. Pharmaceutical and food industries, traditional or alternative practitioners, folk or household medicine users, cosmetic and flavor industry and many more need these plants (Brandt *et al.*, 2011).

The countries with important medicinal and aromatic plant producers in the world, their production areas and the number of plant species they make cultivation are given in Table 2. The countries are the largest manufacturers of China and India, it is seen that come after them if Turkey.

In most European countries, it is observed that medicinal and aromatic plant cultivation is done but the production areas are quite narrow. China and India have been producing medicinal and aromatic plants for many years. In these countries, the main reason for the production of medicinal and aromatic plants in such large areas is the consumption at the same time. On the other hand, it is seen that the number of species produced is quite high as well as the width of the production areas in these two countries. The source of this is the high number of plant species and medicinal plants in these countries.

The number of plant species collected from nature sold in domestic and foreign markets for commercial purposes in Turkey are given as 347 in one study. The number of endemic species among them is 35. In other words, approximately 11% of the traded species are endemic. The number of natural plant species collected from nature and sold abroad is about 100. According to the ethnobotany studies conducted in various regions in Turkey, it uses 10-12% of the natural plant species grown around the local people for various purposes. When all of these are evaluated together, it is estimated that at least 1.000 of the species in Turkey are utilized in various ways and 400 of them are traded (Baytop, 1984; Özhatay *et al.*, 1997; Arslan *et al.*, 2000; Yedek, 2002; Arslan, 2004; Kendir and Güvenç, 2010; Arslan, 2014).

### Cultivation and Production of Medicinal Plants in Turkey

Many medicinal plants, especially aromatic plants, are grown in the fields as single or mixed crops in house gardens and as a small plantation plant. Around 900 medicinal plant species are cultured in the world for commercial purposes (Anonymous, 2019a). This figure corresponds to a ratio of 3.6% to 1.25% compared to the number of medicinal plants used above. The production of medicinal plants in Turkey and statistics are given in Table 3. (Anonymous, 2018). Most of the poppy cultivation area with medicinal and aromatic plants in Turkey, cumin, anise and thyme is understood that. The cultivation area of these plants constitutes approximately 90% of the total cultivation area.

Table 1. Number of total species and medicinal and aromatic plants according to some countries (Schippmann *et al.*, 2006).

Çizelge 1. Bazı ülkelerin toplam tür ve tıbbi ve aromatik bitki sayısı (Schippmann *et al.*, 2006).

Countries Ülkeler	No. of species Tür sayısı	No. of medicinal and aromatic plants Tıbbi ve aromatik bitki sayısı	Ratio of medicinal plants (%) Tıbbi ve aromatik bitki oranı (%)
China	32,200	4,941	15.3
USA	21,641	2,564	11.8
India	18,664	3,000	16.1
Malaysia	15,500	1,200	7.7
Thailand	11,625	1,800	15.5
Vietnam	10,500	1,800	17.1
Turkey	10,000	3,300	33.0
Philippines	8,931	850	9.5
Nepal	6,973	900	12.9
Pakistan	4,950	1,500	30.3
France	4,630	900	19.4
Bulgaria	3,567	750	21.0
Sri Lanka	3,314	550	16.6
Sourh Korea	2,898	1,000	34.5
Hungary	2,214	270	12.2
Jordan	2,100	363	17.3
World	422,000	72,000	17.1

Table 2. Medicinal and aromatic plant production areas and plant species in some countries (Kathe *et al.*, 2003).

Çizelge 2. Bazı ülkelerde tıbbi ve aromatik bitki üretim alanı ve üretilen tür sayısı (Kathe *et al.*, 2003).

Countries Ülkeler	Area (ha) Üretim alanı (ha)	No. of species Tür sayısı
China	460,000	250
India	300,000	150
Turkey	90,000	50
USA	69,200	90
Hungary	40,000	40
Canada	34,700	60
Poland	30,000	30
France	25,000	35
Spain	19,000	40
Romania	15,000	50
Bulgaria	9,500	40
Germany	5,700	45
Austria	4,300	25
Greece	4,000	20
Japan	3,900	35
Croatia	3,000	15
Italy	2,300	25
United Kingdom	2,000	20
Albania	2,000	40
Netherlands	500	20
Bosnia and Herzegovina	300	20

Table 3. Cultivation area and production amount of medicinal and aromatic plants in Turkey (Anonymous, 2018).  
Çizelge 3. Tıbbi ve aromatik bitkiler üretim alanı ve miktarı (Anonymous, 2018).

Species Tür	2014		2015		2016		2017	
	Area cultivated Üretim alanı (ha)	Production Üretim (ton)	Area cultivated Üretim alanı (ha)	Production Üretim (ton)	Area cultivated Üretim alanı (ha)	Production Üretim (ton)	Area cultivated Üretim alanı (ha)	Production Üretim (ton)
Poppy (Haşhaş)	26,621	16,223	61,591	30,730	29,921	16,550	23,700	15,244
Cumin (Kimyon)	22,442	15,570	27,024	16,897	26,884	18,586	26,735	19,175
Ani seseed (Anason)	14,050	9,309	13,811	9,050	13,655	9,491	12,183	8,418
Oregano (Kekik)	9,295	11,752	10,486	12,992	12,112	14,724	12,147	14,477
Rose (Gül)	2,835	10,258	2,824	9,483	2,975	12,267	3,327	13,372
Fennel (Rezene)	1,584	2,289	1,551	161	1,750	2,464	1,652	2,022
Hop (Şerbetçiotu)	353	1,832	350	1,869	341	1,846	300	1,785
Fenugreek (Çemen)	197	218	482	491	823	914	842	984
Lavandula (Lavanta)	218	297	321	400	500	747	660	845
Lemon Balm (Melisa)	50	238	51	242	21	108	20	106
Black Cumin (Karabiber)	171	140	468	425	2,316	2,527	3,256	3,094
Sage (Adaçayı)	13	9	53	80	368	411	412	557
Coriander (Kıyış)	1	1	15	11	50	42	41	29
Spearmint (Nane)	700	3,750	750	4,000	800	4,250	820	4,500
Total (Toplam)	78,530	71,886	119,777	86,831	92,516	84,927	86,095	84,608

### Production and Trade of Medicinal and Aromatic Plants in Turkey

Turkey is carrying out approximately 100 countries worldwide exportation of medicinal and aromatic plants. An important part of its foreign sales is made to North America, European Union, Latin America, Far East and North Africa. US, Germany, Vietnam, Netherlands, Poland, Brazil, Canada, Italy, Belgium, Greece, France and Japan are listed in the list. major pharmaceutical and spice plants thyme exported by Turkey, bay leaf, together with cumin and anise, fennel seeds, juniper bark, mahlep, fenugreek, rosemary, licorice, mint, sumac, sage and lime. The most exported products are oregano and laurel. In 2018, a total of 80

thousand tons of medicinal and aromatic plants were exported and a total of USD 265 million in revenue (Table 4).

Medicinal and aromatic plants which were imported to Turkey in 2018 is given in Table 5. Especially including tea, pepper, anise, oregano, cumin, ginger and carob are main products import to Turkey. However, some of the imported products are processed within the scope of inward processing regime and exported again abroad. Turkey's total medicinal and aromatic plants are just over 38 thousand tons of imports, while its monetary equivalent of just over 79 million dollars. The most important import item in terms of monetary value is green and black tea.

Table 4. Medicinal and aromatic plants exports of Turkey in 2018 (Anonymous, 2019b).

Çizelge 4. Türkiye'nin 2018 yılı tıbbi ve aromatik bitkiler ihracatı (Anonymous, 2019b).

Product Ürün	Amount kg Miktar (kg)	Value (US \$) Değeri (US \$)
Oregano (Kekik)	16,212,000	52,331,000
Laurel Leaf (Defne yaprağı)	13,253,940	36,716,616
Cumin (Kimyon)	6,455,169	19,500,621
Anis seed (Anason)	2,418,735	9,637,809
Sage (Adaçayı)	1,824,818	6,695,586
Sumac (Sumak)	2,108,382	4,491,056
Licorice (Meyan)	1,069,961	3,102,837
Spice Mix (Baharat karışımı)	300,476	2,006,843
Mahaleb (Mahlep)	123,283	1,242,394
Spearmint (Nane)	620,292	1,876,792
Rosemary (Biberiye)	493,389	1,477,264
Black Cumin (Çörekotu)	404,691	983,074
Carob (Keçi Boynuzu)	2,421,351	18,433,777
Linden (Ihlamur)	116,741	1,521,480
Turmeric (Zerdeçal)	45,704	201,441
Cinnamon (Tarçın)	38,505	234,165
Coriander (Kişniş)	142,351	187,920
Clove (Karanfil)	5,555	99,894
Thyme (Dağ kekiği)	48,547	1,287,456
Saffron (Safran)	4,602	89,848
Ginger (Zencefil)	26,368	116,984
Curry (Köri)	24,723	78,260
Fenugreek (Çemen)	168,004	298,736
Cardamom (Kakule)	3,368	54,872
Nutmeg (Küçük Hindistan cevizi)	10,125	55,425
Poppy seed (Haşhaş tohumu)	25,286,661	73,736,971
Morphine (Morfin)	25,647	8,434,688
Tea (Çay)	3,321,866	12,035,946
Other Spices (Diğer baharatlar)	2,985,503	8,233,055
Total (Toplam)	79,960,757	265,162,810

Table 5. Medcinal and aromatic plants imports of Turkey in 2018 (Anonymous, 2019b).

Çizelge 5. Türkiye'nin 2018 yılı tıbbi ve aromatik bitkiler ithalatı (Anonymous, 2019b).

Product Ürün	Amount (kg) Miktar (kg)	Value (US \$) Değeri (US \$)
Oregano (Kekik)	1,787,584	4,750,033
Laurel Leaf (Defne yaprağı)	989,611	1,523,208
Cumin (Kimyon)	1,003,631	3,290,609
Anis seed (Anason)	3,612,533	6,589,114
Sage (Adaçayı)	743,980	1,620,684
Sumac (Sumak)	461,260	113,673
Licorice (Meyan)	1,102,153	1,985,376
Spice Mix (Baharat karışımı)	3,374	45,123
Mahaleb (Mahlep)	19,903	92,954
Spearmint (Nane)	87,241	133,100
Rosemary (Biberiye)	619,752	839,080
Black Cumin (Çörekotu)	3,678,628	7,312,482
Carob (Keçi boynuzu)	2,462,071	4,166,059
Linden (Ihlamur)	25,151	54,442
Turmeric (Zerdeçal)	979,376	1,096,073
Cinnamon (Tarçın)	873,560	1,542,843
Coriander (Kişniş)	522,207	275,604
Clove (Karanfil)	279,113	482,837
Thyme (Dağ Kekliği)	6,276	6,826
Saffron (Safran)	91	20,187
Ginger (Zencefil)	2,990,512	3,295,411
Fenugreek (Çemen)	340	1,322
Cardamom (Kakule)	204,675	871,164
Nutmeg (Küçük Hindistan cevizi)	45,820	58,087
Poppy seed (Haşhaş tohumu)	45,950	125,069
Morphine (Morfin)	2	368
Tea (Çay)	15,635,054	38,911,087
Other Spices (Diğer baharatlar)	69,633	34,799
Total (Toplam)	38,249,481	79,237,614

## Production and Trade of Essential Oils in Turkey

Turkey's foreign sales of essential oils for 2018 were approximately \$ 42 million. Rose oil, stearopten oil and oregano oil are the main products (Table 6). Increased foreign sales of essential oils in Turkey in recent years, seems to have caused an increase in the number of plant essential oils. Especially in Antalya, Manisa, Mersin, Mugla and Hatay in the province of the plant located in the thyme, laurel, mint, rosemary, cumin, myrtle, lemon leaf, anise and aromatic herbs such as aphids are produced from essential oils. A large part of the export of essential oils is made to EU countries. As of 2018, the main export countries were France, Germany, Madagascar, USA, Switzerland, England, Greece, Ireland, Bahrain, Canada and Spain. The share of France in

total export is 53%. Almost all of the rose oil produced in Turkey is exported. 2018 foreign trade is approximately 14 million dollars. An important part of the export was made to EU countries, USA, Switzerland, Bahrain, Kuwait, Japan, UAE, Australia, Azerbaijan, Turkmenistan, Iraq and Turkey Republic of Northern Cyprus. The share of France in the total foreign oil export was 62%, Germany's share was 13%, the US share was 10%, and Switzerland had a share of 9%.

Essential oils which were imported to Turkey is given in Table 7. Imported essential oils include oregano, orange, lemon, other citrus oils and peppermint oil are the main essential oils imported to Turkey. In 2018, the total amount of imported essential oils was 552 tons and approximately 26 million dollars.

### Improving New Varieties on Medicinal and Aromatic Plants in Turkey

Improving new varieties on medicinal and aromatic plants in Turkey has begun to gain momentum in recent years. It is known that the development of varieties in medicinal and aromatic plants began quite late compared to other cultivated plants. As a result, it is seen that the number of species studied and the number of varieties developed are low. As the cultivation,

breeding and cultivar development studies of different species continue, the number of varieties registered will increase over time. Thus, while the number of standard production materials required by different types of manufacturers' increases, the way for standard and quality production will be opened. As a result of breeding and cultivation studies, 55 varieties have been registered so far (Table 8).

Table 6. Essential oil exports of Turkey in 2018 (Anonymous, 2019b).

Çizelge 6. Türkiye'nin 2018 yılı uçucu yağ ihracatı (Anonymous, 2019b).

Product Ürün	Amount (kg) Miktar (kg)	Value (US \$) Değeri (US \$)
Oregano oil (Kekik yağı)	65,000	5,501,000
Spearmint oil (Nane yağı)	16,000	168,895
Rosemary oil (Biberiye yağı)	55	5,723
Lavandula oil (Lavanta yağı)	3,851	129,354
Rose oil (Gül yağı)	16,369	14,136,625
Lemon oil (Limon yağı)	3,121	131,230
Peppermint oil (Tıbbi nane yağı)	1,212	44,566
Other citrus oil (Diğer turunçgil yağı)	4,822	113,459
Maceration (Maserasyon)	280,547	6,615,909
Hydrosol (Hidrosol)	364,240	1,921,192
Other essential oil (Diğer uçucu yağlar)	57,922	13,754,416
Total (Toplam)	813,139	42,522,369

Table 7. Essential oil imports of Turkey in 2018 (Anonymous, 2019b).

Çizelge 7. Türkiye'nin 2018 yılı uçucu yağ ithalatı (Anonymous, 2019b).

Product Ürün	Amount (kg) Miktar (kg)	Value (US \$) Değeri (US \$)
Oregano oil (Kekik yağı)	1,790	4,864,492
Spearmint oil (Nane yağı)	11,985	339,135
Rosemary oil (Biberiye yağı)	1,262	63,613
Lavandula oil (Lavanta yağı)	5,062	289,972
Clove oil (Karanfil yağı)	5,954	233,717
Rose oil (Gül yağı)	380	1,996,689
Orange oil (Portakal yağı)	243,607	3,189,027
Lemon oil (Limon yağı)	64,406	2,239,109
Peppermint oil (Tıbbi nane yağı)	55,676	1,996,950
Other citrus oil (Diğer turunçgil yağı)	31,833	2,268,460
Other essential oil (Diğer uçucu yağlar)	130,785	8,941,328
Total (Toplam)	552,740	26,422,492



Table 8. Medicinal and aromatic plant varieties in Turkey (Anonymous, 2019c).

Çizelge 8. Türkiye'deki tıbbi ve aromatik bitki tescilli çeşit sayısı (Anonymous, 2019c).

Medicinal and aromatic plant varieties	Number of cultivars
Tıbbi ve aromatik bitki çeşitleri	Çeşit sayısı
Poppy (Haşhaş)	16
Anise seed (Anason)	1
Hop (Şerbetçiotu)	7
Oregano (Kekik)	5
Sage (Adaçayı)	4
Thyme (Dağ kekiği)	1
Fenugreek (Çemen)	2
Coriander (Kıyış)	2
Cumin (Kimyon)	2
Saffron (Safran)	1
Black cumin (Çörekotu)	1
Buckwheat (Karabuğday)	2
Basil (Fesleğen)	7
Lemon balm (Melisa)	1
Purple coneflower (Ekinezya)	1
Mountain tea (Dağçayı)	1
Golden thistle (Şevketibostan)	1
Total (Toplam)	55

## CONCLUSION and RECOMMENDATIONS

In this study the current status of medicinal and aromatic plants sector in the world and in Turkey are discussed. The recommendations are suggested needs to be done for the future are as follow.

- 1- The increasing demand for medicinal plants creates a great pressure for the plants collected from nature. Training activities should be planned regularly and periodically. A regulation on the collection and trade of medicinal plants should be issued and necessary legal arrangements should be made.
- 2- Measures should be taken to increase the income level of low income people living in rural areas.
- 3- Similar studies should be done for the transfer and spice producers in various provinces and the source of the medicinal plants sold (domestic, imported, picking from nature, culture, intended use, shape etc.) should be determined, scientific description of each medicinal plant (genus, species, subspecies / variety, author and family) must be verified and recorded.
- 4- In order to reduce the pressure on our natural plants, the studies should be initiated to

cultivate as many plants as possible, especially the plants that are exported and used in Turkey, and the production of those who are successful should be expanded.

- 5- The cultivation of medicinal plants should be considered in good agricultural practices for spices and/or organic farming developed for these plants. Importance should be given to organic certification.
- 6- Medicinal-aromatic and bulbous tuberous plants should be supported.
- 7- After harvesting, there will be a minimum product loss and after-harvest operations should be carried out in a timely manner and in accordance with the technique.
- 8- Cultivated or newly purchased medicinal plant species must have the characteristics that are in the pharmacopoeia of that country or the recipient countries and spice plants must meet the required specifications. Consideration should be given to the improvement and treatment of medicinal aromatic plants.
- 9- Considering that in Turkey has different climates and geographical regions, adaptation studies of plants grown in other countries or

- collected from the nature of that country should be carried out.
- 10- In addition to the export of medicinal aromatic plants as raw drugs, the production and export of processed intermediate or end products should be encouraged and the necessary support should be provided.
  - 11- The use of medicinal plants is commonly standardized extracts in the world. In Turkey, herbal medicines and food supplements for domestic firms producing raw materials they use as a large portion of the extract almost all of America, Germany and China they provide. Depending on the increase in domestic production in the extract, our dependence on foreign sources will gradually decrease.
  - 12- In the chemical analysis of medicinal plants, studies to be carried out to convert the newly found compounds into drugs should be supported and the methods of evaluation of the substances with known efficacy should be investigated.
  - 13- To standardize through pharmacopoeia, codex and other legal documents to ensure the safety and efficacy of medicinal plants; new standard methods suitable for evaluating the pharmacology of medicinal plants should be developed.
  - 14- In the production of medicinal aromatic plants, the farmer should warn the farmer about the speculation made in his / her use; those who do this should be warned and punished.
  - 15- Regular records should be kept from collection and / or production to export of medicinal and aromatic plants. In order to carry out healthy studies on these plants, it is necessary to monitor their trade, export and especially production amounts and how much of them are collected from nature and how much of it comes from field production in the statistics. This issue is important all over the world.
  - 16- Treatment of medicinal aromatic plants, cleaning, relocation, classification and residual residues after obtaining the essential oil should be evaluated and the costs should be reduced and new products should be obtained. Examples of spices processing plants such as oil from volatile carriers, aniseed, cumin, as well as essential oils of seeds as well as the evaluation of fixed oils of the seeds.

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