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# Investigation of Medicinal Plant Production and Trade Potential in Turkey

Ersin Yücel [a], Filiz Önen [a] , Dilge Yücel [b]

[a] Eskisehir Tecnical University, Faculty of Sciences, Department of Biology, Eskişehir, Turkey
[a] Eskisehir Tecnical University, Faculty of Sciences, Department of Biology, Eskişehir, Turkey
[b] Eskişehir Osmangazi University, Faculty of Medicine, Eskişehir, Turkey

bitkilerim@gmail.com
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## ABSTRACT

This study is aimed to assess the import and export data and to determine Turkey's potential about the production of some medicinal plants between the years 2017-2018. Production quantities of the subject plants, import and export data is taken from the Turkey Statistical Institute's internet database.

The species examined in this study are as follows; asparagus (*Asparagus tenuifolius*), asphodel (*Asphodelus aestivus*), anise (*Pimpinella anisum*), black seed (*Nigella damascena*), cannabis (*Cannabis sativa*), canola seed (*Brassica napus*), carob (*Ceratonia siliqua*), cinnamon (*Cinnamomum sp.*), citrus (*Citrus sp.*), clove (*Syzygium aromaticum*), coriander (*Coriandrum sativum*), cumin (*Cuminum cyminum*), curcuma (*Curcuma longa*), daphne (*Laurus nobilis*), eucalyptus (*Eucalyptus sp.*), fennel (*Foeniculum vulgar*), flax seed (*Linum usitatissimum*), ginger (*Zingiber officinale*), lavender (*Lavandula sp.*), lemon (*Citrus limon*), licorice (*Glycyrrhiza glabra*), linden (*Tilia sp.*), melissa (*Melissa officinalis*), mint (*Mentha sp.*), niaouli (*Melaleuca quinquenervia*), orange (*Citrus sinensis*), pelargonium (*Pelargonium graveolens*), poppy seed (*Papaver somniferum*), rose (*Rosa sp.*), rosehip (*Rosa canina*), rosemary (*Rosmarinus officinalis*), safflower seeds (*Carthamus tinctorius*), saffron (*Crocus sativus*), sage (*Salvia officinalis*), sumac (*Rhus sp.*), sweet almond (*Prunus amygdalus var. dulcis*), thyme (*Origanum sp.*).

When the data obtained were examined; poppy seed (*Papaver somniferum*), daphne (*Laurus nobilis*), cumin (*Cuminum cyminum*) *a*re the most exported species; *Sesamum indicum,* sweet almond (*Prunus amygdalus var. dulcis*), safflower seeds (*Carthamus tinctorius*) are among the most imported species. In terms of the plants examined, the USA was the most exported country in 2017, followed by Vietnam and Germany; Russia was the most imported country, followed by Nigeria and the USA. In 2018, the highest exports were made to India, followed by Vietnam and the USA; Nigeria was the most imported country, followed by the USA and Russia. The most exported Essential oil species are; rose (*Rosa damascena*); orange (*Citrus sinensis*) and lavender (*Lavandula sp*.), While the most imported species were orange (*Citrus sinensis*), mint (*Mentha sp*.), citrus (*Citrus sp*)., and lemon (*Citrus lemon*).

**Keywords:** Medicinal plant, spicery, export, imports, trade

## INTRODUCTION

According to World Health Organization (WHO) data, approximately 20,000 plants are used for medicinal purposes (Faydaoğlu and Sucuoğlu, 2011). Throughout human history, many diseases (diabetes, jaundice, shortness of breath, etc.) have been tried to be treated using plants and are being studied. The World Health Organization (WHO) reports that around 4 billion people around the world are attempting to address health problems with herbal drugs in the first place (80% of the world's population). In particular, extracts obtained from parts of plants such as roots, leaves, flowers and fruits are the main ingredients of many medicinal drugs used today. In addition, approximately 25% of prescription drugs in developed countries are composed of active substances of plant origin (quinine, aspirin, etc.) (Farnsworth et al., 1985). Besides being used for therapeutic purposes, medicinal aromatic plants are used in the production of many products such as cosmetic products, essential oils, herbal health products, coloring dyes, plant protection products and intermediates obtained from these products (Lubbe and Verpoorte, 2011).

Of the 8 plant origin regions (phytogeographic) dominating the Earth, 3 (Euro-Siberian, Mediterranean, Iranian) intersect in the territory of our country. This situation, which causes a rich plant bed formation, allows 12.000 plant species to be grown in our country's soil, about 32% of which are endemic (Anonymous, 2019).

Turkey's unique geographic location, climate and plant diversity, agricultural potential, thanks to the large surface area of medicinal and aromatic plants is one of the leading countries in trade. Turkey in this matter; This is due to the input of established herbal medicine, plant chemicals, food and additives, cosmetics and perfumery industries in developed countries. (Bayram et al., 2010). Although known in Turkey as the exact number of medically used plants from them despite being estimated to be around 500 it is stated only that of about 200 medicinal and aromatic plant's export potential (Baytop, 1999; October et al. 2000; Aydin, 2004).

The sale of a good made to foreign countries against foreign exchange is called export. Export has an important place in the development of the country's economy. Therefore, increasing exports and reducing imports are among the important targets in the countries (Anonymous, 2019). Buyers in one country purchase goods and services produced in other countries are called import or foreign purchases. It is anti-export and forms the foreign trade balance of a country with it (Anonymous, 2019).

In this study of medicinal plants which are subject to a maximum of Turkey's trade in the years 2017-2018, production, aimed to assess the import and export data.

## MATERIALS AND METHODS

In this study, data on the most tradable medicinal plants in Turkey's 2017-2018 year was selected as research material. Production quantities of medicinal plants, import and export data; Turkey Statistical Institute with the Ministry of Commerce (TSI) 's access has been taken from the online open environment (the http://www.tuik.gov.t) (Anonymous, 2019). 24 plants which are mostly used for medicinal purposes were included in this study. Plants not used as medicinal plants (ornamental plants, etc.) were not included in the study.

## RESULTS

### Some Medicinal Plants Subject to Exports and Imports

Specified purposes in medicinal plants as considered to be the most tradable 30 plants identified and the data obtained for them TUİK 2017-2018 (Anonymous, 2019) in Table 1-2 are given collectively.

Table 1. Production, Export and Import Data of Some Medicinal Plants at Turkey for 2017 (Anonymous, 2019)

| Name | 2017 | | | | |
|---|---|---|---|---|---|
| | Production Ton | Export | | Imports | |
| | | Kg | $ | Kg | $ |
| *Salvia officinalis* | 557 T | 1.843.946 | 6.729.430 | 942.410 | 1.823.828 |
| *Pimpinella anisum* | 8.418 T | 1.886.869 | 6.938.263 | 2.272.905 | 4.758.519 |
| *Carthamus tinctorius* | 50.000 T | 290.906 | 227.611 | 91.075.367 | 39.349.244 |
| *Rosmarinus officinalis* | | 591.646 | 1.752.895 | 590.456 | 788.589 |
| *Asphodelus aestivus* | | 3.552 | 10.586 | 4.656 | 11.068 |
| *Nigella damascena* | 3.094 T | 461.724 | 1.360.906 | 5.500.803 | 5.558.042 |
| *Laurus nobilis* | | 12.708.650 | 36.058.749 | 1.330.028 | 1.795.342 |
| *Papaver somniferum* | 15.244 T | 3.771.956 | 10.989.800 | 19.658 | 54.975 |
| *Tilia sp.* | | 42.657 | 502.652 | 24.777 | 59.674 |
| *Brassica napus* | 60.000 T | 5.000 | 4.250 | 29.451.151 | 28.019.656 |
| *Ceratonia siliqua* | 15.016 T | 1.367.481 | 1.098.836 | 3.292.194 | 1.053.313 |
| *Thymus leucostomus var. argillaceus* | 14.477 T | 6.403.225 | 17.908.343 | 1.512.916 | 3.939.989 |
| *Cannabis sativa* | 1 T | 5.140 | 8.999 | 1.921.012 | 2.372.323 |
| *Linum usitatissimum* | | 2.821.909 | 1.144.868 | 121.395.428 | 82.802.359 |
| *Cuminum cyminum* | 19.175 T | 3.569.424 | 11.796.578 | 2.286.540 | 6.032.674 |
| *Coriandrum sativum* | 29 T | 46.907 | 53.484 | 1.360.690 | 727.287 |
| *Rosa canina* | | - | - | 154.870 | 88.322 |
| *Asparagus tenuifolius* | 178 T | 5.849 | 22.894 | 85.580 | 210.764 |
| *Lavandula angustifol*ia | 845 T | 443 | 16.198 | 4.512 | 220.601 |
| *Glycyrrhiza glabra* | | 897.421 | 2.721.601 | 915.175 | 1.539.684 |
| *Mentha sp.* | 14.213 T | 623330 | 1.743.663 | 319.449 | 377.164 |
| *Eucalyptus sp.* | | 119 | 3.707 | 27.543 | 550.394 |

| | | | | | |
|---|---|---|---|---|---|
| *Foeniculum vulgare* | 2.022 T | 929 | 4.477 | - | - |
| *Crocus sativus* | | 464 | 21.532 | 96 | 5.567 |
| *Rhus sp.* | | 354.493 | 671.297 | 349.600 | 191.572 |
| *Sesamum indicum* | 18.410 T | 1.557.867 | 3.980.627 | 142.451.179 | 235.913.610 |
| *Cinnamomum sp.* | | 6.456 | 56.960 | 1.776.651 | 2.704.010 |
| *Prunus amygdalus var. dulcis* | | 50.721 | 82.903 | 13.306.657 | 59.385.656 |
| *Zingiber officinale* | | 11.716 | 26.033 | 2.929.427 | 3.213.477 |
| *Curcuma longa* | | 76.861 | 227.027 | 782.959 | 938.318 |

Table 2. Production, Export and Import Data of Some Medicinal Plants at Turkey for 2018 (Anonymous, 2019)

| Name | | 2018 | | | |
|---|---|---|---|---|---|
| | Production Ton | Export | | Imports | |
| | | Kg | $ | Kg | $ |
| *Salvia officinalis* | 428 T | 1.932.902 | 6.967.544 | 743.980 | 1.620.684 |
| *Pimpinella anisum* | 8.664 T | 2.550.051 | 10.193.338 | 3.612.308 | 6.586.962 |
| *Carthamus tinctorius* | 35.000 T | 611.289 | 234.167 | 47.927.230 | 11.127.110 |
| *Rosmarinus officinalis* | | 516.600 | 1.542.164 | 619.752 | 839.080 |
| *Nigella damascena* | 3.322 T | 461.550 | 1.096.636 | 2.429.310 | 2.511.634 |
| *Laurus nobilis* | | 14.589.148 | 40.195.850 | 989.611 | 1.523.208 |
| *Papaver somniferum* | 26.991 T | 26.030.157 | 76.499.264 | 45.950 | 125.069 |
| *Tilia sp.* | | 124.581 | 1.544.036 | 25.151 | 54.442 |
| *Brassica napus* | 125.000 T | 40.000 | 27.470 | 21.322.770 | 9.768.733 |
| *Ceratonia siliqua* | 15.506 T | 750.147 | 685.525 | 1.633.451 | 602.846 |
| *Thymus leucostomus var. argillaceus* | 15.895 T | 6.097.153 | 17.228.018 | 1.786.894 | 4.743.223 |
| *Cannabis sativa* | 3 T | 1.900 | 2.986 | 104.258 | 139.022 |
| *Linum usitatissimum* | | 16.816 | 26.999 | 27.035.482 | 11.076.317 |
| *Cuminum cyminum* | 24.195 T | 6.061.519 | 18.249.567 | 993.335 | 3.213.808 |
| *Coriandrum sativum* | 29 T | 53.637 | 67.012 | 512.527 | 252.314 |
| *Rosa canina* | | 158 | 1.398 | 84.050 | 44.739 |
| *Asparagus tenuifolius* | 169 T | 28.624 | 124.857 | 65.742 | 151.537 |
| *Lavandula angustifol*ia | 1.040 T | 4.061 | 143.086 | 5.062 | 289.972 |
| *Glycyrrhiza glabra* | | 1.089.961 | 3.168.234 | 1.102.153 | 1.985.376 |
| *Mentha sp.* | 14.511 T | 653.975 | 1.975.466 | 87.241 | 133.100 |
| *Eucalyptus sp.* | | 34 | 4.382 | 25.974 | 730.860 |
| *Foeniculum vulgare* | 3.067 T | 7.120 | 12.978 | - | - |
| *Crocus sativus* | | 1.248 | 58.179 | 50 | 18.564 |
| *Rhus sp.* | | 400.606 | 649.703 | 451.260 | 113.673 |
| *Sesamum indicum* | 17.437 T | 1.907.019 | 4.903.289 | 150.122.362 | 195.074.108 |
| *Cinnamomum sp.* | | 11.040 | 86.879 | 872.560 | 1.542.843 |
| *Prunus amygdalus var. dulcis* | | 55.282 | 100.921 | 9.696.124 | 33.344.154 |
| *Zingiber officinale* | | 7.553 | 22.780 | 2.987.840 | 3.273.526 |
| *Curcuma longa* | | 48.754 | 217.433 | 979.376 | 1.096.073 |

**Some Essential Oils Subject to Exports and Imports**

Most of the 10 plant essential oils exported and imported were identified and the data obtained for them TUİK 2017-2018 (Anonymous, 2019) in Figure 1-2 are given collectively.

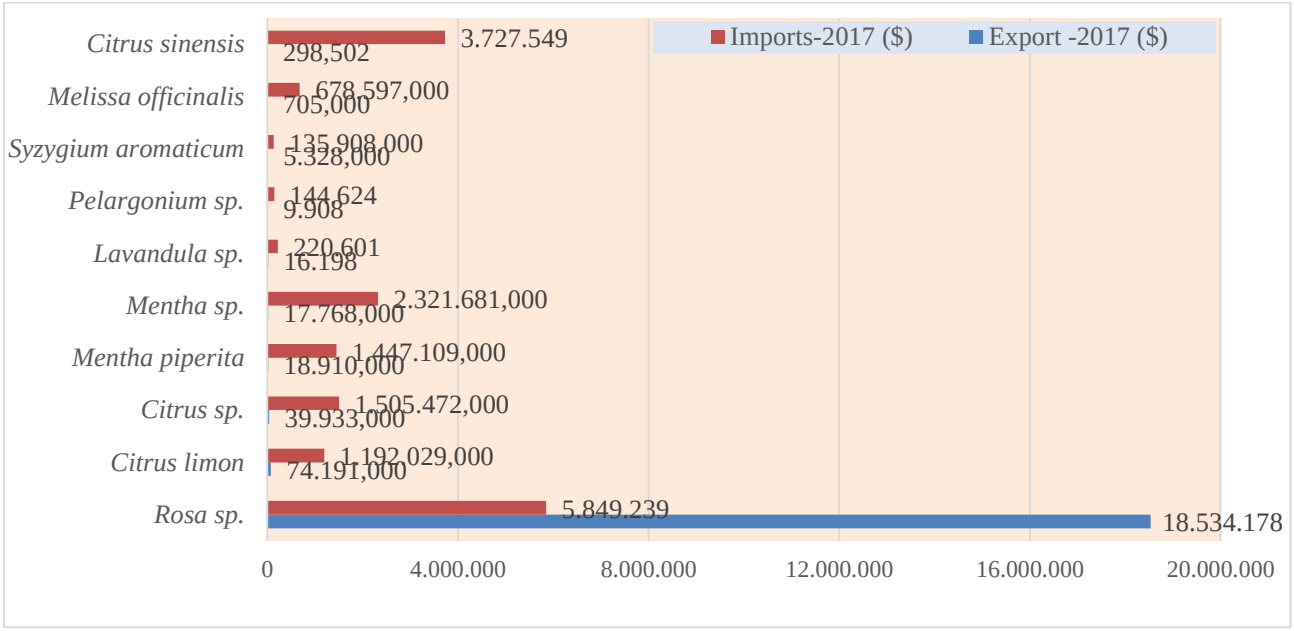


Figure 1. Export And Import Of Essential Oil at Turkey for 2017 (Total value of with and without terpene), year in 2017.

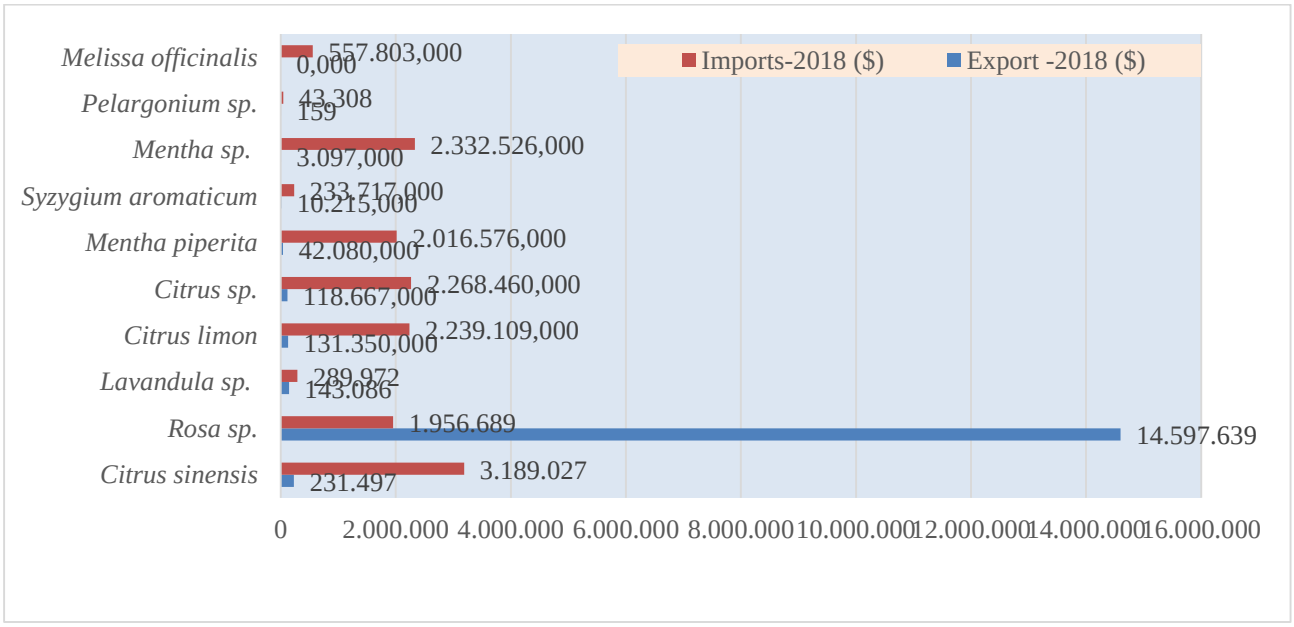


Figure 2. Export And Import Of Essential Oil at Turkey for 2018 (Total value of with and without terpene), year in 2018.

## DISCUSSION

Plants can be used directly in the manufacture of folk remedies, as pure active ingredients; it is also used in the preparation of spices, dyes, liquor, food, perfumery and various preparations, and this diversity increases

the importance of the places of sale and the places offered for sale (Yücel, 2008). Referring collectively to figures given above, it is very important of Turkey's total export of herbal drugs, such as most of thyme is known to be in the position of exporting countries in the world. Essential oil exports were at very high levels. Turkey's done a very rich source of herbal and medicinal plants that have great commercial potential of transport by reason of medical and aromatic plants cultivation on culture is of great importance (Yücel. 2008). It is of great importance to produce plants that are suitable for meeting various needs of plants existing in nature and to develop new varieties or culture breeds that have economic value (Yücel, 2010).

Our country is importing many plant species despite having an extremely rich vegetation Turkey is a large number of herbal products, the subject of trade, which is a part of nature, about 2/3 of tropical plants (clove, ginger, henna, cassia, etc.) it is formed. There is the potential growth of imported these plants in Turkey, a large part. In recent years, there are important studies on this subject. In order for plant resources to contribute to the national economy, the existing resource potential should be determined with all its elements, and then a planned and regular way of utilization should be introduced in order to provide optimum benefit from these riches (Yücel, 2014).

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