

# Current Studies in **Agricultural** Economics

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## **PREFACE**

It is known that the agricultural sector is important for people to live in healthy and suitable conditions. Agricultural production is the oldest production activity in human history. Agricultural production, which is the source of food for humanity, has strategic importance for countries. The increasing trend in population and income causes consumers to demand different agricultural products. Especially in recent years, there has been an increase in the consumption of organic and frozen food products. This situation necessitates the more intensive use of science and technology in agricultural activities.

In the book, which consists of chapters prepared by distinguished academicians, Sunflower Production in Adana, Consumers' Organic Egg and Chicken Meat Consumption Trends and Consumption of Frozen Food Products are examined. Hoping that the book will be a useful resource for interested parties, we would like to thank our chapter authors and BİDGE publishing house, which contributed to the creation of the book.

**Editor**

Assoc. Dr. İsmail UKAV

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# **CHAPTER I**

## **Sunflower Production in Adana**

**Aytekin GÖRDEBİL<sup>1</sup>**  
**Dilek BOSTAN BUDAK<sup>2</sup>**

### **Introduction**

Oilseeds are one of the most important raw material sources for the oil, feed, chemical and energy sectors. The oil, protein, carbohydrates, minerals and vitamins found in seeds hold significant importance in human and animal nutrition. Additionally, they play an undeniable role in the energy sector for biodiesel production. A significant portion of the fats required for human nutrition is obtained from plant-based oils. Currently, 92% of global crude oil production comes from vegetable sources, while the remaining 8% is sourced from animal origins (Kıllı and Beycioğlu, 2019). Aksoy et al. (1996) stated that sunflower is an important

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oilseed crop in terms of vegetable crude oil production due to its high oil content ranging from 22% to 50%. They also mentioned that sunflower oil is nutritionally valuable as it has a high proportion of polyunsaturated fatty acids (69%) and a low proportion of saturated fatty acids (11%).

Oils hold a crucial place in human nutrition due to being an energy source. An adult human requires approximately 2800-3000 calories. It is recommended that around 30-35% of this energy intake (850-900 calories) should come from fats for a healthy and balanced diet. One-third of the total fat needed by individuals is obtained from liquid sources in meals, another one-third from solid fats in breakfast and the remaining one-third from food such as cheese, milk, nuts and peanuts (Kıllı and Beycioğlu, 2019).

Despite the presence of numerous plants containing oil in their seeds on earth, the plants that are processed in industries to obtain oil from their seeds today include soybean, sunflower, cottonseed, rapeseed, peanut, sesame, safflower, castor, flaxseed, hemp, jojoba, corn (from corn kernel), olive, date palm, and coconut. Among these, cottonseed, castor, flaxseed, hemp and corn are not specifically cultivated for oil extraction but rather have their oil obtained as a byproduct from their seeds. Additionally, plants such as jojoba, olive, date palm and coconut are perennial, while other are annual crops. Due to its diverse climate characteristics, Turkey can successfully cultivate all oilseed plants except jojoba, date palm and coconut (Arioğlu et al., 2017).

Sunflower has a wide range of uses in various fields today. Nutrition is certainly one of the primary uses. Sunflower oil is commonly used as a liquid in cooking and frying. After extracting the oil from sunflower seeds, the remaining meal contains a high amount of protein. Among oilseeds, sunflower seeds have a very high energy value after soybean meal. Therefore, they are widely preferred in livestock farming for the production of mixed animal feed. In addition, to nutrition, sunflower is also used in the cosmetic industry and in the production of oil-based paints. The second-

preseed oil is used in soap production. Sunflower stalks are utilized in papermaking and the cellulose industry.

The genetic center of sunflower is North America, and it is still found in the wild in the central regions of the United States. Although sunflower has a long and diverse history as an economic plant, the exact location and the time of its first cultivation are unknown. Before the first migrations in the New World, Native Americans used it as a source of dye. Sunflower seeds collected from North America by Spanish explorers in the 1850s were initially cultivated as an ornament plant in gardens in Spain. Sunflower, as an oilseed crop, was first produced in Russia and then spread throughout Europe. After World War II, in the years 1945-1950, sunflower entered Turkey through seeds brought by Bulgarian immigrants, and cultivation began. However, the main increase in production and cultivation area occurred after the introduction of hybrid seeds into the country in the 1980s (Kaya, 2018; Meral, 2019; Tüfekçi, 2019). High-oil content and high-yielding sunflower varieties developed by breeders worldwide have contributed to the increase in sunflower production, and the hybrid sunflower varieties developed in the last 20 years have also led to the desired level of production (TEPGE, 2021).

With the increasing population, nutrition has emerged as a problem both globally and in Turkey. Sunflower is primarily grown for oil production in Turkey. Global sunflower production has reached around 54.9 million tons in recent years, and Turkey ranks among the top ten countries in terms of production and cultivation areas. Oilseed sunflower production in Turkey is mainly concentrated in the Trakya-Marmara Region, while confectionery sunflower production is mostly carried out in the Central and Eastern Anatolia Regions, with a small amount produced in other regions as well.

Sunflower cultivation areas for oil production in Turkey have been fluctuating in recent years due to climate conditions and price policies. According to data from 2020, sunflower is cultivated in an

area of 8,113,116 hectares, with a production quantity of 2,215,00 tons (TUIK, 2021). The sunflower cultivation areas have been increasing from year to year in different regions due to its suitability for mechanization and requiring less labor.

In Turkey, despite the tendency for an increase in the cultivated area of oilseed, the growing population and the resulting increase in per capita consumption have led a situation where oil productin cannot meet the demand. As a result, an increasing oil deficit has emerged, which has been met through imports. This deficit is covered through the import of oilseeds and crude oil (TURKSTAT, 2021). This indicates the strategic importance of sunflower, considering its role in the country's economy. The aim of this study was to examine the factors influencing the production and determine the cost of sunflower oil production per unit area.

## **Material and method**

Sunflower production is carried out in the Adana province in the three periods: as the first crop in March, as a relay planting (April sowing), and as the second crop in June. The main material of this study consists of data obtained through survey conducted with sunflower farmers registered in the Farmer Registration System in the Ceyhan and Sarıçam districts of Adana province. In the study area, there are 13,980 registered producers in the Farmer Registration System. Initially, 20 pilot surveys were conducted and their standard deviations (per acre) were calculated. The following method was used to determine the sample size for the survey (Arıkan, 2017).

$$n = \frac{N z^2 s^2}{N d^2 + z^2 s^2}$$

In the formula;

N: the total number of producers in the population (13.980)

n: the sample size



z: represents the confidence interval (corresponding to the z-table value for a 90% confidence level, which is 1.58)

s: the standard deviation (25.44)

d: the deviation from the mean for a certain proportion ( $\pm 5$  acres)

Using the Neyman method, the calculated sample size representing the population is 64.33. Taking into account the possibility of survey errors, 70 surveys were conducted in the study. Efforts were made to reach as many villages involved in sunflower production as possible and the surveys were completed in May-June 2022. Farmers were selected randomly.

Using the survey results and the collected physical and financial data for the 2021-2022 production year, unit product costs have been determined based on a budget approach. After analyzing the data, summary tables were prepared and the physical and monetary values in these tables were organized to represent the simple arithmetic average of the farms. Average physical and financial values related to production activities were calculated by dividing the total cultivated area of the products, representing the average per unit area.

Production costs consist of fixed and variable expenses. In the scope of this study, the fixed cost elements related to sunflower production activities include land rent/land capital interest, family and permanent labor expenses, general administrative expenses and other expenses (depreciation, equipment capital interest, insurance, taxes, etc.). The variable cost elements of this product include seed expenses, fertilizer expenses, pesticide expenses, temporary labor expenses, water fees, equipment fuel expenses, equipment maintenance and repair expenses and working capital interest costs. The support utilized by the farms in calculating the sunflower production cost has not been taken into account. In the cost calculations, only the expenses incurred for sunflower production in the farm have been considered. In other words, a single-crop budget

analysis has been used. The physical quantities of the inputs used in production have been priced with the real prices paid by the farmers in the product cost calculations.

## **Results**

The ages of the oilseed sunflower producers in the study range from 24 to 70, with an average age of 53,8. All of the producers are male and only 12,9% of them belong to the young age group of 40 years and below. In recent years, the younger population has been distancing themselves from agricultural activities and the findings of this study confirm this trend. Among the producers, 1,86% are literate, 42,86% have completed primary school, 24,29% have completed middle school, 27,14% have completed high school and 2,86% have a university degree. It was found that 14,3% of the producers have a two-person family, 22,7% have a three-person family, 20,7% have a four-person family and 42,3% have a family with five or more members. The majority of the producers are solely engaged in agriculture, with only 21,43% of them involved in non-agricultural activities.

In only 85,7% of the producers engaged in oilseed sunflower production, family members work, while in others, foreign labor is employed. It was found that 48,7% of them produce in a single parcel, 27,14% produce in two parcels, 18,57% produce in three parcels and 5,72% produce in four or more parcels. The average oilseed sunflower cultivation area for the producers is 95,5 hectares, min 20 maximum 330 hectares. The occurrence of tenancy and sharecropping among sunflower producers in Adana province is low. None of the producer in this study engage in sharecropping for sunflower cultivation. Among the surveyed producers, 84,29% cultivate sunflower on their own fields, while 15,71% lease their field for sunflower production.

Sunflower producers in Adana province generally engage in cultivation under dry conditions. The adaptability of sunflower to dry conditions, allowing it to be grown without irrigation, and its

suitability as a rotation crop with wheat have popularized its cultivation in dry conditions. Only 1,43% of the sunflower producers indicated that they cultivate in irrigated areas, while the remaining 98,75% stated they produce in dry lands. Due to the predominantly dry cultivation conditions in the study area, the bare land value of the fields where sunflower is grown is at a low price level, which is 17,102 Turkish Liras. Due to cultivation on dry land, the yields of the producers vary depending on weather conditions. It has been found that the average yield for the 2021 season among the producers is 201,4kg.

Out of the 70 producers, 92,8% of them benefit from support in sunflower production, while the remaining 7,2% do not receive any support. Those who do not benefit from support face issues with their land titles, have shared fields for cultivation, and have not registered in the Central Registration System (ÇKS). The producers receive subsidies for premiums, diesel fuel, and fertilizers. In the 2021 production season, the producers received a subsidy of 0,50 kuruş per kilogram for premiums, 29TL per hectare for diesel fuel, and 8TL per hectare for fertilizers.

The producers sold their products at an average price of 4,64 TL. The producers who sold at the highest price (5,50TL) mentioned that they wait for a short time at farm and sell the product when the price increases. 5,71% of the producers sell their products within their own farm, while the remaining 94,29% sell outside the farm. All producers sold their products to traders for cash. No producer sold their products to the Turkish Grain Board (TMO), seed companies, or Commodity Exchanges.

### **Problems of the producers in sunflower production process**

The agricultural sector, which has a significant impact on the development of societies, self-sufficiency, and lifestyle, is a sector whose importance is further recognized with globalization. While the agricultural sector, like other sectors, develops and modernizes, it also strives to cope with many challenges despite all the progress

and modernization. It is stated that the high input costs (98,6%) and the problem of diseases and pests (91,4%) are very important in the sunflower production. 41,4% of the producers consider technical inadequacies in production to be moderately important, while 12,9% consider to be very important. Climate change, which has become the most significant problem in the recent years, is considered very important by 92,9% of the producers. Almost all of the producers (98,6%) stated that they did not experience any marketing issues because they sell at their own farm to traders (Table 1).

*Table 1. Problems that producers consider in sunflower production process (%)*

| <b>Factors</b>                      | <b>Not Very Important</b> | <b>Not Important</b> | <b>Moderate</b> | <b>Important</b> | <b>Very Important</b> |
|-------------------------------------|---------------------------|----------------------|-----------------|------------------|-----------------------|
| High input costs                    | 1,4                       |                      |                 |                  | 98,6                  |
| Diseases/pests                      |                           |                      |                 | 1,4              | 91,4                  |
| Irrigation problems/irrigation cost | 45,4                      | 1,4                  | 7,1             |                  | 45,7                  |
| Technical inadequacies              | 38,6                      |                      | 41,4            | 7,1              | 12,9                  |
| Climate conditions/climate changes  |                           |                      | 5,7             | 1,4              | 92,9                  |
| Marketing problems                  | 98,6                      |                      |                 |                  | 1,4                   |
| Not finding suitable variety        | 84,3                      |                      |                 |                  | 15,7                  |

### **Reasons for producers' preference for oil sunflower production**

In recent years, the oilseed sunflower cultivation areas in Turkey have increased due to the implemented price policies. Despite fluctuations in yield due to changing climatic conditions and droughts, the production has shown an overall increase from year to year in parallel with the expansion of cultivation areas. The suitability of oilseed sunflower for mechanization, its low labor requirements, the pricing policies and support measures implemented in this field, and its easier production compared to

other crops have made oilseed sunflower a preferred product among producers. In the area where this study was conducted, oilseed sunflower is observed to be preferred by producers, particularly due to its high yield potential when grown in arid conditions and its suitability as a good rotation crop with wheat.

Producers' preference for oilseed sunflower production is significantly influenced by support measures, with 78,6% considering them very important. Surprisingly, the suitability of oilseed sunflower for storage is found to be not important for the majority of producers (78,6%). This is attributed to the practice of oilseed sunflower producers involved in the study, who sell their products to traders on the same day of harvest. The suitability of oilseed sunflower for mechanization (98,6%) and the ease of product sales (98,6%) have been identified as highly significant factors among the producers participating in the study. The fact that oil seed sunflower requires less labor is considered very important (97,2%) and the economic viability of oilseed sunflower production is also deemed highly important by the producers (98,6%) (Table 2).

*Table 2. Reasons for producers' preference for oil sunflower production (%)*

| <b>Factors</b>  | <b>Not very important</b> | <b>Not important</b> | <b>Moderate</b> | <b>Important</b> | <b>Very important</b> |
|---|---------------------------|----------------------|-----------------|------------------|-----------------------|
| Supports  | 12,9                      |                      | 4,3             | 4,3              | 78,6                  |
| Convenient for storage                                  | 78,6                      |                      | 4,3             | 1,4              | 15,7                  |
| Suitable for mechanization                              |                           |                      | 1,4             |                  | 98,6                  |
| Ease of sale  | 1,4                       |                      |                 |                  | 98,6                  |
| Ease of production                                      | 1,4                       |                      |                 |                  | 98,6                  |
| Suitability for crop rotation                           |                           |                      |                 |                  | 100                   |
| Being an alternative crop that can be grown in dry land |                           |                      |                 |                  | 100                   |
| Not requiring much labor                                |                           |                      | 1,4             | 1,4              | 97,2                  |
| Economics   |                           |                      |                 | 1,4              | 98,6                  |

## PREFERENCES IN SEED VARIETY SELECTION FOR OIL SUNFLOWER PRODUCTION

Seed selection is important in sunflower farming. Producers take into account many criteria when selecting sunflower seeds. In sunflower cultivation, hybrid varieties that are high-yielding, resistant to orobanche, diseases and pests are predominantly used. It is important for producers to use seed selections that are highly adaptable to their environmental conditions. All producers (100,0%) have stated that the productivity level of the seed is very important. The majority of the producers consider very important of the seed price (65,7%) and the trust in the seed company (72,9%). The oil performance of the seed selection is indicated as “not very important” by 94,3% of the producers. One of the most significant problems in sunflower production is bird damage. When the seeds start to mature on the head, birds cause significant damage by feeding on them. To reduce the extent damage, it is important to prefer varieties with downward-hanging heads. In this regard, 84,3% of the producers consider it very important and 15,7% consider it moderately important (Table 3).

*Table 3. Preferences in Seed Variety Selection for Oil Sunflower Production (%)*

| <b>Factors</b>                   | <b>Not very important</b> | <b>Not important</b> | <b>Moderate</b> | <b>Important</b> | <b>Very important</b> |
|----------------------------------|---------------------------|----------------------|-----------------|------------------|-----------------------|
| Seed price                       | 12,9                      | 1,4                  | 12,9            | 7,1              | 65,7                  |
| Trust to seed company            | 10,0                      |                      | 12,9            | 4,3              | 72,9                  |
| Yield performance                |                           |                      |                 |                  | 100                   |
| Technical support of the company | 44,3                      |                      | 15,7            | 4,3              | 35,7                  |
| Early start/early drying         | 4,3                       |                      | 5,7             |                  | 90,0                  |
| Easy to find                     | 2,9                       |                      |                 |                  | 97,1                  |
| Oil performance                  | 94,3                      |                      |                 |                  | 5,7                   |

|   |      |     |      |     |      |
|---|------|-----|------|-----|------|
| Preferences of leading producers                        | 37,1 | 1,4 | 14,3 | 2,9 | 44,3 |
| Place of production/origin of the seed                  | 58,6 |     | 22,9 |     | 18,5 |
| Segment of the seed                                     | 78,6 |     | 10,0 | 4,3 | 7,1  |
| Drought resistance                                      |      |     |      |     | 100  |
| Disease and pest resistance (Mildew and common ragweed) |      |     |      |     | 100  |
| Table shape (against bird damage)                       |      |     | 15,7 |     | 84,3 |

## Oil Sunflower Production Costs

Soil preparation and planting expenses constitute the most significant cost item within variable costs (78%). Oilseed sunflower is a crop that requires minimal labor and producers in the region prefer oilseed sunflower cultivation without irrigation. Additionally, the producers in the region use a minimum amount of pesticides and fertilizers. Therefore, maintenance expenses have the lowest share among variable costs at 3,54%. Sunflowers are harvested with a combine and harvesting-transportation expenses account for 18,46% of the variable costs. In the research area, soil preparation and seed planting vary, but generally, three tillage operations are carried out before planting sunflower. First, the field is deeply plowed with a plow, then in spring, it is mixed again with a cultivator and before planting, it is prepared for sowing a harrow. Although three tillage operations are commonly performed in the research area, it has been observed that some farmers also perform a fourth and fifth tillage operation before planting. The fuel cost of the tractor used in soil preparation, maintenance operations, and transportation operations in sunflower production amounts to 56TL per decare and constitutes

44,12% of the variable expenses. The cost of sunflower seeds constitutes 36,80% of the variable expenses. On average, 435 gram of seeds are sown per hectare, and the planting process is carried out with a precision seeder. The cost of fertilizer accounts for 2,73% of the total variable expenses. Micro fertilizers are predominantly used for fertilization, and this fertilization process is done together with the planting process. Since fertilization is mainly done during the planting process, there are no additional expenses apart from the fertilizer cost. DAP (Di-Ammonium Phosphate) is used as the base fertilizer. Although there are not many farms that apply top dressing, UREA is used as the top dressing fertilizer. On average, 10 kg of base fertilizer is applied per hectare, while 20 kg of top dressing fertilizer is applied per hectare. On average, 25 grams of pesticides are used per decare. There are no irrigation costs for sunflower under dry conditions. (Table 4).

*Table 4. Oil Sunflower Production Costs*

| Production processes             | Man and machine |      |               |       | Equipment Used           | Material Used |      |        | Total |
|----------------------------------|-----------------|------|---------------|-------|--------------------------|---------------|------|--------|-------|
|                                  | Man power       |      | Machine power |       |                          |               |      |        |       |
| A) Soil preparation and planting | Hour            | TL   | Hour          | TL    |                          | Type          | kg   | Tu tar | (TL ) |
| First tillage                    | 0,19            | 4,32 | 0,19          | 16,76 | Plow                     |               |      |        | 21,08 |
| Second tillage                   | 0,08            | 2,74 | 0,08          | 6,84  | Cultivator + Disc harrow |               |      |        | 9,58  |
| Third tillage                    | 0,08            | 2,67 | 0,08          | 6,63  | Cultivator + Disc harrow |               |      |        | 9,30  |
| Fourth                           | 0,06            | 2,15 | 0,06          | 5,08  | Harrow                   |               |      |        | 7,23  |
| Planting                         | 0,1             | 2,84 | 0,1           | 3,38  | Seeder                   | Seed          | 0,44 | 94,56  | 47,82 |
|                                  |                 |      |               |       |                          | 20x20         | 0,98 | 3      | 2,94  |
|                                  |                 |      |               |       |                          | 18-46 DAP     | 0,15 | 3,5    | 0,53  |



|   |             |              |             |              |           |           |      |    |                |
|---|-------------|--------------|-------------|--------------|-----------|-----------|------|----|----------------|
| <b>B)Maintenance</b>                        |             |              |             |              |           |           |      |    |                |
| Fertilizer                                  | 0           | 0,13         | 0           | 0,04         | Frill     | Micro     | 0,08 | 26 | 2,08           |
| Herbicide                                   | 0           | 0,21         | 0           | 0,11         | Holder    | Herbicide | 0,03 | 70 | 2,42           |
| <b>C)Harvest-Threshing</b>                  |             |              |             |              |           |           |      |    |                |
| Harvest                                     | 0,03        | 20,31        | 0,03        | 0,10         | Harvester |           |      |    | 20,41          |
| Transportation                              | 0,02        | 2,28         | 0,02        | 0,78         | Trailer   |           |      |    | 3,06           |
| <b>D)Variable Costs (DM) (A+B+C)</b>        | <b>0,21</b> | <b>37,65</b> | <b>0,56</b> | <b>39,72</b> |           |           |      |    | <b>126,93</b>  |
| D1. Capital interest (D*0,06)               |             |              |             |              |           |           |      |    | 7,6158         |
| <b>E) Total Variable Costs (TVC) (D+D1)</b> |             |              |             |              |           |           |      |    | <b>134,546</b> |
| F1.Land rate                                |             |              |             |              |           |           |      |    | 250            |
| F2.Administrative Costs (B x %3)            |             |              |             |              |           |           |      |    | 2,25           |
| <b>F) Total Fixed Costs (TFC) (F1+F2)</b>   |             |              |             |              |           |           |      |    | <b>252,25</b>  |
| <b>G) Total Production Costs (B+C)</b>      |             |              |             |              |           |           |      |    | <b>386,79</b>  |
| H).By-product income (TL/da)                |             |              |             |              |           |           |      |    | -              |
| I).Yield of sunflower (kg/da)               |             |              |             |              |           |           |      |    | 198,91         |
| <b>J) Cost per 1 KG of Sunflower (G/I)</b>  |             |              |             |              |           |           |      |    | <b>1,94</b>    |

## Conclusion and Recommendations

In the study, the preference for the production of oilseed sunflower is seen as highly important by producers due to its suitability for mechanization, ease of sale, ease of production compared to other crops, suitability for crop rotation, alternative cultivation in dry conditions, low labor requirement and economic viability. The suitability of oilseed sunflower for storage, as it is sold immediately after harvest, is not considered important by producers. Producers have indicated that they find yield performance, earliness,

ease of availability of seeds, drought resistance of seeds, disease/pest resistance, and the shape of the head to be very important in the selection of oilseed sunflower seeds.

Turkey ranks first in the world in the import of oilseeds, clearly indicating that oilseed production in Turkey is not sufficient. Based on the findings, the following recommendations have been developed:

- Oilseed crops, especially sunflower production, should be encouraged to reduce the vegetable oil deficit in Turkey.
- Continuous policies should be implemented to increase sunflower production in the long term.
- Sunflower producers struggle with high input costs. In this regard, fuel, fertilizer and incentive support provided for sunflower production should be increased to meet the needs of the producers.
- Awareness of sunflower production as an alternative crop under dry conditions should be promoted among farmers. Agricultural education and extension activities should be increased.
- The Mediterranean and Aegean regions, especially, have suitable climate and weather conditions for second-crop sunflower production. Wheat/barley rotation with sunflower as a second crop should be increased in these regions. This should be encouraged by relevant government authorities and organizations.
- To achieve high yields from sunflower, irrigation conditions in sunflower production areas should be improved and irrigation investments should be made in areas where irrigation facilities are not available.
- The use of high-yielding and quality seed should be promoted to increase yield per unit area in sunflower production.

- In order to increase sunflower yield, efforts should be intensified to develop varieties with high resistance to diseases and pests (such as downy mildew and stem weevil) in sunflower production.

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## **CHAPTER II**

### **Consumers' Organic Egg and Chicken Meat Consumption Trends**

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#### **Introduction**

Today, not only taste but also health, environment and ethical issues have gained importance in shaping consumers' food preferences. In this sense, organic food products are attracting increasing attention from consumers. Organic food production, a human and environment-oriented approach, aims to protect and improve ecological diversity and to produce using as little agricultural input as possible (Bircan et al ., 2019). Organic animal products, which form the basis of healthy nutrition, have a very important place in meeting people's animal protein needs, and their production is increasing day by day (Uruk and Yenilmez, 2018).

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Organic animal production, producing animals using breeding animals or semen, producing human food and animal and plant nutrition products from animal products, supplying organic raw materials to industries and scientific studies that source their raw materials from agriculture, each stage of which is based on the Principles and Implementation of Organic Agriculture, which came into force by being published in the Resmi Gazete No. 27676. It refers to the production activity controlled and certified by the authorized organization according to the Regulation (Legislation Information System, 2023). The low export chance of animal products in our country and the lack of consumer awareness and purchasing power in the domestic market negatively affect the production and consumption of organic animal products (Anonymous, 2023). In addition, the fact that organic product markets are not widespread enough in our country is another factor affecting organic product consumption. The majority of production in organic livestock farming in Turkey is concentrated in the beekeeping and poultry sector (Anonymous, 2023). The application of intensive farming methods and the weakening effects of cramped housing systems on the immune systems of animals cause serious health problems in animals. Over time, organic poultry farming, which aims to produce quality and healthy products with every stage of production under control, has found a place in organic agriculture (Öztürk et al ., 2017). .

The increase in demand for organic products, providing a better environment and more reliable food support are among the main factors affecting the transition of producers to organic agriculture (Külekcı and Aksoy, 2015). The importance they attach to personal health and especially the health of children comes first when demanding ecological products by consumers (Ak et al., 2019). While egg consumption is one of the food products that consumers pay most attention to due to health concerns, organic egg consumption is one of the food products that families attach most importance to, due to the statements of nutritionists encouraging egg consumption of both adults and children ( Onurlubaş et al ., 2020 ).

While consumer attitudes and purchasing behaviors towards organic agriculture and food products differ compared to conventional alternatives; The process of purchasing organic agriculture and food products begins with the effort to obtain information about these products, the perception of the differences of these products compared to other products, and awareness ( Adanacioğlu et al ., 2023).

According to 2023 data of the Ministry of Agriculture and Forestry; In 2022, 684,408 poultry were produced in 14 provinces (Ministry of Agriculture and Forestry, 2023). Organic poultry production is 98% within organic livestock farming in our country. According to the 2023 data of the Ministry of Agriculture and Forestry, 87,444,562 organic eggs were produced in our country in 2022 (Ministry of Agriculture and Forestry, 2023). In 2022, 5,497,374 organic chickens were produced in European countries (Eurostat , 2023). Among European countries, the leading countries in organic chicken production are Austria and Sweden, respectively (Eurostat , 2023). Among European countries, Turkey's organic chicken (poultry) production is 12.4%. According to the 2023 data of the Ministry of Agriculture and Forestry, 1,406,679 kilograms of organic animal products were exported in 2022 (Ministry of Agriculture and Forestry, 2023).

Consumer purchasing behavior is a very complex and multifaceted issue as it is affected by many factors. In particular, issues such as consumers' health awareness, environmental awareness, importance given to animal welfare, price factor, conscious consumer movement, geographical/cultural factors, promotion and awareness are factors that can significantly affect organic food product preferences. In general, consumers' personal preferences, values and consciousness levels are very important in shaping consumption trends. Consuming organic eggs and chicken meat is not only a dietary habit, but also reflects a level of awareness about environmental awareness and sustainability. In addition to protecting their own health by choosing such organic products, individuals also play a role in trying to minimize the effects of



agriculture on nature. For these reasons, researching organic egg and chicken meat consumption trends can help both consumers and industry make informed decisions for a more sustainable and healthy future. Additionally, identifying these trends can play an important role in determining food industry and agricultural policies in the future. The main purpose of this study is to examine consumers' organic egg and chicken meat consumption and purchasing behavior.

## **Material and Method**

The main material of this research consists of primary data obtained through survey from consumers in Osmaniye, Niğde, Adana, Adıyaman, Amasya and Ankara provinces. Additionally, the study was supported by secondary data. The survey questions prepared for the research were developed taking into account the purpose of the research, the content of the subject and the characteristics of the population to which the survey will be applied.

The sample size of this study was determined according to the Simple Random Probability Sampling method. The formula used to determine the sample volume (Yamane , 2001) is below.

$$n = z^2 \left( \frac{p \cdot q}{d^2} \right)$$

n : sample volume

z : 1.96 (standard z value corresponding to 95% confidence level)

p : Probability that the sample represents the main population (0.50)

q : (1-p) The proportion of the population that does not have the relevant feature

d : Accepted fault tolerance level. (Accepted as  $\pm 5\%$ .)

The sample size was calculated as 384, and a survey was conducted with 400 consumers in case there were any incorrect or

incomplete surveys. The data obtained as a result of the survey were evaluated through package programs and presented in the form of frequency distributions and percentages.

## Research Findings and Discussion

The demographic characteristics of the consumers participating in the research are given in Table 1. 64.5% of consumers are women and 35.5% are men. 48.3% of the consumers participating in the research are between the ages of 18-25, 21.8% are between the ages of 26-33 , and 19.5% are between the ages of 34-41. While 34% of consumers are high school graduates, 4.8% are secondary school graduates, 4.5% are primary school graduates, 1.8% are literate. The rate of consumers who are university graduates and students is 55%. 45% of consumers are married and 55% are single . 48% of consumers are working, 52% are not working. Consumers in the non-working segment are predominantly between the ages of 18 and 25 and are generally students. More than half of the consumers participating in the research (54%) have less than 5 members in their family. The average number of family members of consumers is 4.4.

*Table 1. Demographic characteristics of consumers*

| <b>Gender</b>             | <b>f</b> | <b>%</b> | <b>Age range</b>                          | <b>f</b> | <b>%</b> |
|---------------------------|----------|----------|---|----------|----------|
| Female                    | 258      | 64.5     | 18 - 25                                   | 193      | 48.3     |
| Male                      | 142      | 35.5     | 26 - 33                                   | 87       | 21.8     |
| Total                     | 400      | 100.0    | 34 - 41                                   | 78       | 19.5     |
| <b>Educational Status</b> | <b>f</b> | <b>%</b> | 42 - 49                                   | 25       | 6.3      |
| Literate                  | 7        | 1.8      | 50+                                       | 17       | 4.3      |
| Primary school            | 18       | 4.5      | Total                                     | 400      | 100.0    |
| Middle school             | 19       | 4.8      | <b>Number of People<br/>in the Family</b> | <b>f</b> | <b>%</b> |
| High school               | 136      | 34.0     | 1   | 22       | 5.5      |
| University                | 220      | 55.0     | 2   | 43       | 10.8     |
| Total                     | 400      | 100.0    | 3   | 62       | 15.5     |
| <b>Working Status</b>     | <b>f</b> | <b>%</b> | 4   | 89       | 22.3     |

|                       |          |          |       |     |       |
|-----------------------|----------|----------|-------|-----|-------|
| Yes                   | 192      | 48.0     | 5     | 103 | 25.8  |
| No                    | 208      | 52.0     | 6     | 45  | 11.3  |
| Total                 | 400      | 100.0    | 7     | 20  | 5     |
| <b>Marital status</b> | <b>f</b> | <b>%</b> | 8     | 5   | 1.3   |
| Married               | 180      | 45.0     | 9     | 4   | 1     |
| Single                | 220      | 55.0     | 10+   | 7   | 1.9   |
| Total                 | 400      | 100.0    | Total | 400 | 100.0 |

While 45.5% of consumers are informed about organic agriculture, 54.5% are not informed. Definitions of organic agriculture by consumers who are knowledgeable about organic agriculture are given in Table 2. 26.9% of consumers define organic agriculture as production without the use of chemicals. This is followed by controlled and certified production with 23.6%, production of products with logos and non-GMOs with 12.6%, pesticide-free agriculture with 12.1%, production of pesticide-free and fertilizer-free products grown in the village with 10.4%, products we grow ourselves with 3.8%, and natural resources with 3.3%. Production using the best possible means, fresh food production with 2.7%, products without pesticide residues with 2.2%, agriculture under hygienic conditions with 1.6%, and a new agricultural approach that ensures sustainable resource use and considers animal welfare with 0.5%. In the study conducted in Osmaniye and Şanlıurfa provinces, when consumers were asked to define organic agricultural products; The answers were received: "It is a form of agriculture in which healthy products are grown", "It is an agricultural product in which pesticides are not used", "It is a form of agriculture in which natural products are grown" ( Bahşi and Akça, 2018 ). Organic product in the study conducted in Bingöl province; The rate of consumers who say "it is a product produced under natural conditions" is 66.5%, the rate of those who say "it is a product labeled without the use of any chemicals" is 56.9%, the rate of those who say "it is a product without hormones" is 60.6%, the rate of those who say "it is a product whose production is more

careful and laborious" is 46.1%, the rate of those who say "it is a product that is labeled without the use of any chemicals" is 46.1%, The rate of those who say "it is a product that is friendly" is 53.5%, the rate of those who say "it is a product that is healthy" is 61.7%, the rate of those who say "it is a more delicious product" is 50.2%, the rate of those who say "it is a product sold at a high price" is 35.7% and the rate of those who say "it is a product that has been independently inspected" is 35.7%. The rate of those who gave was determined as 28.6% (Söğüt et al ., 2020). In Bardakcı's (2021) study, 33.83% of consumers define organic food as a product in which synthetic drugs and chemicals are not used, while 17.96% define it as a product in which hormones are not used, and 14.67% define ecology -friendly air, soil and water. 13.47% defined the product as a product grown without polluting, with every stage controlled and certified.

*Table2. Organic farming definitions of consumers who are knowledgeable about organic farming*

| <b>Definitions</b>   | <b>f</b> | <b>%</b> |
|--|----------|----------|
| Production without the use of chemicals  | 49       | 26.9     |
| Controlled and certified production  | 43       | 23.6     |
| Production of products with logo and without GMO   | 23       | 12.6     |
| pesticide-free agriculture   | 22       | 12.1     |
| Production of pesticide-free, fertilizer-free products grown in the village                  | 19       | 10.4     |
| Products we grow ourselves   | 7        | 3.8      |
| Production using natural resources in the best possible way                                  | 6        | 3.3      |
| Fresh food production  | 5        | 2.7      |
| Products without pesticide residue   | 4        | 2.2      |
| Agriculture carried out under hygienic conditions  | 3        | 1.6      |
| New agricultural approach that ensures sustainable resource use and considers animal welfare | 1        | 0.5      |
| Total  | 182      | 100.0    |

82% of consumers consume chicken and eggs. The rate of participants who do not consume eggs but only chicken meat is 4.8%, and the rate of participants who consume only eggs is 5.8%. While 65% of consumers consume organic chicken meat, 35% do not (Table 3).

*Table 3. Consumers' organic chicken meat consumption status*

| <b>Consuming Organic Chicken Meat</b> | <b>f</b> | <b>%</b> |
|---------------------------------------|----------|----------|
| Yes                                   | 260      | 65.0     |
| No                                    | 140      | 35.0     |
| Total                                 | 400      | 100.0    |

The reasons why consumers who do not consume organic chicken meat are given in Table 4. While 28.6% of consumers agree with the statement "I do not find it hygienic", 21.4% are undecided and 50% disagree. While 34.2% of consumers agree with the statement "I don't like the taste", 15% are undecided and 50.8% disagree. While 51.4% of consumers agree with the statement "I do not find it economical", 27.9% are undecided and 20.7% disagree. While 26.4% of consumers agree with the statement "I don't think it is healthy," 17.1% are undecided and 56.5% disagree. While 75.7% of consumers agree with the statement "It is not sold in my immediate area", 14.3% are undecided and 10% disagree. While 30.7% of consumers agree with the statement "I do not find it reliable", 16.4% are undecided and 52.9% disagree.

*Table 1. Reasons not to consume organic chicken meat*

| <b>Reasons</b>             | <b>I agree</b> |          | <b>I'm undecided</b> |          | <b>I do not agree</b> |          | <b>T otal</b> |          |
|----------------------------|----------------|----------|----------------------|----------|-----------------------|----------|---------------|----------|
|                            | <b>f</b>       | <b>%</b> | <b>f</b>             | <b>%</b> | <b>f</b>              | <b>%</b> | <b>f</b>      | <b>%</b> |
| I don't find it hygienic   | 40             | 28.6     | 30                   | 21.4     | 70                    | 50.0     | 140           | 100.0    |
| I don't like the taste     | 48             | 34.2     | 21                   | 15.0     | 71                    | 50.8     | 140           | 100.0    |
| I don't find it economical | 72             | 51.4     | 39                   | 27.9     | 29                    | 20.7     | 140           | 100.0    |
| I don't think it's healthy | 37             | 26.4     | 24                   | 17.1     | 79                    | 56.5     | 140           | 100.0    |

|                          |     |      |    |      |    |      |     |       |
|--------------------------|-----|------|----|------|----|------|-----|-------|
| Not sold near me         | 106 | 75.7 | 20 | 14.3 | 14 | 10.0 | 140 | 100.0 |
| I don't find it reliable | 43  | 30.7 | 23 | 16.4 | 74 | 52.9 | 140 | 100.0 |

Consumption frequencies of those who consume organic chicken meat are given in Table 5. 45% of consumers consume organic chicken meat several times a month. This is done respectively; The following statements are followed: "I consume it once every two weeks, on certain days of the week, a few times a year, once a week and every day." In the study conducted in Bursa province, it was determined that 31.89% of consumers consumed organic chicken meat once a week, 26.53% once a month and 12.50% 2-3 times a week ( Bardakcı , 2021).

*Table 2. Consumption frequency of organic chicken meat*

| <b>Consumption Frequency</b> | <b>f</b> | <b>%</b> |
|------------------------------|----------|----------|
| Every day                    | 6        | 2.3      |
| One day per week             | 20       | 7.7      |
| Certain days of the week     | 37       | 14.2     |
| Biweekly                     | 44       | 16.9     |
| Few times a month            | 117      | 45.0     |
| Several times a year         | 36       | 13.8     |
| Total                        | 260      | 100.0    |

While 73.5% of consumers consume organic eggs, 26.5% do not. The reasons why consumers who do not consume organic eggs are given in Table 6. While 40.6% of consumers agree with the statement "I do not find it hygienic," 17.9% are undecided and 41.5% disagree. While 49.1% of consumers agree with the statement "I don't like the taste", 12.3% are undecided and 38.7% disagree. While 61.3% of consumers agree with the statement "I do not find it economical", 19.8% are undecided and 18.9% disagree. While 36.8% of consumers agree with the statement "I don't think it is healthy," 15.1% are undecided and 48.1% disagree. While 71.7% of consumers agree with the statement "It is not sold in my immediate area", 14.2% are undecided and 14.1% disagree. While 43.4% of

consumers agree with the statement "I do not find it reliable", 15.1% are undecided and 41.5% disagree.

*Table 3. Reasons not to consume organic eggs*

| Reasons                    | I agree |      | Partially |      | I do not agree |      | Total |       |
|----------------------------|---------|------|-----------|------|----------------|------|-------|-------|
|                            | f       | %    | f         | %    | f              | %    | f     | %     |
| I don't find it hygienic   | 43      | 40.6 | 19        | 17.9 | 44             | 41.5 | 106   | 100.0 |
| I don't like the taste     | 52      | 49.1 | 13        | 12.3 | 41             | 38.7 | 106   | 100.0 |
| I don't find it economical | 65      | 61.3 | 21        | 19.8 | 20             | 18.9 | 106   | 100.0 |
| I don't think it's healthy | 39      | 36.8 | 16        | 15.1 | 51             | 48.1 | 106   | 100.0 |
| Not sold near me           | 76      | 71.7 | 15        | 14.2 | 15             | 14.1 | 106   | 100.0 |
| I don't find it reliable   | 46      | 43.4 | 16        | 15.1 | 44             | 41.5 | 106   | 100.0 |

The consumption frequency of those who consume organic eggs is given in Table 7. 33.7% of consumers consume organic eggs every day. This is done respectively; I consume it on certain days of the week, a few times a month, once a week, a few times a year and once every two weeks. In the study conducted in Bingöl province, the rate of people consuming organic eggs always and once a month was determined as 26.9%, and the rate of people consuming organic eggs every 15 days was 46.2%. In his study in Bursa province in 2021, Bardakcı found that 54.34% of consumers consumed organic eggs 2-3 times a week, 36.73% consumed organic eggs every day and 8.93% consumed organic eggs once a week.

*Table 4. Organic egg consumption frequency*

| Consumption Frequency    | f  | %    |
|--------------------------|----|------|
| Every day                | 99 | 33.7 |
| One day per week         | 22 | 7.5  |
| certain days of the week | 98 | 33.3 |

|                      |     |       |
|----------------------|-----|-------|
| Biweekly             | 11  | 3.7   |
| few times a month    | 48  | 16.3  |
| several times a year | 16  | 5.4   |
| Total                | 294 | 100.0 |

While 35.3% of consumers stated that they had information about the growing conditions of organic chickens, 67.7% stated that they had no information. The definitions of consumers who stated that they had knowledge about the growing conditions of organic chickens regarding the growing conditions of organic chickens are given in Table 8. While 42.6% of the consumers who stated that they had knowledge about the growing conditions of organic chickens stated that organic chickens are free-range chickens, these definitions are respectively; The following definitions follow : chickens raised in a village environment without medication, chickens raised hygienically and healthily on the farm, chickens fed with organic feed, chickens raised on free-range feeds without chemical treatment, chickens raised in pastures suitable for the climate of the region, chickens not produced by machines in the factory, and chickens raised in a coop. Consumers in Aydın province stated that when it comes to ecological chicken meat and eggs, they are products obtained from chickens fed in good conditions and with feed that does not threaten human health (Armağan and Özdoğan, 2005). In the Efeler district of Aydın province, 46.3% of the consumers answered "strongly agree" to the question that organic eggs should be free-range chicken eggs. 53.7% of the consumers answered "I agree" to the question that the feeding/maturation period of chickens from which organic eggs are taken is longer than industrial chickens, and that the feed eaten by chickens from which organic eggs are taken is When asked whether organic product should be certified feed, 73% said they strongly agree. 80% of consumers think that organic eggs should have a certificate . When asked whether the eggs produced and sold in the village are organic, 72.7% said they are undecided (Çınar et al ., 2022).



*Table 8. Consumers' knowledge of organic chicken growing conditions*

| <b>Growing Conditions</b>  | <b>f</b> | <b>%</b> |
|--|----------|----------|
| free-range chicken   | 60       | 42.6     |
| It is grown in a village environment with natural nutrition, without any medication. | 25       | 17.7     |
| hygienically and healthily on the farm.  | 17       | 12.1     |
| Chickens fed with organic feed   | 12       | 8.5      |
| It is grown on feed that has not been chemically treated.                            | 10       | 7.1      |
| Raised in natural conditions with natural feeds                                      | 9        | 6.4      |
| It is grown in pastures suitable for the climate of the region.                      | 6        | 4.3      |
| Chickens that are not produced by machines in the factory                            | 1        | 0.7      |
| Raised in coops  | 1        | 0.7      |
| Total  | 141      | 100.0    |

Consumers' availability of organic chicken meat and eggs on demand is given in Table 9. While 32% of the consumers stated that they could obtain it whenever they wanted, 25.5% stated that they could not obtain it, and 38.5% stated that they could partially obtain it whenever they wanted.

*Table 9. Availability of organic chicken meat and eggs on demand*

| <b>Availability</b> | <b>f</b> | <b>%</b> |
|---------------------|----------|----------|
| Yes                 | 128      | 32.0     |
| No                  | 102      | 25.5     |
| Partially           | 154      | 38.5     |
| Not responding      | 16       | 4.0      |
| Total               | 400      | 100.0    |

40.3% of consumers stated that they follow news about animal husbandry, and 59.8% stated that they do not. 67.1% of

consumers who follow news about animal husbandry stated that they would give up consumption of animal products in the face of negative news, and 32.9% stated that they would not give up consumption. When we look at whether the news in the media affects the chicken meat consumption of Artvin Çoruh University students positively or negatively; It is seen that 50.2% of the students are affected by these news, while 49.8% are not affected (İskender et al., 2015).

39.5% of consumers stated that they encountered negative news about organic chicken meat and eggs, and 60.5% stated that they did not encounter negative news. The situations in which consumers who do not encounter negative news about organic chicken meat and eggs stop consuming the products if they encounter negative news are given in Table 10. 69% of consumers stated that they would pause consumption if they encountered negative news, and 31% stated that they would not pause consumption.

*Table 10. Suspension of consumption in response to negative news*

| <b>Consumption Suspension Status</b> | <b>f</b> | <b>%</b> |
|--------------------------------------|----------|----------|
| Yes                                  | 109      | 69.0     |
| No                                   | 49       | 31.0     |
| Total                                | 242      | 100.0    |

The places where consumers purchase organic chicken meat and eggs are given in Table 11. The most preferred place for consumers to buy organic chicken meat and eggs is the village. This is done respectively; market, delicatessen, public market, hypermarket, organic market and farm. Approximately 68% of consumers in Istanbul and Izmir provinces declared that they purchased organic eggs from organic markets, and approximately 80% of them declared that they made this purchase every week (Demirel and Yercan , 2022). It has been stated that students of Osmaniye Korkut Ata University Department of Nutrition and Dietetics are the most preferred option among the main places where

organic eggs are procured, from self-producing breeders (45.4%) (Avcılar and Yılmaz, 2023).

*Table 11. Where to buy organic chicken meat and eggs*

| <b>Where Products Are Purchased</b> | <b>f</b> | <b>%</b> |
|-------------------------------------|----------|----------|
| Bay                                 | 150      | 37.5     |
| Market                              | 63       | 15.8     |
| Delicatessen                        | 62       | 15.5     |
| Public market                       | 40       | 10.0     |
| Hypermarket                         | 33       | 8.3      |
| organic market                      | 19       | 4.8      |
| Farm                                | 1        | 0.3      |
| Not responding                      | 32       | 8.0      |
| Total                               | 400      | 100.0    |

While 81.3% of consumers always buy organic chicken meat and eggs from the same place, 10.8% do not always buy from the same place. Consumers who do not always buy organic chicken meat and eggs from the same place, mostly prefer markets, villages and markets.

The criteria that consumers pay attention to when determining where they buy organic chicken meat and eggs are given in Table 12. 60.4% of consumers stated that proximity to home/work, 41.5% stated that variety, and 74.4% stated that being able to pay by credit card was an unimportant criterion . 48% of consumers stated that affordable prices, 71.2% stated that healthy sales conditions, 52.8% stated that service quality and 44.5% stated that the product's quality guarantee was an important criterion . It was determined that Artvin Çoruh University students primarily pay attention to the expiration date when purchasing chicken meat (32.8%), brand preference (28.8%) comes second, and the price factor is less important than other factors (İskender et al., 2015 ).

*Table 12. Criteria taken into consideration when determining where to buy organic chicken meat and eggs*

| Criteria                            | Important |      | Partially |      | Insignificant |      | Total |       |
|-------------------------------------|-----------|------|-----------|------|---------------|------|-------|-------|
|                                     | f         | %    | f         | %    | f             | %    | f     | %     |
| Proximity to home/work              | 125       | 33.7 | 22        | 5.9  | 224           | 60.4 | 371   | 100.0 |
| Having diversity                    | 139       | 37.5 | 78        | 21.0 | 154           | 41.5 | 371   | 100.0 |
| sale at affordable price            | 178       | 48.0 | 43        | 11.6 | 150           | 40.4 | 371   | 100.0 |
| Healthy sales place conditions      | 264       | 71.2 | 41        | 11.0 | 66            | 17.8 | 371   | 100.0 |
| Payment by credit card              | 49        | 13.2 | 46        | 12.4 | 276           | 74.4 | 371   | 100.0 |
| Service quality                     | 196       | 52.8 | 72        | 19.4 | 103           | 27.8 | 371   | 100.0 |
| The product has a quality guarantee | 165       | 44.5 | 67        | 18.1 | 139           | 37.4 | 371   | 100.0 |

Consumers' consumption of organic chicken meat and eggs due to price increases are given in Table 13. 7% of consumers stated that they would continue consumption, 36.3% stated that they would not continue consumption, 38% stated that they would reduce consumption, and 11.5% stated that they were undecided whether to continue consumption or not.

*Table 13. Consumers' consumption of organic chicken meat and eggs due to price increase*

| Consumption Situation in Price Increase | f   | %     |
|---|-----|-------|
| Yes                                     | 28  | 7.0   |
| No                                      | 145 | 36.3  |
| I reduce                                | 152 | 38.0  |
| I'm undecided                           | 46  | 11.5  |
| Not responding                          | 29  | 7.2   |
| Total                                   | 400 | 100.0 |

Consumers' participation levels in opinions about organic products are given in Table 14. 86.8% of consumers agree with the statements that they find organic products hygienic , 87.3% like their taste, 90% think they are healthy and 83.5% find them reliable. 39.8% of consumers were undecided on the statement that they found organic products economical. Gümüş et al ., in their study in Istanbul in 2019, stated that consumers stated that the prices of

organic products were high. In the study conducted in Izmir, it was determined that the most important factors that affect consumers' preference for organic food products are that the products are healthy, do not contain chemicals and are of high quality. According to the opinions of the consumers, the least important factors are that the products look beautiful and that the people around the consumers consume organic products. According to the data, organic product prices are considered moderately important in consumers' preference for organic food products (Adanacıoğlu et al., 2023). Onurlubaş et al., in their study in 2020, stated that when consumers' perceptions of organic products were examined, they stated that the products were high-priced in the first place, healthy in the second place, reliable in the third place and natural in the last place.

*Table 14. Consumers' level of agreement with statements about organic products*

| emoticons            | I agree |      | Indecisive |      | I do not agree |      | Total |       |
|----------------------|---------|------|------------|------|----------------|------|-------|-------|
|                      | f       | %    | f          | %    | f              | %    | f     | %     |
| I find it hygienic   | 347     | 86.8 | 38         | 9.5  | 15             | 3.8  | 400   | 100.0 |
| I like its taste     | 349     | 87.3 | 35         | 8.8  | 16             | 4.0  | 400   | 100.0 |
| I find it economical | 131     | 32.8 | 159        | 39.8 | 110            | 27.6 | 400   | 100.0 |
| I think it's healthy | 360     | 90.0 | 32         | 8.0  | 8              | 2.0  | 400   | 100.0 |
| I find it reliable   | 334     | 83.5 | 54         | 13.5 | 12             | 3.0  | 400   | 100.0 |

## Conclusion and Recommendations

Chicken meat and eggs are important foods to meet protein needs. Decreasing confidence in ready-made eggs and frozen chicken meat is one of the biggest reasons why consumers turn to organic chicken meat and eggs, especially with the idea that they are healthy. In general, it is observed that consumer awareness about the consumption of organic products has increased, but there are still

certain difficulties and lack of knowledge in the consumption of organic chicken meat and eggs. Consumers predominantly define organic agriculture as production without the use of chemicals. This situation reveals that consumers have a lack of knowledge about what exactly an organic product is . Public service announcements etc. to increase consumers' knowledge of organic products. It is important to focus on applications. By increasing awareness of organic agriculture, information about organic chicken and eggs will also increase, paving the way for consumers to turn to these products. Price, availability and consumer perception play important roles in the demand for organic chicken meat and eggs. This data can provide important information for marketing strategies and consumer awareness campaigns for organic chicken products. Considering that organic products are not economical and organic chicken meat and eggs not being available nearby are important problems. The production phase of organic agriculture also causes high costs. Reducing production costs and further supporting organic agriculture to achieve this will reduce the price and increase the consumption of organic agricultural products. In order to make it easier to access organic chicken meat and eggs, there are markets, bazaars, etc. in the districts where organic agricultural products are sold. It is important to open purchasing points. Selling these products via e-commerce is also an easy way to access these products today.

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## **CHAPTER III**

### **Consumption of Frozen Food Products**

**Nermin BAHŞİ<sup>1</sup>**

#### **Introduction**

Nowadays, rapidly changing lifestyles and intense work tempo direct consumers to more practical and long-lasting food options. Arora et al. (2022) state that with the increase in the working population and student population in cities and the increase in the number of retail sales points, the demand for frozen food products also increases with the increase in accessibility. Frozen foods offer consumers a healthy and delicious alternative that adapts to modern eating habits.

One of the primary advantages of frozen foods is that they extend the preservation period of fresh vegetables and fruits, allowing them to consume certain products out of season, as well as minimizing income and nutritional value losses. Külekçi et al.,

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<sup>1</sup> Osmaniye Korkut Ata University, Osmaniye, Turkey.

(2006) stated that the characteristics of frozen food such as its ability to be stored for a long time, easy to process, no seasonal restrictions, practicality, almost no loss of nutritional value, compatibility with household appliances in freezing, thawing and cooking processes, and ease of use increase the importance of these products. states. Lifestyle, not being able to spare time for cooking, the desire to turn to out-of-season foods, availability, high variety, ease of food preparation, and the desire to have a meal that can be easily and quickly prepared in case of emergency can be counted among the reasons for consuming frozen food (Bal et al., 2012).

Moreover, with increasing disposable income, the consumer is ready to experience a wider variety of frozen food products (Arora et al., 2022). The product range of frozen foods, which was initially used to meet the consumption needs of vegetables, meat and meat products and pastries, now covers many types of food (Gündüz and Emir, 2010). Consumers either buy ready-made frozen food or prepare their own frozen products at home in various ways in line with their own needs and the tastes of their family members (Bektaş et al., 2011). From a health perspective, frozen foods largely preserve the nutritional values of fresh foods. Modern freezing technology minimizes nutritional loss during freezing of foods and ensures that they retain their taste.

However, there are points to be careful about consuming frozen food. Frozen food products, which are perishable in nature, require appropriate refrigeration to maintain the quality and safety of such food products (Arora et al., 2022). Correct opening and storage of packaging is critical to the freshness and safety of products. Additionally, consumers being aware of the additives and preservatives contained in these products can help them develop healthy eating habits.

Increasing awareness about frozen food, the use of deep freezers and the spread of hypermarkets have increased the use of frozen food in the world as well as in Turkey (Bal et al, 2012). It is noteworthy that the consumption of frozen food products is quite common in

countries with high per capita income (Bektaş et al., 2010; Bektaş et al., 2011). Frozen Food Industry in Turkey; At the end of 2011, the size of the market, including out-of-home consumption, was 381,000 tons in tonnage and 1 billion lira in turnover, and it exceeded 2 billion lira in 2018 (Hekimoğlu and Altindeğer, 2019). Although there is a significant increase in demand, Turkey is far behind developed countries in frozen food consumption (Bal et al, 2012). Although the frozen food market figures in Turkey are far behind compared to developed countries, factors such as the rapidly developing industrialization process in recent years, the increased involvement of housewives in business life and the increase in the number of individuals living alone are paving the way for the sector (Hekimoğlu and Altindeğer, 2019).

There are various studies conducted at national and international levels to determine consumer preferences and expectations for frozen food products. In this context; Külekçi et al (2006), Gündüz and Emir (2010) investigated the relationships between frozen food consumption and socio -economic characteristics. Bektaş et al (2010), Aamir et al. (2014) examined consumers' frozen food consumption trends and purchasing behaviors. Bektas et al. (2011) analyzed consumers' demand for frozen food. Yatağan et al. (2015) examined consumers' preferences for frozen food products. Bal et al. (2012), Islam et al. (2019), Sen et al. (2021), Arora et al. (2022) investigated the factors affecting the consumption of frozen food products. Singh and Bhatia (2023) examined the consumption patterns of generation Y towards frozen food.

Determining consumers' frozen food consumption trends and the factors affecting consumption is important for the development of the frozen food industry and directing the markets. This study was carried out in Kadirli district of Osmaniye province, as it is stated in the literature that the consumption of frozen foods is widespread, mainly in big cities, and a similar study has not been conducted in the region before. The aim of the research is to determine consumers' frozen food consumption levels and the factors affecting consumption.

## Material and Method

The main material of this research consists of primary data obtained through survey from consumers living in the urban area of Osmaniye province. Additionally, the study was supported by secondary data. The survey questions prepared for the research were developed taking into account the purpose of the research, the content of the subject and the characteristics of the population to which the survey will be applied.

The sample size of this study was determined according to the Simple Random Probability Sampling method. The formula used to determine the sample volume ( Yamane, 2001) is below.

$$n = z^2 \left( \frac{p \cdot q}{d^2} \right)$$

n : sample volume

z : 1.65 (standard z value corresponding to 90% confidence level)

p : Probability that the sample represents the main population (0.50)

q : (1-p) The proportion of the population that does not have the relevant feature

d : Accepted fault tolerance level. (Accepted as  $\pm 10\%$ .)

The sample size was calculated as 68, and a survey was conducted with 100 consumers in case there were any incorrect or incomplete surveys. The data obtained as a result of the survey were evaluated through package programs and presented in the form of frequency distributions and percentages.

## Findings and Discussion

The demographic characteristics of the consumers who participated in the research in Kadirli district of Osmaniye province are given in Table 1. 44% of consumers are women and 56% are men. In terms of age distribution, the group that provides the most support for the research is between the ages of 18-28 (42%). 64% of

the consumers participating in the research are single and 36% are married. 77% of married consumers have children. 45.5% of the consumers who supported the research have a university level education. This group does not only consist of university graduates but also includes students. It is seen that consumers with high school education or above contribute more to the research.

*Table 1. Demographic characteristics of consumers*

| <b>Gender</b>              | <b>f</b> | <b>%</b> | <b>Marital status</b> | <b>f</b> | <b>%</b> |
|----------------------------|----------|----------|-----------------------|----------|----------|
| Female                     | 44       | 44.0     | Married               | 36       | 36.0     |
| Male                       | 56       | 56.0     | Single                | 64       | 64.0     |
| Total                      | 100      | 100.0    | Total                 | 100      | 100.0    |
| <b>Educational Status</b>  | <b>f</b> | <b>%</b> | <b>Age</b>            | <b>f</b> | <b>%</b> |
| literate                   | 3        | 3.0      | 18-25                 | 42       | 42.0     |
| illiterate                 | 2        | 2.0      | 26-33                 | 16       | 16.0     |
| Primary school             | 15       | 15.0     | 34-41                 | 18       | 18.0     |
| High school and equivalent | 33       | 33.0     | 42-49                 | 17       | 17.0     |
| University                 | 47       | 47.0     | 50 and over           | 7        | 7.0      |
| Total                      | 100      | 100.0    | Total                 | 100      | 100.0    |

While 61% of the consumers participating in the research live with their family, 23% live alone and 16% live with a roommate. While 61.6% of the consumers are working, 38.4% are not working. Non-working consumers include housewives, retirees and students.

While 65.7% of the consumers participating in the research consume frozen food products, 34.30% do not consume frozen food products. In their study in Samsun province, Gündüz and Emir (2010) revealed that 82% of the families participating in the survey

consumed frozen food and the average frozen food consumption amount was 0.54 kg per person per month. Bal et al. (2012) in their study in Tokat determined that 72.12% of households consumed frozen food.

The reasons why consumers prefer frozen food products are given in Table 2. Although consumers mostly find frozen food products partially delicious, they find them practical, think they save time, and find them economical are listed as the most important reasons why they prefer frozen food products. Bektas et al. (2010) and Külekçi et al., 2006 determined that the most important reasons why consumers consume frozen food are ease of preparation and time saving. Islam et al. (2019), factors affecting consumers' perception of frozen and ready-to-cook food products; They listed these as saving time, being useful and economical, low price, diversity and being beneficial to health, brand image and quality, and availability of frozen food. Sen et al. (2021), easy to cook (94%), safe (73%), brand image (84%), quality (68%), low price (77%), advertising (64%), appearance (69%) states that availability (59%) and taste (78%) factors drive consumers to purchase frozen food. Singh and Bhatia (2023) stated that the factors that motivate consumers to choose frozen foods instead of fresh foods are personal preference and ease of cooking.

*Table 2. Reasons why consumers prefer frozen food products (%)*

| reasons              | One  | 1    | 2    | 3    | 4    | 5 | Total |
|----------------------|------|------|------|------|------|---|-------|
| I find it practical  | 41.8 | 47.8 | 9.0  | 1.5  | -    |   | 100.0 |
| saves time           | 37.9 | 43.9 | 12.1 | 4.5  | 1.5  |   | 100.0 |
| I find it delicious  | 9.1  | 16.7 | 40.9 | 28.8 | 4.5  |   | 100.0 |
| I find it economical | 17.2 | 57.8 | 15.6 | 9.4  | -    |   | 100.0 |
| I find it healthy    | 9.5  | 22.2 | 22.2 | 30.2 | 15.9 |   | 100.0 |

Note: (1: Strongly agree, 2: Agree, 3: Partially agree, 4: Disagree, 5: Strongly disagree)

The main reason why consumers do not prefer frozen food products is that they buy fresh products and do not find them healthy

and tasty (Table 3). In addition, consumers think that frozen food products are sold in their immediate surroundings and that there is enough variety. Bektas et al. (2010) stated that consumers who do not buy frozen food do not prefer to consume frozen products because they can find all kinds of fresh products in every season.

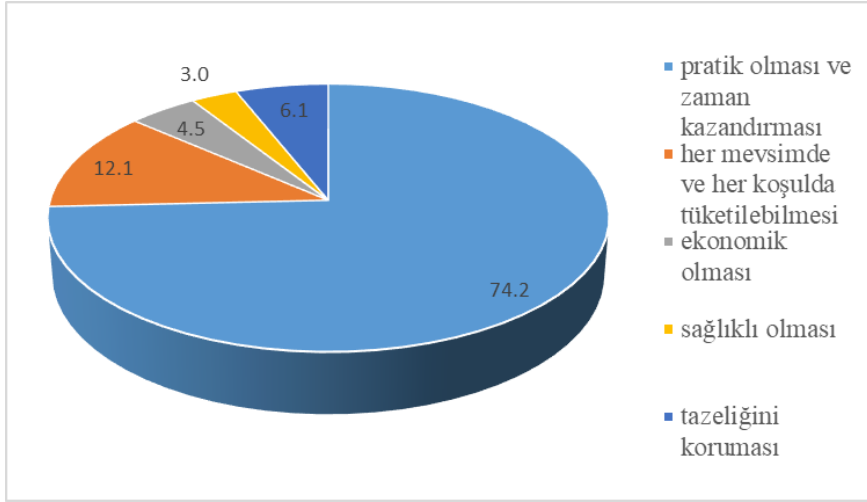
*Table 3. Reasons why consumers do not prefer frozen food products (%)*

| <b>reasons</b>    | <b>One-1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>Total</b> |
|-------------------|--------------|----------|----------|----------|----------|--------------|
| It is not healthy | 20.0         | 43.3     | 33.3     |          | 3.3      | 100.0        |
| I buy fresh       | 62.5         | 25.0     | 3.1      | 6.3      | 3.1      | 100.0        |
| not tasty         | 6.3          | 53.1     | 34.4     | 3.1      | 3.1      | 100.0        |
| Expensive         | 6.3          | 25.0     | 28.1     | 34.4     | 6.3      | 100.0        |
| Not sold near me  | 6.3          | 15.6     | 15.6     | 31.3     | 31.3     | 100.0        |
| little variety    | 3.4          | 13.8     | 31.0     | 27.6     | 24.1     | 100.0        |

Note: (1: Strongly agree, 2: Agree, 3: Partially agree, 4: Disagree, 5: Strongly disagree)

Consumers participating in the research list the advantages of frozen foods as being practical and saving time, being consumed in all seasons and under all conditions, being economical, and being healthy (Figure 1).

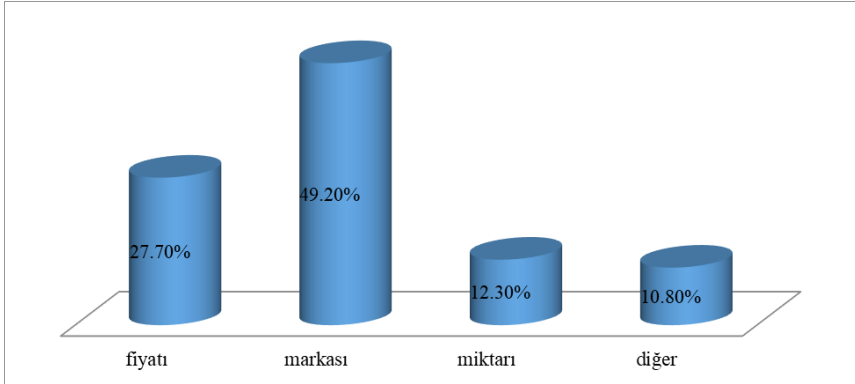




*Figure 1. Advantages of frozen food (%)*

Frozen food product preferences of the consumers participating in the research are listed as follows: 35% meat and meat products, 28% pastries, 20% ready meals, 7% corn side dish , 5% french fries and 5% pizza. Yatagan et al. (2015) stated that vegetables, meat products and dough products are the most consumed frozen foods. Bal et al. (2012) states that the most consumed frozen food in households is vegetables (93.30%), and the least consumed is seafood (72.16%).

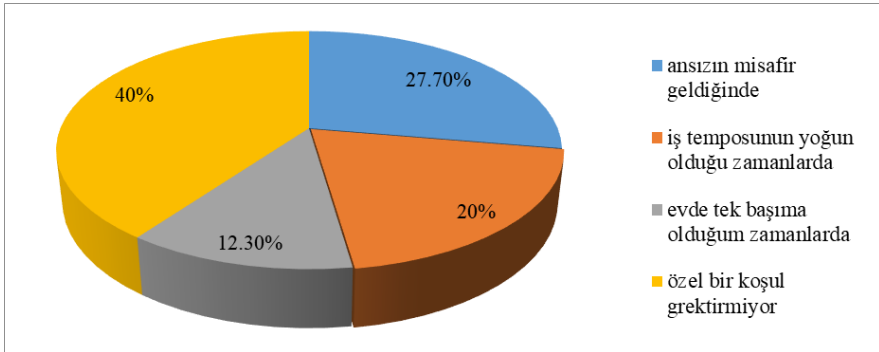
Consumers state that brand, price and quantity are the most effective when purchasing frozen food products (Figure 2). Apart from these, effective criteria are expiration date, convenience and quality. Yatagan et al. (2015), consumers who buy frozen food products mostly purchase; They stated that they took into consideration the production date, brand and company factors.



*Figure 2. Factors taken into consideration when purchasing a frozen food product*

58.1% of consumers state that season has an impact on frozen food consumption. 80.6% of consumers who state that the season has an effect consume frozen foods mostly in the winter season.

27.7% of the consumers who participated in the research stated that they bought frozen food products when guests suddenly arrived, 20% when the workload was busy, 12.30% when they were alone at home, and 40% bought frozen food products without any special conditions (Figure 3).



*Figure 3. Consumers' frozen food purchasing times*

The most preferred purchasing points of consumers participating in the research for purchasing frozen food are supermarkets in the first place with 59.7%, hypermarkets in the second place with 57.1%, delicatessens in the third place with 39.7% and grocery stores with 35.5% .

## **Conclusion and Recommendations**

Consuming frozen food is an important nutritional alternative that meets the practical needs of modern life. When used correctly, frozen foods offer consumers a delicious, nutritious and diverse meal option. However, being careful and making informed choices when using these products is important to maintaining a healthy lifestyle. When the results of the research are evaluated, although frozen food consumption is common among Turkish consumers, there are some clear trends and preferences. While the majority of consumers prefer frozen food products, the main factors that determine these preferences are practicality, time saving, economic advantages and the ability to be consumed in all seasons. However, partial dissatisfaction with taste and the tendency of consumers to prefer fresh products suggest that manufacturers should focus on product quality and health effects. Additionally, considering that seasonal effects affect frozen food consumption, the importance of seasonal campaigns and special seasonal products should be emphasized in marketing strategies. Brand, price and quantity come to the fore as determining factors in the purchasing process. It is of great importance for frozen food manufacturers to carefully manage these elements to gain a competitive advantage in the market. Additionally, better understanding consumer profiles and developing tailored campaigns for them can help attract the target audience more effectively. As a result, the frozen food industry needs to focus on product quality, strengthen innovation and marketing strategies, evaluate online sales channels and better focus on consumers' demands in order to better respond to the changing needs and preferences of consumers.

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# Current Studies in Agricultural Economics

It is known that the agricultural sector is important for people to live in healthy and suitable conditions. Agricultural production is the oldest production activity in human history. Agricultural production, which is the source of food for humanity, has strategic importance for countries. The increasing trend in population and income causes consumers to demand different agricultural products. Especially in recent years, there has been an increase in the consumption of organic and frozen food products. This situation necessitates the more intensive use of science and technology in agricultural activities.

In the book, which consists of chapters prepared by distinguished academicians, Sunflower Production in Adana, Consumers' Organic Egg and Chicken Meat Consumption Trends and Consumption of Frozen Food Products are examined. Hoping that the book will be a useful resource for interested parties, we would like to thank our chapter authors and the publishing house, which contributed to the creation of this book.