NON-WOOD FOREST PRODUCTS

THYME

VALUE CHAIN

RESEARCH REPORT 2018

Prepared by
Yaşama Dair Vakıf

Design
TGIF Visual and Creative Solutions
Melis Sertoğlu

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Non-Wood Forest Products: Thyme Value Chain Research Report was published for the Nature Conservation Centre (DKM) by Yaşama Dair Vakfı under the project "Integrated Approach to Management of Forests in Turkey, with Demonstration in High Conservation Value Forests in the Mediterranean Region" which is conducted by the Ministry Of Agriculture And Forestry, General Directorate of Forestry in cooperation with the United Nations Development Programme (UNDP) with the financial support of the Global Environment Facility (GEF).

TAG METHOD

"Non-Wood Forest Products: Research on Thyme Value Chain" was conducted by the General Directorate of Forestry for one of the project partners, the Nature Conservation Centre (DKM), in cooperation with United Nations Development Programme (UNDP) and with the financial support of Global Environment Facility (GEF) in order to provide an overview of value chain of thyme from forest to market at the Köyceğiz and Gazipaşa Forest District Directorates under the project on "Integrated Approach to Management of Forests in the Mediterranean Region".

15 interviews were conducted under the research between October and December 2016 in Antalya, Muğla, İzmir, and İstanbul.

The interviews were respectively conducted with Forest Regional Directorates' Non-Wood Products and Services Sections, Forest District Directorates, forest villagers, gatherers, mukhtars, middlemen, spice traders and the managers of drying – processing facilities. Following the interviews at local level, in-depth interviews were conducted with the Aegean Exporters' Association in order to understand thyme export process and with the spice sellers at Istanbul Spice Bazaar to track the end product that is offered to the end consumer at the domestic market. At the final stage, interviews were conducted with the spice sector representatives.

Finally, official statistics of the Ministry of Agriculture and Forestry and the Ministry of Customs and Trade were studied to compile the macro data related to thyme products in Turkey and the world and a thyme value map was created..

CON-TENTS

EXECUTIVE SUMMARY

“Non-Wood Forest Products: Research on Thyme Value Chain” was conducted by the General Directorate of Forestry for one of the project partners, the Nature Conservation Centre (DKM), in cooperation with United Nations Development Programme (UNDP) and with the financial support of Global Environment Facility (GEF) in order to provide an overview of value chain of thyme from forest to market at the Köyceğiz and Gazipaşa Forest District Directorates under the project on “Integrated Approach to Management of Forests in the Mediterranean Region”.

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In Turkey, Denizli represents the highest thyme production. However, the two target areas of the report (Köyceğiz and Gazipaşa) represent less than 1% of the total thyme production. According to the findings of the analysis, field owners are the major determinants of the supply to domestic market and for exports. Thyme in forest villages is usually collected when necessary amount of thyme cannot be supplied for exports or only for home consumption. Thus, thyme is not considered a significant source of income in Köyceğiz and Gazipaşa.

Cultivated thyme can be harvested for six years after the seeds are planted in the field. Therefore, it can be said that the cost of thyme cultivation is low. Thyme quality is determined by the essential oil ratio and the wild thyme’s essential oil ratio varies. The main demand of exporters is to supply the product whose oil ratio complies with a certain standard. Wild thyme collected from forests does not always meet the oil ratio standards. As a result of expansion of thyme cultivation, collection of thyme by forest villagers declines. The ageing of populations in forest villages and the fact that wild thyme grows on rough terrain makes wild thyme harvesting difficult. Cultivation alone does not meet the increasing global thyme demand

Improper collection and cut off by villagers have an adverse impact on thyme yield. Villagers usually collect thyme by pulling off with roots and this interrupts the rehabilitation works aimed by Forest District Directorates. It is stated that cooperatives established for thyme in the region are not successful. It is suggested that it is mostly due to the fact that cooperatives do not have a strong command of the market to be able to compete with the private sector in the area of exports and that they do not have an efficient feasibility study.

The report’s recommendations based on the findings are as follows:

- Procuring seeds in order to encourage thyme cultivation in villages with available agricultural areas in the region.

- Encouraging on-site drying and stem-removing in order to increase the profitability of producers and reduce the cost and environmental impact of logistics.

- Increasing the number of and improving the quality of trainings offered to villagers in order to increase thyme quality and yield, doing field monitoring and evaluation on the impact of trainings.

- Opening channels and supporting existing channels to supply from regions to the consumers the by-products such as thyme water, thyme oil that are demanded on domestic market.

- Providing grants / loans to facilities that could produce high added value – high quality products and to the initiatives which has a potential to increase exports.

THYME INVENTORY

In Turkey, the term “thyme” does not refer to herbs that belong to a single species. Instead five different plant species are traditionally named as thyme including [1]:

- Thymus (rock thyme)
- Origanum (tall thyme)
- Satureja (za’atar/savory)
- Coridothymus (Spanish thyme)
- Thymbra (pointed thyme)

Unlike Turkey, these species are globally named differently. For instance, the spice made of Origanum is called oregano whereas the spice made of Thymus is called thyme and the spice made of Satureja is called savory. As all commercial thyme varieties contain essential oils, they have a characteristic smell.

Historically İzmir thyme accounts for the largest share in thyme exports in Turkey [2]. Thus, cultivation and agronomy work mostly involved this species. A major part of the domestically consumed and exported thyme in Turkey (app. 90%) comprises of the plant species belonging to the genus Origanum with Origanum onites (=Origanum symrnaeum) that is also known as İzmir thyme constituting a major part of it.

In addition, although rare, Origanum minutiflorum, which is known as “highland thyme”, and Origanum majorana, which is known as “Alanya thyme” or “white thyme”, and also Syrian thyme are produced in Turkey.

First studies on İzmir thyme were conducted by the Faculty of Agriculture, Ege University in 1970s and agronomy and breeding works involving the Ege University and the private sector were initiated by the Aegean Agricultural Research Institute in early 1990s. Later, breeding works were sustained by the Aegean Agricultural Research Institute.

Commercial thyme varieties grow in the areas stretching from the sea level to the highlands in Marmara, Aegean and Mediterranean Regions. Especially in Denizli, thyme production was initiated as an alternative to tobacco production in mid-90s by distributing seeds to local producers. Today thyme production is the primary source of income for villagers in Pamukkale, Güney, Buldan and Çal districts.

In Turkey, thyme production covers a total area of 121.472 hectares [3]. This represents the total production areas including both cultivation areas and wild thyme areas on the mountains. It has been observed that thyme production areas more than doubled in the eleven-year period between 2006 and 2017. While in 2006 thyme production covered an area of approximately 59 thousand hectares, this increased to 121 thousand hectares in 2016. In addition, in this ten-year period, thyme production areas expanded almost each year, notably in 2008 and in 2012 compared to the previous years. As a result of regular expansions in the upcoming years, thyme production areas reached to more than 100 thousand hectares by 2015 (See Chart 1) [4]. Although relatively less, the expansion continued between the years 2016 and 2017.

Having a look at thyme production and harvest by years, it is observed that it for the first time exceeded 10 thousand tons as of 2008 and reached almost 15 thousand tons in 2016. Just like the breaking points in thyme production areas, two major breaking points are observed in terms of amount of thyme added to value chain. The first breaking point occurred in 2008; while before 2008 the production ranged between 5,500 and 8,000 tons, it reached over 10,000 tons in 2008 and never fell below this level in the upcoming years. It reached to 12,500 tons in 2009 and ranged between 11,000 and 13,500 tons between 2009 and 2015. In 2016 and 2017 it for the first time exceeded 14,000 tons and reached almost to 15,000 tons (see Chart 2) [5].

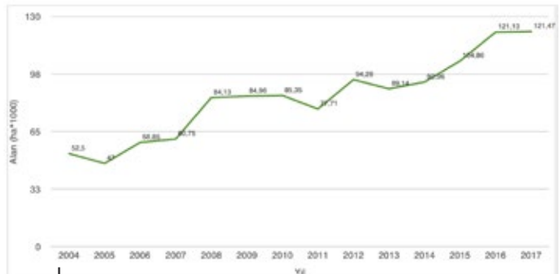


Chart 1. Thyme inventory by year (ha* 1000)

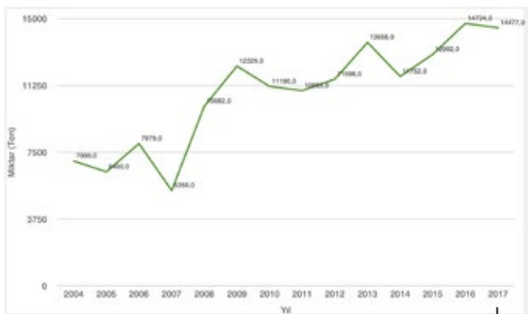


Chart 2. Thyme Inventory by year (Tons)

When both the production area and amount of thyme added in value chain are compared, it is observed that the highest yield was recorded in the years 2009, 2011 and 2013. Except these years, amount of thyme per hectare ranged between 120 and 130 kg. In 2009, 2011 and 2013 amount of thyme per hectare reached almost to 150 kg. (See Chart 3) [6].

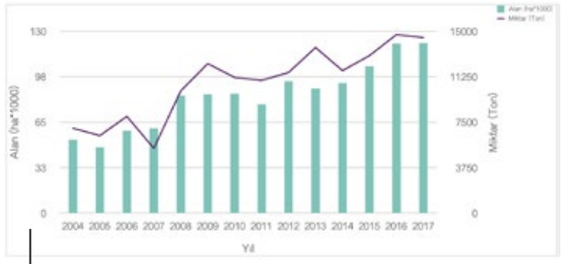


Chart 3. Thyme yield per year (Tons / HA * 10)

Major part of the domestically consumed and exported thyme in Turkey is cultivated. This, in tons, represents 90% of the total harvest. Only 10% is wild thyme. Even though this rate ranges by years compared to the total yield, it never exceeded the level of 80 to 90% except for 2007. Only in 2007 yield in cultivated thyme dropped significantly and the yield of wild thyme increased proportionally and the yields from these two types approached each other in tons.7 Today, yield from cultivation still represents app. 90% of the total yield. (see Chart 4) [7,8].

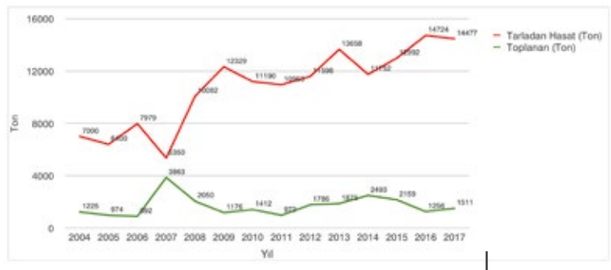


Chart 4. Yield per year from cultivation and from natural growing areas (Tons)

In Turkey, Denizli represents the highest thyme production. As of 2014, 95% of the thyme cultivation areas were in Denizli [9]. As of 2017, this rate is 92% [10]. Denizli is followed by Manisa, but cultivation areas in Manisa correspond to app. one 52th of the cultivation areas in Denizli (see Table 1) [10]. In order words, in order to have a full picture on thyme production in Turkey we need to include Denizli in our analysis. On the other hand, the two target areas of the report (Köyceğiz and Gazipaşa) represent less than 1% of the total thyme production.

Table 1. Thyme production areas per province (HA)

Province	Thyme Production Areas (HA)	Percentage
Denizli	111.769	92
Manisa	2.120	2
Uşak	2.110	2
Kütahya	1.940	2
Hatay	1.263	1
Aydın	1.200	1
Antalya	460	0
Muğla	273	0
Afyonkarahisar	158	0
Samsun	144	0
İzmir*	60	0
Isparta	25	0
Karaman*	18	0
Balıkesir	5	0
Osmaniye	4	0

THYME EXPORT

Turkey has long been a thyme exporter. It supplies 90% of the world's thyme production and it is almost a sole trader in the world market. It owes this position to the fact that thyme has been cultivated on fields since early 2000s and Turkey's ecology is favorable for thyme cultivation.

Thanks to cultivation and expansion of cultivation, standards expected by exporters can more easily be met and compared to wild thyme, supply process is less interrupted. Therefore, exports usually target cultivated thyme and wild thyme is usually consumed at the domestic market. Only in case of supply gaps, wild thyme comes into play and the supply gap is eliminated through the harvest of wild thyme.

Thyme quality is determined by the essential oil ratio and the wild thyme's essential oil ratio varies. The standard essential oil ratio is expected to be 2% but this ratio is hardly observed with the wild thyme. Therefore, this type of thyme is usually blended with another type of thyme with a higher essential oil ratio. Unlike wild thyme, essential oil ratio of cultivated and harvested can go up to 4%. In addition, collecting wild thyme is more labor intensive than harvesting cultivated thyme and this also increases the unit price.

In 2016 the following countries were the major thyme importers from Turkey: USA (4,092 tons), Germany (2,144 tons), Poland (449 tons), and the Netherlands (491 tons). These countries were followed by Italia (343 tons), Canada (331 tons), and South Africa (314 tons) [11] .

In 1990s, thyme exports from Turkey ranged between 5,000 to 6,000 tons and each year exports amounted in average to USD 10 – 12 million. In 2000s, thyme exports exceeded 10,000 tons with the cultivation of thyme. As of 2016, thyme exports exceeded 17,000 tons and as of 2017 approached to 18.000 tons (See Chart 5) [12, 13, 14].

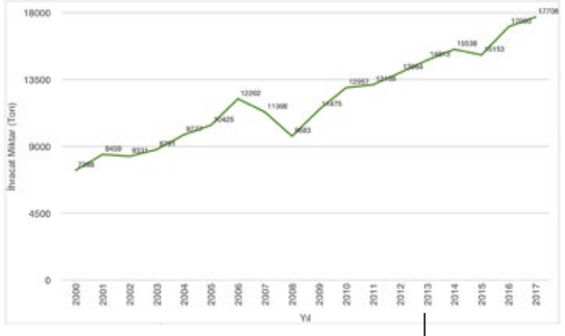


Chart 5. Thyme exports per year (amount)

When we look at the USD value range of thyme exports per year, we observe that while it was below USD 20 million in 2016, it reached over USD 50 million in 2013 and as of 2017 it exceeded USD 60 million. We can say that as of today the export value of thyme is more than USD 60 million (See Chart 6) [15, 16, 17].

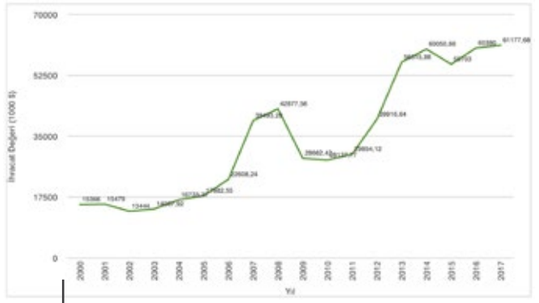


Chart 6. Thyme exports per year (value)

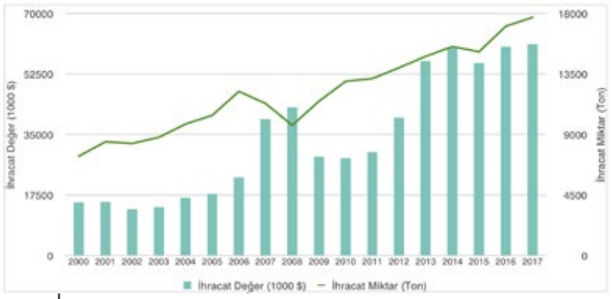


Chart 7. Export value of thyme per ton per years

Export value of thyme per ton keeps rising as well. While the price per kg was in the range of USD 1,5 and 2.00 between early 2000s and the year 2007, it was in the range of USD 2 and 4,5 per kg after 2007. Today we can roughly say that the value per kg almost doubled within the last 17 years. (See Chart 7) [18, 19]

Thyme is mostly an export product but it is also imported rarely for re-export purposes. Only in 2007, when there was a drop in thyme production, thyme imports did not go over USD 5 million. (See Chart 8) [20, 21]

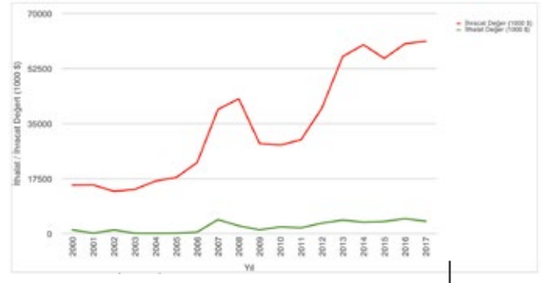
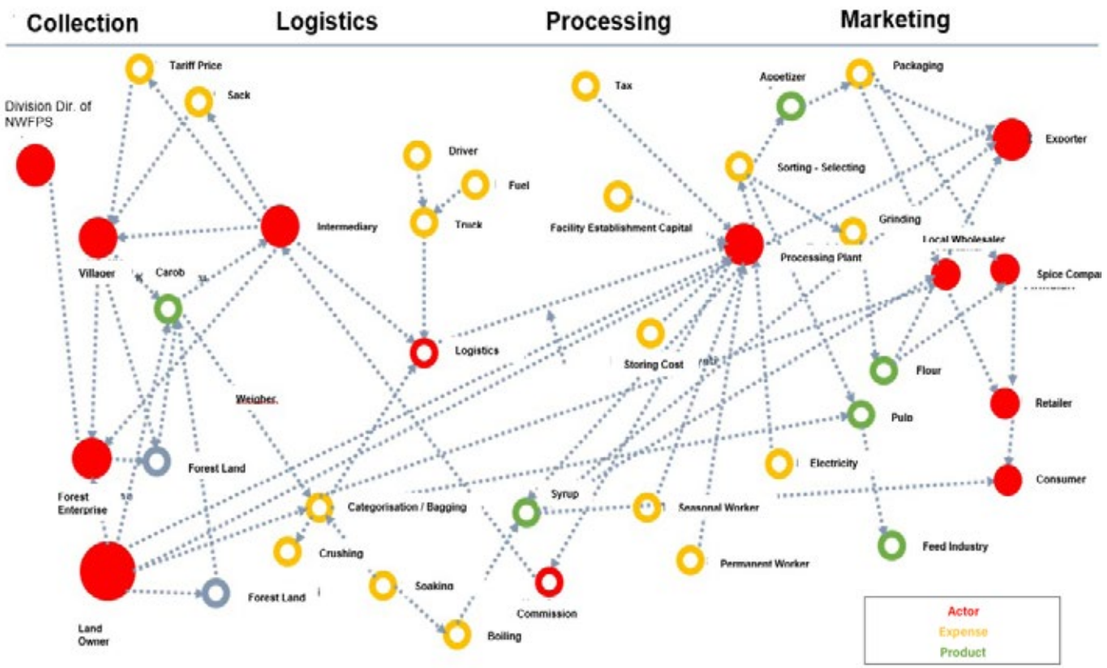


Chart 8. Import / Export values per year

THYME VALUE MAP



MAJOR ACTORS OF THYME VALUE CHAIN

Thyme farmers: They produce major part of thyme consumed at domestic market in Turkey.

Thyme workers: are workers harvesting thyme on fields. They are employed by field owners.

Regional Directorate of Forest, Non-Wood Products and Services Section: The exploitation plan that is prepared following the forest management plans by the Regional Directorate of Forest' Non-Wood Products and Services Section is submitted for approval to the General Directorate of Forestry in Ankara.

Forest District Directorate: It is in charge of forest management and implements forest management plans. It has a more direct interaction with villagers. The annual tariffs determined for the relevant year are collected by the Forest District Directorates.

Forest villagers: They come into play especially when the thyme harvest does not meet the demand for exports. They collect thyme in areas identified by the Forest District Directorate. They pay tariff value to the Forest District Directorate before collection. These are the individuals receiving the lowest income in the chain of thyme collection, processing, and export. In some cases, they sell thyme after having middlemen dry it.

Trader/Intermediary: Individuals who contact forest villagers for thyme collection. They load and transport the products after collection. They may work directly with export companies or may work with drying facilities to transport the products to the facilities.

Cooperatives: There is a thyme cooperative in Köyceğiz. However, there has been a drop in the harvest of wildly grown thyme and the initiative is downsizing.

Processing plants: The facilities mostly seek to respond to the exporters' demand. They receive thyme through traders or mukhtars and sometimes directly from villagers. Thyme is dried and stems are removed. Later it is sieved and fanned to remove any impurities like metals and final product is sacked. In addition, the oil ratio of thyme is determined in line with the customer's demand. The product is blended with other thyme varieties or with non-oil thyme in order to meet the required oil ratio.

Exporter: Producers contact traders and drying facilities based on international demand. When such companies have the capacity or facilities to process the raw material, they process the product bought from producers or traders themselves.

Buyer: Actors who are in contact with export companies and demand thyme. Mostly the USA, EU countries, and Far East countries. Quality of the export thyme is determined by the demand and needs of the customers.

FROM FOREST TO MARKET: THYME VALUE CHAIN

Planning and Organization of Thyme Cultivation / Picking

In Turkey, major part of thyme is cultivated, thus field owners are the major determinants of the supply to domestic market and for exports. Thyme in forest villages is usually collected when necessary amount of thyme cannot be supplied for exports or only for home consumption. Thus, thyme is considered a significant source of income in Köyceğiz and Gazipaşa. It is rather a process where middlemen come into play when a need arises; they organize the villagers only for the relevant lot.

"In the past, thyme was totally wildly grown. Actually, it was collected. However, after one point, collected amounts were insufficient to meet the demand. And also, in 1987, a radiation incident occurred. Following the Chernobyl accident, there appeared some radiation issues. At that point with the support and initiative of large companies, cultivation was encouraged. And in this region cultivation was more successful."

İzmir, Exporter Company

"In Büyükeceli, in a fire in 2008, which was the second biggest fire in Turkey, a total area of 5 thousand hectares burned. There, a sufficient amount of thyme is available. The villagers collect it. They pay the tariff value and then they go and collect. Thyme production is high."

Köyceğiz Forest District Directorate

After the cultivated thyme is sown, it can be harvested for six years. Therefore, it can be said that thyme cultivation is low cost. As the oil ratio of wild thyme is not standard, exporter is not sure whether the oil ratio requested by customer can be ensured or not. Thyme received by the exporter has sometimes high and sometimes low oil ratio depending on the thyme variety and harvest period. Thus, exporters' main demand is to procure a product with a certain standard.

"We bought thyme also from the Mediterranean Region in the past. There exists a thyme variety that we call white thyme for example. Its oil ratio is much higher. It has an oil ratio that can go up to 4%. The thyme variety that we call regular thyme has a maximum oil ratio of 3%."

İzmir, Company owner

"Or there is the pointed thyme as we call it. It also has varieties in different regions. There is the one that we call 'Ödemiş pointed'. It has varieties in Mersin and Tarsus regions. There is also the variety that we call timari, which is similar to that type. That one comes from different locations including Menemen and Milas in our region, and even Karaburun."

İzmir, Exporter Company

The major factor determining the quality of thyme is its essential oil ratio. Even though essential oil ratio varies according to the thyme variety, the harvest period is a determinant on essential oil ratio. Thyme is usually harvested during summer months when 50% of flowers have bloomed. In early harvest, the market value declines as the essential oil ratio is low. In addition, thyme with an essential oil ratio of less than 2% is not demanded on the market.

"Maturation period of thyme is in May, June, and July. In these months, thyme is harvested after running to seed. It is dried. The tariff value is very low, but I do not recall it. After harvesting, the villagers dry it. They sell it after drying, I do not know how much goes to the traders. As far as I know export center is Izmir. I hear that it is sent abroad from Izmir by certain companies."

Köyceğiz, Mukhtar

"There are pointed wild thyme and marble thyme (İzmir thyme). There is a difference in flavor. Wild thyme is more precious. We send it without processing. In this area, we do have marble thyme. We have wild and pointed thyme. Pointed thyme is grown in lower villages. Wild thyme is grown in mountain villages. Thyme starts in June and it continues until September."

Gazipaşa, Mukhtar

As of 2017, the tariff value of thyme paid to forest district directorates was TRY 0.07 per kg. Producers' sales price varies seasonally. In 2017, the price declined to TRY 3.00 in summer months when thyme was abundant and went up to TRY 8.00 in periods when it was difficult to find thyme. In December 2017, at Denizli Commodity Exchange the producers' price for thyme ranged between TRY 5.00/kg and TRY 8.00/kg.

"Now, prices have been declared anyway, the price is set. In İzmir the current price of marble thyme is TRY 5.5. What do we seek here? Would the product that we will buy from this price level bring a profit of 55% or not? We make a rough analysis of that. Color, flavor, sometimes there is an early harvest. It gets like powder. Is it harvested on time? Sometimes we have to do agricultural pesticide analysis. If the levels are above the EU standards, then the product is rejected. Thus, we get samples from the received products. If the levels are above the standards, we do not accept that product."

Processing Facility, İzmir

It is stated that cooperatives established for thyme in the region are not successful either. It is suggested that it is mostly due to the fact that cooperatives do not have a strong command of the market to be able to compete with the private sector in the area of exports and that they do not have an efficient feasibility study.

"A cooperative was established for thyme in this region. In Köyceğiz area, but they were not so successful. They established a plant. They were not very efficient even though they produced the raw material themselves. Because a feasibility study is needed. What do you aim? If you are producing and if you want to sell your product at foreign market, you need a market analysis. People with this experience should be employed at your institution or at your cooperative."

Köyceğiz, Forest District Directorate

THYME HARVEST

Ideally, thyme is harvested by cutting the stem from 5 to 10 cm up from the soil level by gardening scissors or knife. However, in smaller varieties, villagers harvest thyme by pulling it off from the soil. Since this gives harm to the roots, it has a serious adverse impact on the yield in upcoming periods.

"Thyme blossoms every year. You should cut it every year, but you should not pull it off with the roots. They leave thyme on fallow, but I am not for it. You should cut it so that it can shoot forth. If you do not cut it, it dries, it remains under, it grows green on the upper side, but it lignifies and does not grow much."

Gazipaşa, Forest District Directorate

While manual harvest is the ideal method to prevent degradation and dirt, producers started harvesting by machines on large fields. Therefore, plant owners complain about the decline in the quality.

"Combine harvesters collect and ground this. The ratio of stem and dirt inside is much higher. Thus, our profitability falls down to 50%."

Plant owner, İzmir

In Köyceğiz and Gazipaşa, there are not many villages collecting thyme. With the expansion of cultivation, there has been a decline in the collection of thyme in forests. Notably, limited young population in forest villages and the fact that thyme grows on rough terrain, reduced collection by forest villagers.

"We do not have people collecting thyme. People do not go from the village and do it."

Köyceğiz, Villager

"We do not go to harvest thyme. It is done in Pınarlı village."

Köyceğiz, Mukhtar

"Thyme villages are Karalar, Hasdere, Yeşilyurt, Yenigüney, Çimenbağ, İnalköy… It exists in almost all villages. In some villages it is in the village center, in some it is on the highlands, but they do not collect much."

Gazipaşa, Forest District Directorate

THYME LOGISTICS AND PROCESSING

Major part of thyme goes from fields to processing plants and this cost is usually born by processing plant or exporter. There are also spice companies producing thyme on their own fields. These companies produce and process thyme themselves and they supply it to the domestic market.

> *"Products we export are almost all products that we procure from producers. Sometimes we buy these products through middlemen. Sometimes we buy them directly."*
>
> *İzmir, Exporter Company*

> *"Now, of course, ours is 100 kg of thyme. It is usually one truck. If we are to load a product of one lorry or one container, 6 tons, then we need to but 8-10 tons of raw product. We are used to that scale. It of course depends on the agreement. At the final analysis, nothing changes. Let's say it is transported from Denizli to here for TL 1,000. It means that 10 cents are added to the per kg cost. Sometimes we pay it, sometimes the middle man pays it."*
>
> *İzmir, Exporter Company*

Transport of raw thyme costs around KRŞ 10 per kg.

> *"Say, the product totally costs TRY 5,5 in İzmir, including transportation and stoppage, etc. When this product valuing 5,5 in İzmir goes under processing in the plant with a cost of TRY 1, its cost rises up to TRY 6,5. When you have a profitability of 55% the total cost reaches up to TRY 11,80. This is of course the price of the end product."*
>
> *İzmir, Exporter Company*

Thyme that is brought to the processing plant is dried in dry and shady areas 20 cm up from the floor level. Drying lasts around 10 – 15 days, and ideally, thyme that is left to dry should be turned over from time to time to prevent it from heating too much (kızışma) which decreases its quality.

Dried thyme is separated from stems by haymaker or by beating. At this stage, app. 45% of the raw thyme is separated as dirt.

> *"Cultivated thyme has proven to be more profitable than wild thyme. For example, in the beginning we would get a yield of 70%. Producers would usually pull up the stalk by hand or they would beat thyme. We would get a yield of 50% from wild thyme. However, these percentages have declined a bit in the last years. Producers do not show the same sensitivity may be because the prices do not satisfy them."*
>
> *İzmir, Exporter Company*

Thyme that is removed from stems is sieved to remove stones, dirt, and impurities. Finally, thyme goes through metal detectors that is available in some processing plants and is taken to packaging.

> *"Natural product is roughly sieved. The long stems and dirt inside are removed. The leaves and the parts that we call balls fall down. These are taken to the grinder. After the grinder they are taken to the sieve. After sieving, they reach to aspirator. There is a machine that we call trio which removes the tiny dirt inside. There is another machine that we call stone machine. It is weight sensitive. There is the metal detector. It removes the heavy metals inside. And the process is finalized in this way. The product is released with no impurities."*
>
> *İzmir, Processing Plant*

Thyme is usually kept in 20 – 25 kg cloth bags. The export products are loaded to containers and products that will be supplied to the domestic market are forwarded to spice companies for packaging. In addition, at this stage thyme is blended with other varieties to meet the oil ratio required by the customers.

> *"Some request prices on the basis of the oil ratio. For example, they say that they demand thyme with an oil ratio of 1.5%. In order to meet this ratio, it is possible to make various combinations. For example, a company in Germany says they would like to receive thyme with an oil ratio of 1.5%. However, let's say the thyme we have has an oil ratio of 3%. In order to lower the price, we find ourselves in a position where we blend it with a low oil ratio thyme and sell the product at a lower price."*
>
> *İzmir, Exporter Company*

> *"This brings extra cost, but it lowers the price to a certain extend. Actually, the buyer buys thyme, the content is thyme, but this process lowers the price."*
>
> *İzmir, Processing plant*

> *"I guess the customer is not aware of this, but all buyers are aware of this. I am not of the opinion that any exporter is tricking their buyers. This is totally determined by the demand. At first, we did not want to send products with some hesitation. Later we saw that the olive leaves or the other blended content inside is not harmful for human health. In contrary, some products even proved to be very good for health. However, when we look at from an ethical point of view, the end consumer buys thyme but actually consumes a different product."*
>
> *İzmir, Processing plant*

Lastly, the exporter takes some samples from the export products and sends them for analysis. Strictness of the analysis varies according to the legislation of import country.

> *"It should comply with the pesticide standards. In terms of microbiological standards, it should comply with the food codex. In order to meet these standards, we do analysis from time to time. There are some laboratories here. But this is a cost item. We usually do this per container. It is very costly to separately send the products of each buyer to analysis each time."*
>
> *İzmir, Exporter Company*

THYME AND ITS BY-PRODUCTS ON THE MARKET

Thyme has long been known and consumed as a spice in the countries at the Mediterranean coast line. While it is heavily used for meat, in meat dishes and pizzas (Italy's imports are mostly for pizza dressings), it is also used for salads, soups, and sauces.

Besides Origanum sp. having anti-bacterial and anti-fungal qualities, carvacrol, a component of thyme oil, is said to be anti-bacterial, anti-fungal, to be a natural pain-killer and to heal wounds quickly. Following the prohibition of antibiotics in animal feed industry, Izmir and Istanbul thyme which are in line with the European Pharmacopoeia standards came to be used in livestock production.

It is known that both thyme water and thyme oil is used to remedy cold, sore throat, gastro and intestinal spasms and to ease digestion. Thus, thyme water and thyme oil are traditionally used to strengthen immune system and balance the digestive system. Thyme is also commonly used by diabetics. Thyme water's price ranges between TRY 12 – 40 per liter in Turkey.

It has been found that thyme essential oils have a killing or controlling effect on microorganisms that degrade food. Thus, it is concluded that thyme can be used for preserving food.

Besides these, the scientific studies reveled that active ingredients derived from thyme varieties can be used as insecticide and herbicide. They also proved to have an impact on nematodes and viruses. In addition, it has been concluded that they could be used for phytosanitary purposes.

While price per 100 g of thyme spice is TRY 3.00 on Turkish domestic market, the price per 100 g in the USA is more than USD 15.00.

Oil derived from thyme is also used in cosmetic sector. In Turkey, price of a 100 g thyme soap bar ranges between TRY 4.00 and 30.00. While thyme oil's price per 20 cl ranges between TRY 18.00 to 20.00 in Turkey, this can go up to USD 20.00 in the USA. (app. TRY 75.00)

FACTORS IMPACTING THE QUALITY OF THYME

Essential oil ratio (Essence): Thyme variety and the harvest period determine the essential oil rate. In Turkey, the essential oil rate of cultivated thyme and wild thyme in some regions can go up to 4%. However due to its high price, buyers usually do not demand the highest oil ratio but request a different oil ratio when importing products. Thus, processing plant owners and exporters export blended thyme in order to lower the oil ratio in line with the customer's demand.

Harvest period: Harvest period is the major factor determining the quality of thyme. The best harvest period is the period when 50% of flowers have bloomed. This corresponds to the summer months. If harvesting is done in March and April, the desired oil ratio cannot be secured.

Thyme collection / cutting: Collection method is the major factor determining the next years' yield. Pulling off harms the roots. In addition, if the whole stem is cut off, the crop is unable to survive.

Pesticide residues: Although rare, identification of pesticide residues and impurities in accordance with the EU Food Codex and Standards results in the rejection of exported products.

> *"During the export process, we conduct very detailed analysis. Despite our detailed analysis, one lot was rejected by Japan on the argument that it contained pesticide residues by 0.0001 ratio. The rejection resulted in a reputational loss for Turkey."*
>
> *İzmir, Exported Company*

Drying: The ideal drying method for thyme is drying in the shade above the floor level. Thyme that is left for drying for 10-15 days should be turned from time to time.

MAJOR CHALLENGES IN THYME VALUE CHAIN

• As a result of expansion of thyme cultivation, collection of thyme by forest villagers declines. The ageing of populations in forest villages and the fact that wild thyme grows on rough terrain makes wild thyme harvesting difficult.

• Exporters seek a certain standard on thyme. Wild thyme from forests does not always meet these standards.

• Cultivation alone does not meet the increasing global thyme demand.

• Improper collection and cut off by villagers have an adverse impact on thyme yield. Villagers usually collect thyme by pulling off with roots and this interrupts the rehabilitation works aimed by forest district directorates.

RECOMMENDATIONS ON THYME VALUE CHAIN

• Procuring seeds in order to encourage thyme cultivation in villages with available agricultural areas in the region.

• Encouraging on-site drying and moving in order to increase the profitability of producers and reduce the cost and environmental impact of logistics.

• Increasing the number of and improving the quality of trainings offered to villagers in order to increase thyme quality and yield, doing field monitoring and evaluation on the impact of trainings.

• Opening channels and supporting existing channels to supply from regions to the consumers the by-products such as thyme water, thyme oil that are demanded on domestic market.

• Providing grants / loans to plants that could produce high added value – high quality products and to the initiatives which has a potential to increase exports.

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NON-WOOD FOREST PRODUCTS THYME VALUE CHAIN

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