

Determination of Consumers' Bee Products Consumption Behavior

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Abstract

In this study, it was aimed to determine consumers' consumption behaviour regarding bee products (honey, beeswax, pollen, royal jelly and propolis) residing in Ordu province. For this purpose, a face-to-face survey was conducted with 387 consumers determined by simple random sampling in Ordu province. When the educational status of the consumers was examined, it was determined that 0.8% were illiterate, 25.3% were primary school graduates, 28.9% were high school graduates and 45.0% were university graduates. In the study, various behaviors were asked and analyzed such as how they consume crystallized honey, where they buy the honey products, and whether they consume pollen, royal jelly, and bee venom. 86.3% of the consumers stated that they prefer glass jars and 11.1% of them prefer tin cans when purchasing honey. When consumers were asked whether the price is important for them when buying honey, 61.0% of the consumers answered yes, 35.1% answered no and 3.9% stated that they had no opinion. When consumers were asked if they were aware of adulterated (sugar-added) honey, 43.7% of the consumers said yes, 34.1% said no, and 22.2% stated that they had no opinion. When asked the question "Do you trust honey purchased over the internet?", 88.6% of the consumers said no, 6.2% said yes, and 5.2% stated that they had no opinion on this issue.

Introduction

Today, when concepts such as food safety and food security are frequently on the agenda, it is extremely important to examine the attitudes and behaviours of consumers, to determine their preferences and to examine the mechanisms of influence in the decision-making process despite unethical production and market structure. Nutrition is a basic need for humans. This need is met from animal and plant foods. Beekeeping activity is extremely important today in terms of both nutrition and livelihood. Honey and other beekeeping products are consumed by people not only for food but also for medicinal purposes. It has been known for thousands of years that honey is a very important and indispensable food source (Akgün, 2019; Alkan et al. 2020).

Honey, pollen, royal jelly, propolis, bee venom and beeswax obtained from beekeeping are extremely important products for human life and health. The research that are concluded every day draw the

attention of societies on this subject and treatment methods with bee products, which started especially in the Far East countries and developed rapidly in the world, are rapidly becoming widespread. It is reported that honey, propolis and royal jelly, which are among the beekeeping products that are widely used for the treatment of many diseases among the people in our country, have excellent, scientifically proven antibacterial properties, and bee venom is widely used in the treatment of rheumatic and immunological diseases. Bees provide people with products such as honey, beeswax, royal jelly, bee venom, pollen, and propolis, which are very valuable. At the same time, bees play an important role in maintaining the natural balance and in agricultural production with their contribution to pollination in plants. For this reason, bees play a very important role in maintaining the biological diversity of Türkiye (Pirim et al., 2011; Sıralı, 2015; Sıralı, 2017). Ordu province, located in the Eastern

Black Sea Region, has recently attracted more attention of people with its natural beauties, vegetation, sea, mountains and beautiful plateaus. In the province of Ordu, which ranks first in hazelnut production in Türkiye, beekeeping is also very common. Ordu province has a great economic potential in terms of beekeeping and a significant part of the people, especially in the districts located in high areas, make a living from beekeeping (Sıralı, 2017). In Ordu province, beekeeping has become more profitable with the transition from traditional production methods to modern production methods and the transfer of bees to other regions. Ordu province ranks second after Muğla province in terms of the number of hives. Beekeepers from Ordu, who utilize the flora in different regions of Türkiye, contribute significantly to the economy of the province with the honey and bee products they produce. For this reason, beekeeping has become the most important agricultural sector in Ordu after hazelnut cultivation (Seçim and Alkan, 2003; Sıralı, 2015).

The objective of this research is to determine the consumption behaviour levels of consumers residing in Ordu province regarding honey bee products (honey, beeswax, pollen, royal jelly and propolis). At the same time, these results will enable people working in this field to better understand the level of behaviour of consumers in terms of honey and its products, and will contribute to the development of some solution proposals for honey bee products.

Material and Methods

Material

In this study, face-to-face interviews were used as the data collection method, and questionnaire forms were used as the data collection tool.

Method

The equation given below was used to determine the number of surveys and a survey was conducted with a total of 387 people (Akday and Yıldız Tiryaki, 2007).

$$n = (t^2 * p * q) / d^2$$

n: number of samples

t^2 = Confidence coefficient (for 95% confidence, the coefficient was taken as 1.96),

p= Ratio value of the population (0.50),

$q=1-p=0.50$,

d^2 = Accepted margin of error in sampling.

Before the main data collection, the questionnaire was reviewed by three experts in agricultural economics and food sciences to ensure content validity. A pilot test was conducted with 30 participants from the target population, and necessary revisions were made based on their feedback.

Statistical Evaluation

The SPSS (2008) statistical software was used for data evaluation.

The study was conducted in accordance with ethical standards, and all participants provided informed consent prior to data collection.

Results and Discussion

Main Findings Regarding the Consumption Consciousness of Bee Products of Consumers

The frequency values (as n and %) obtained from the answers to the questions asked to determine the honey consumption behaviours of the consumers participating in the research are given in Table 1.

When consumers were asked how do you consume crystallized honey, 62.0% of the consumers stated that they dissolve it in hot water, 37.5% stated that they consume honey in its crystallized form and 0.5% stated that they destroy crystallized honey. In the study conducted by Coşkun (2019), it was determined that 16.87% of the consumers destroyed the crystallized (frozen) honey, 20.39% consumed the honey in its crystallized state, 40.65% dissolved it in hot water, 5.06% dissolved it in boiling water, 13.86% consumed it by dissolving it by other methods (by keeping it at room temperature or on a heating pad) and 3.17% returned it to the place / person from whom it was purchased. In this study, 48.8% of the consumers stated that they consume honey every day, 36.4% once a week, 14.0% once every fifteen days, while 0.8% stated that they do not consume honey. In the study conducted by Baki et al. (2017), the frequency of purchase of strained pine honey by consumers was analyzed and it was determined that 64.4% of them purchased strained honey once a month and 22.2% of them purchased it every 2-3 months. In his study, Akdemir (2019) stated that more than half of the consumers who consume strained honey (84.50%) consume strained honey every day (62.43%), and about half of the people who consume honeycomb honey (54.75%) consume it every day (47.95%). In the study conducted by Kabakçı (2011) in Erzurum province, it was stated that most of the consumers consumed a total of 5 kg per year. Soylu and Silici (2018) reported that 47.9% of the students consumed honey infrequently, 14.7% consumed honey once a week, 12.5% consumed honey every day, while 12.1% did not consume honey at all.

When consumers were asked, "What is your packaging preference for honey?", 86.3% of the consumers stated that they prefer glass jars and 11.1% stated that they prefer tin cans. Aktürk (2017) stated in his study that consumers preferred glass packaging with 67.1% in honey packaging type preferences, followed by plastic packaging with 7.9%, tin with 7.2% and other packaging types with 7.2%. In the study conducted by Akdemir (2019), it was determined that 93.55% of

Table 1. Main Findings on Honey Consumption Behaviour of Consumers

No	Questions	Options	Frequency	
			n	%
1	How do you consume crystallized honey?	I destroy crystallized honey	2	0.5
		I consume it in crystallized form	145	37.5
		Dissolving in hot water	240	62
		Total	387	100
2	What is your honey consumption frequency?	I do not consume honey	3	0.8
		Every 15 days	54	14
		Once a week	141	36.4
		Every day	189	48.8
		Total	387	100
3	What is your packaging preference in honey?	Glass jar	334	86.3
		Plastic box	8	2.1
		Tin can	43	11.1
		Bag	2	0.5
		Total	387	100
4	What is your brand preference in honey?	Branded	194	50.1
		Both branded and unbranded	110	28.4
		Unbranded	57	14.7
		No opinion	26	6.7
		Total	387	100
5	In which regions do you prefer honey produced?	Eastern Anatolia region	195	50.4
		Western Anatolia region	14	3.6
		Black Sea region	172	44.4
		South Anatolia region	6	1.6
		Total	387	100
6	Do you trust the places where you buy honey?	No	37	9.6
		No opinion	51	13.2
		Yes	299	77.3
		Total	387	100
7	Where do you buy honey?	Beekeepers	277	71.6
		Supermarkets	57	14.7
		From the markets	5	1.3
		I produce it myself	39	10.1
		Beekeeping Research Institute	9	2.3
		Total	387	100
8	Do you have information about the content of the honey you bought?	No	97	25.1
		No opinion	69	17.8
		Yes	221	57.1
		Total	387	100
9	Is your honey consumption affected by the honey brand?	Yes, I prefer certain honey brand	249	64.3
		No, I consume all honey brand	138	35.7
		Total	387	100
10	Do you pay attention to the expiry date of the honey you buy from the supermarket?	Yes	62	16
		No	325	84
		Total	387	100
11	When do you consume honey most often?	Morning	316	81.7
		Noon	8	2.1
		Evening	12	3.1
		Always	51	13.2
		Total	387	100

consumers preferred glass jars, 6.13% preferred tin and 0.32% preferred plastic packaging. In response to the question "What is your trade brand preference in honey?", 51.1% of the consumers stated that they preferred branded honey, 28.0% preferred both branded and unbranded honey, 14.7% preferred unbranded honey and 6.7% had no opinion on this issue. In the study conducted by Aktürk (2017), it was determined that 40.5% of consumers preferred only unbranded honey, 38.8% preferred only branded honey and the remaining 20.8% preferred branded and unbranded honey. Coşkun (2019) found that the rate of those consuming branded honey was 29.5%, the rate of those consuming only unbranded honey was 28.8% and the rate of those consuming both branded and unbranded honey was 41.7%. Bölüktepe and Yılmaz (2006) found that 49.6% of consumers preferred to buy only branded honey.

In response to the question "In which regions do you prefer honey produced?", 50.4% of the consumers stated that they prefer honey produced in the Eastern provinces, 44.4% prefer honey produced in the Black Sea Region, 3.6% prefer honey produced in the Western provinces and 1.6% prefer honey produced in the Southern provinces. In the study conducted by Coşkun (2019), it was determined that consumers generally prefer honey produced in the Eastern Anatolia region and the Black Sea region. The rate of those who prefer honey produced in the Eastern Anatolia region was found to be 31.3%, and the rate of those who prefer honey produced in the Black Sea region was found to be 17.4. Again, in the study conducted by Kabakçı (2011), it was reported that 73.33% of the consumers preferred honey produced in Eastern Anatolia, 18.09% in Black Sea and 3.8% in South Eastern Anatolia regions, while 4.76% of them preferred honey produced in other regions. It can be said that the difference in the preferences of consumers in honey consumption is due to the fact that consumers have different tastes and the regions have different vegetation of their own. When consumers were asked whether they trust the place where they buy honey, 77.3% of the consumers answered yes, 9.6% answered no and 13.2% stated that they had no opinion on this issue. Again, when consumers were asked where do you get honey from, 71.6% of the consumers stated that they got it from bee breeders, 14.7% from markets, 10.1% produced it themselves, 2.3% from the Beekeeping Research Institute and 1% from the market. In similar studies (Kumova and Korkmaz, 1999; Bölüktepe and Yılmaz, 2006; Saner et al., 2011; Sayılı, 2013; Tunca et al., 2015; Akdeniz et al., 2016; Niyaz and Demirbaş, 2017; Coşkun, 2019) it was stated that consumers generally prefer beekeepers and markets when purchasing honey.

While 57.1% of the consumers who participated in the survey stated that they had information about the content of the honey they bought, 25.1% stated that they did not have any information and 17.8% stated that they had no idea. When consumers were asked whether

their honey consumption is influenced by brand, 64.3% of the consumers said yes, I prefer a certain brand and 35.7% said no, I prefer all brands. When consumers were asked whether their honey consumption is affected by brand, 64.3% of the consumers answered yes and stated that they prefer certain brand, while 35.7% answered no and stated that they have no brand preference. It was also determined that consumers consume honey mostly at breakfast (81.7%). In the study conducted by Soylu and Silici (2018), it was determined that 54.8% of consumers prefer honey because it is nutritious, 19.30% because it protects health and 18.1% because it is a sweet food. In a study conducted by Akdemir (2021), it was found that 62.5% of consumers consumed honey for health and 4.50% for the mental and physical development of children. In the study conducted by Bölüktepe and Yılmaz (2006), it was found that 33.0% of the consumers consumed honey only for breakfast. In the study conducted by Onuç (2020), it was determined that 32.73% of the consumers bought flower honey and 35.16% of female consumers and 29.46% of male consumers preferred flower honey. In the same study, it was determined that 25.45% of the consumers purchased honeycomb honey, 20.5% purchased pine honey and 14.88% purchased organic honey. In his study, Karahan ve Özbakır (2020) determined that 54.2% of consumers buy honey directly from the beekeepers and 11.4% prefer to buy from large markets.

Main Findings on Consumers' Consumption Behaviour of other Bee Products

In this study, consumers' consumption behaviours of bee products other than honey are summarized in Table 2.

To the question "Do you consume pollen?", 57.1% of the consumers answered no, 39.5% answered yes and 3.4% stated that they had no opinion. When consumers were asked whether they consume royal jelly, it was determined that 77.3% of the consumers did not consume royal jelly, 20.4% consumed royal jelly and 2.3% had no opinion. In the study conducted by Akdemir (2021), it was determined that most consumers consume pollen and royal jelly once a month. To the question "Do you consume bee venom?", 86.8% of the consumers answered no, 6.2% answered yes and 7% stated that they had no opinion. In a similar study, Tunca (2015) found that 56.8% of consumers did not consume bee venom, while 43.2% did. When those who had information about bee venom were asked whether they used it or not, it was found that 2.1% of the consumers used bee venom for therapeutic purposes. To the question "Do you consume propolis?", 61.2% of the consumers answered no, 30% answered yes and 8.8% stated that they had no idea. Saral and Yılmaz (2020) found that the least known bee product was propolis with 5.4% and 80.2% of the participants liked bee products. In his study, Tunca (2015) determined that only 8.5% of those who knew propolis used propolis as a medicine for treatment purposes. Aytop et al. (2019)

found that 7.78% of consumers consumed pollen and 1.5% consumed royal jelly and pollen. Onuç (2020) found that 16.32% of the students consumed pollen, 13.16% consumed propolis, 10.79% consumed royal jelly, and very few of them consumed bee venom (4.21%) and bee bread (2.89%).

Table 2. Main findings regarding consumers' consumption behaviour of bee products other than honey

No	Questions	Options	Frequency	
			n	%
1	Do you consume pollen?	No	221	57,1
		No opinion	13	3,4
		Yes	153	39,5
		Total	387	100
2	Do you consume royal jelly?	No	299	77,3
		No opinion	9	2,3
		Yes	79	20,4
		Total	387	100
3	Do you consume bee venom?	No	336	86,8
		No opinion	27	7
		Yes	24	6,2
		Total	387	100
4	Do you consume propolis?	No	237	61,2
		No opinion	34	8,8
		Yes	116	30
		Total	387	100

Factors Effective in Deciding Where to Buy Honey

The frequency values (n and %) of the factors that are effective in deciding where to buy honey are given in Table 3.

When consumers were asked whether price is important for you when buying honey, 61.0% of the consumers answered yes, 35.1% answered no and 3.9% stated that they had no opinion. From the answers given, it can be said that the price of honey is important for the consumer considering the economic conditions for consumers. To the question "How often do you buy honey?", 40.8% of the consumers said once every six

months, 33.1% said once a year and 26.1% said once a month. Again, to the question "Do you pay attention to the odour of honey when buying honey?" 76.0% of the consumers said yes, 14.2% said no and 9.8% had no idea. Is the flavour of honey important for you? To the question, 83.7% of the consumers answered yes, 10.6% had no idea and 5.7% said no. When consumers were asked if they were aware of adulterated (sugar-added) honey, 43.7% of the consumers said yes, 34.1% said no, and 22.2% stated that they had no opinion. When asked the question "Do you trust honey purchased over the internet?", 88.6% of the consumers said no, 6.2% said yes, and 5.2% stated that they had no opinion on this issue. Coşkun (2019) found that the rate of those who buy honey online is negligible (1.0%). In a similar study conducted by Merden (2018), it was determined that consumers do not have confidence in honey sales over the internet and order made through television advertisements. In the study conducted by Akdemir (2021), it was stated that the most effective criteria for consumers to purchase honey and bee products are the quality, taste, safety in terms of health, whether it contain additives and the name/brand of the producing company. Arvane et al. (2010) determined that the most important points that consumers pay attention to when purchasing honey are the taste, colour and quality of honey, while the least important points are the quality of the packaging, the size of the packaging and the name of the producer. In the study conducted by Soylu and Silici (2018), it was determined that university students paid the most attention to the production date, consistency and brand of honey when purchasing honey. Aytop et al. (2019) stated in their study that they primarily prefer direct producers and markets when purchasing bee products.

Conclusion

It is known that approximately 40,0% of the protein that a person should consume for an adequate and balanced diet should be met from animal-derived proteins. Proteins of animal origin contain sufficient and balanced amounts of essential amino acids necessary for human health. Malnutrition has negative effects on people all over the world. Therefore, safe food production and balanced nutrition will be the most important health factors in the future as in the past and present. Honey is one of the most important protein sources of animal origin. Animal nutrients must be produced under healthy conditions and in sufficient quantities in order for the individuals who make up the society to have a healthy diet. In Türkiye, consumption of bee products per people is not at the desired level and we have a long way to go in this regard.

In this study, 48.8% of the consumers stated that they consume honey every day, 36.4% once a week, 14.0% once every fifteen days, while 0.8% stated that they do not consume honey. To the question "Do you consume pollen?" 57.1% of the consumers answered

Table 3. Main findings on the issues that consumers pay attention to when purchasing honey

No	Questions	Options	Frequency	
			n	%
1	Is price important for you when buying honey?	No	136	35,1
		No opinion	15	3,9
		Yes	236	61
		Total	387	100
2	How often do you purchase honey?	Once a year	128	33,1
		Every 6 months	158	40,8
		Once a month	101	26,1
		Total	387	100
3	Do you pay attention to the smell of honey when buying honey?	No	55	14,2
		No opinion	38	9,8
		Yes	294	76
		Total	387	100
4	Is the flavour of honey important to you?	No	22	5,7
		No opinion	41	10,6
		Yes	324	83,7
		Total	387	100
5	Do you make sure that the honey is organic?	No	28	7,2
		No opinion	24	6,2
		Yes	335	86,6
		Total	387	100
6	Do you know about adulterated (sugar-added) honey?	No	132	34,1
		No opinion	86	22,2
		Yes	169	43,7
		Total	387	100
7	Do you trust honey purchased via the internet?	No	343	88,6
		No opinion	20	5,2
		Yes	24	6,2
		Total	387	100

no, 39.5% answered yes and 3.4% stated that they had no opinion. When consumers were asked whether they consume royal jelly, it was determined that 77.3% of the consumers did not consume royal jelly, 20.4% consumed royal jelly and 2.3% had no opinion. "Do you consume bee venom?", 86.8% of the consumers answered no, 6.2% answered yes and 7% stated that they had no opinion. To the question "Do you consume propolis?", 61.2% of the consumers answered no, 30% answered yes and 8.8% stated that they had no idea. When consumers were asked if they were aware of adulterated (sugar-added) honey, 43.7% of the consumers said yes, 34.1% said no, and 22.2% stated that they had no opinion. When asked the question "Do you trust honey purchased over the internet?", 88.6% of the consumers said no, 6.2% said yes, and 5.2% stated that they had no opinion on this issue. When consumers were asked if they were aware of adulterated (sugar-added) honey, 43.7% of the consumers said yes, 34.1% said no, and 22.2% stated that they had no opinion. When asked the question "Do you trust honey purchased over the internet?", 88.6% of the consumers said no, 6.2% said yes, and 5.2% stated that they had no opinion on this issue. When consumers were asked whether price is important for them when buying honey, 61.0% of the consumers answered yes, 35.1% answered no and 3.9% stated that they had no opinion. From the answers given, it can be said that the price of honey is important for the consumer considering the economic conditions for consumers.

In order to increase the consumption of honey and other bee products by consumers, it is very important that consumers from all age groups, especially children in the developmental age, consume honey and other bee products at an adequate level. In order to achieve this, the place and importance of honey and bee products in adequate and balanced nutrition should be accurately explained to consumers through both written and visual media. Again, structural problems of beekeeping enterprises should be solved rapidly, input problems should be solved, quality bee genotypes should be used, and a very good coordination should be ensured between beekeeping enterprises and industry. As a result, the studies to be carried out on bee products should be carried out by people or institutions specialized in this field.

In addition, beekeeping people or enterprises should diversify their products by considering the preferences, behaviours and especially habits of the consumers. In this regard, beekeeping enterprises should review their own situation and develop new strategies. Thus, by producing honey in the quality desired by consumers, it can provide significant contribution to both Ordu province and Türkiye's economy. Türkiye has the potential to produce more and better-quality honey and is an important honey producing country. This potential should be reflected more in production and the necessary studies should be

put into effect in a planned and rapid manner in order to get more share of the honey economics in the world.

The findings suggest that improving consumer education and access to accurate information about bee products could further strengthen consumer trust and support the sustainable development of the beekeeping sector. As a limitation, the study relied on descriptive statistics and did not apply inferential analyses to examine associations between variables. Further research is needed to confirm the patterns observed in this study with more advanced statistical methods.

Ethical Statement

The study was conducted in accordance with ethical standards, and all participants provided informed consent prior to data collection.

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Conflict of Interest

The author declare that there is no conflict of interest.

Author Contributions

First Author: Collection and analysis of data. Second Author: Supervision of data collection and analysis, Writing - review and editing of the manuscript.

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