

## ***Research on cheese in Montenegro - a livestock country***

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**Abstract.** *Each country seeks to improve food production in order to achieve the higher level of satisfying the needs of its population. Montenegro, as a livestock country, has a long tradition, and therefore the production of milk and dairy products is an important food product in the diet of the population. The aim of this project is to conduct a cheese survey of about 100 respondents in order to prove the hypothesis that the traditional types of cheese are most commonly consumed in Montenegro, since this hypothesis is confirmed by the analysis of numerous conditions of livestock (cattle, sheep and goats) and milk production which is growing on farms in Montenegro. On this occasion, the characteristics of the type of cheese most frequently consumed, as well as the ways of consuming cheeses were analyzed. The research showed that when consuming certain types of cheese, the most important aspects were taste, then smell and colour, and the smallest important structure. Price as the second major factor is important because it directly influences the purchase of traditional products, which depends on the employment and a number of other economic factors. The purpose of this project is to define a marketing program for the type of cheese to be consumed. The project started with determining the opinions and behaviors of consumers, their frequency of use of cheeses and preferences. By establishing a system of quality and protection, the potential of milk production on the holding could be better utilized for the purpose of enriching the market and tourist offer, or encouraging the development of rural areas.*

**Keywords:** Montenegro, livestock, agricultural industry, food product, customer, potential of milk and dairy production, cheese.

**JEL Codes:** Q10, Q18.

### **1. Introduction**

An important resource for food production is the production of milk and dairy products, in accordance with its importance, appropriate legal and institutional attention is given to the world. As you know, cheese is a food product with a long tradition. Its origin is mostly associated with Arab nomads who accidentally carried milk in an improvised animal bubble, noticed the stratification of milk after a certain time on whey and cheese. Since then until today, cheese has been a prestigious food.

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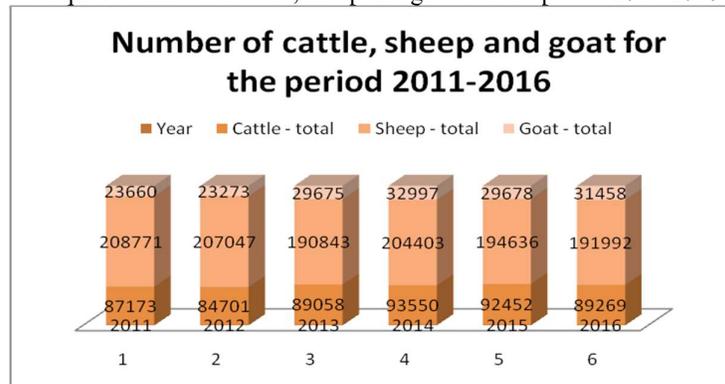
The tradition of making cheese is the oldest when it comes to food production in this region. The quality and the experience passed on to next generations made cheese the most favourite Montenegrin spruce-unavoidable part of each meal.

### 1.1 Background information

Livestock in these areas has a long tradition, and the production of milk and dairy products is a rich heritage. The geographical position of Montenegro, dominated by the highlands rich in pastures, went hand in hand with the development of livestock breeding, and hence the dairy industry when it comes to food production. Today, in almost every corner of Montenegro, you will come across a specific way of production that does not differ much from that of the beginning of the last century. A single species and production techniques could be widely written - one thing is constant and always true: if you choose the cheese from any Montenegrin domestic industries-you have chosen a healthy and delicious way to learn about Montenegro.

In order to better understand the significance of my project, the analysis starts with quantitative indicators, i.e. a review of the numerous livestock status, which is the basis of milk production, as well as a review of milk production for the period of the past six years.

Graph 1. Number of cattle, sheep and goats for the period 2011-2016



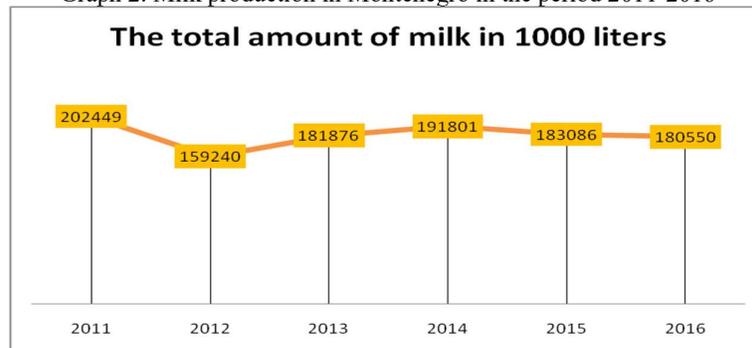
• Source Statistical Office of Montenegro - Monstat: Release-Number of livestock and poultry, production of milk, wool and eggs in Montenegro

For the six-year period, the number of sheep is the most frequent in number, and their number was the highest in 2011 and amounted to 208,771, which represents a decrease of about 8% in 2016. Although the decline has not diminished the importance of sheep farming, which is reflected in the efficient exploitation of low-productive areas - meadows and pastures and sustainable utilization of pastures, as well as the production of high-quality products for human consumption and other needs. The reasons for the decline are:

- ✚ leaving the village in search of a better and safer employment, social changes in the countryside,
- ✚ changing the employment structure of rural households, an increase in the number of rural households in the countryside,
- ✚ the unfavorable economic situation of sheep farming due to large price fluctuations and difficult product placement in the past few years.

As for the number of cattle in 2016, it was 89,269 individuals, which in comparison with 2011 represents an increase of about 2.4%. The number of goats follows an increase of 33% compared to 2011, which indicates the growth of goats as the agricultural industry, which is slowly returning goat products on the Montenegrin market with direct sales and there is greater demand than supply.

Graph 2. Milk production in Montenegro in the period 2011-2016



• Source Statistical Office of Montenegro - Monstat: Release-Number of livestock and poultry, production of milk, wool and eggs in Montenegro

During 2016 in Montenegro the lumpy skin disease of cows was present and bluetongue in cattle and sheep, which led to a decline in the total number. The presence of the disease has led in particular to a decline in milk cows and dairy sheep, and yet there was an increase productivity thereof, the amount of cow's milk production per cow was 2,803l, and the quantity of milk per sheep was 86. In comparison with the decrease in the number dairy cattle and sheep, the total quantity of milk is decreased by 1.4% compared to 2015. What is a fact and represents a good foundation and prerequisite for the implementation of the project is that the total quantity of milk produced on the farm tends to increase since 2012, and therefore suggests increasing the availability and utilization of hospital of traditional products (milk, cheese, cream, and yogurt).

## 2. Methods

### 2.1 Research design

**Research Plan:** The task of the research is to show that the most common traditional types of cheese in Montenegro. With the execution of the balance sheet based on the available documentation and conducted field research, the ultimate goal should be to determine, on the basis of the obtained knowledge, the direction of further development of this boundary in quantitative and qualitative terms.

From the above research objectives derive the following research tasks:

- ✚ Analysis of the number of cattle (cattle, sheep and goats) and milk production in farms in Montenegro;
- ✚ Analysis of the characteristics of the type of cheese most commonly consumed, as well as the methods of cheese consumption;
- ✚ Calling on the continuation of agricultural and political measures that will encourage farms to increase milk production and processing.

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By setting these goals, they would encourage milk producers to deal with processing on their farms in order to achieve the added value of their products. Many areas are known for one of the products that have a unique recipe, and each of them is a confirmation of the existence of tradition, experience and customs.

## 2.2 Hypothesis

If we observe consumer behavior, the quality of food products is affected by the primary and secondary factors. Primary objective characteristics of quality are mainly related to the organoleptic properties of the product and the color, smell, taste, structure, as well as the amount of money for the purchase of a particular type of cheese, whether it is traditional cheese or some of the imported types. Determining factors that influence consumer attitudes and perceptions is very important for understanding, especially if it is about the desirable properties that determine the demand for a particular type of cheese.

One of the objectives of this project is to increase the demand for cheese produced on family farms (traditional cheeses) rather than industrially produced cheeses. The advantage in this production related to the processing of milk produced on the holding is that the changes in the structure of milk fat change as a result of mechanical manipulation during the transport and pumping of milk by mechanical pumps. Several researchers were working to establish that consumers of traditional cheese are less priced than consumers of industrially produced cheeses. Thus, Cowan et al. (2000) found a low price sensitivity of the demand for traditional cheese in Ireland. Examining the preferences of cheese consumers in Lisbon, Monjardino de Souza Monteiro and Ventura Lucas (2001), found that consumers have the greatest importance to give Protected Denomination of Origin (PDO) assuming they are associated with cheese properties such as cheese history or regional characteristics. They found that of relatively little importance is the price for purchasing traditional cheeses. If we compare this with the situation in Montenegro, we have a controversial situation because the price is important when buying traditional cheeses.

The purpose of this project is to define a marketing program for the type of cheese to be consumed. The project started with determining the opinions and behaviors of consumers, their frequency of use of cheeses and preferences: 1. according to certain types of cheeses, 2. method of use and 3. how much money they are willing to allocate for consumption of this product. The results of this research are the starting point for determining the important characteristics of the type of cheese most commonly consumed, then for marketing the product design, distribution.

## 2.3 Methods

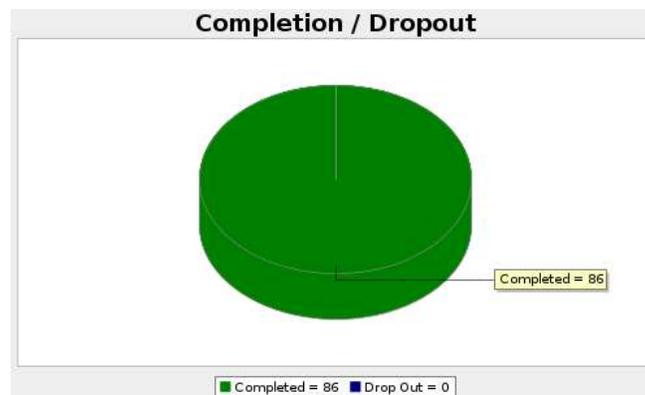
The research was carried out as a standard desk ("Desk-research" 1) method of research, and the on-line questionnaire collected the necessary data. The attitudes and behavior of consumers and the frequency of consumption of cheese were examined. The questionnaire for this research was looked at by 149 people, while a total of 86 people participated in the study, 64% of them female respondents and 36% male respondents. The average age of the subjects was 40 years or in the range of 30 to 50 years. Respondents are of different occupations: graduate engineers, students, traders, economists, actually from various occupations as well as pensioners. The collected data were processed using the method of content analysis, and the results were used for making conclusions based on the views on the consumption of cheese.

The research consisted of ten questions, both open and closed. The questions are short and clear, with no abbreviations and complicated words in order to obtain more precise and complete information. Consumer testing was conducted using structural questions open-closed type for:

- ✚ determining the type of cheese that is most often consumed and the way cheese is consumed;
- ✚ determination of the importance of the characteristics of the cheese.

The importance of particular characteristics is measured in a way where characteristics that are not important for the consumption of cheese are evaluated as unimportant, and the characteristics that are crucial for consuming a particular type of cheese are important. The following characteristics of cheese were measured: colour, odour, taste and structure. The last group of questions in the survey related to the socio-demographic characteristics of respondents: gender, age, the amount of money that is set aside for the purchase of cheese, as well as the issue of employment. Time spent on the questionnaire design, implementation and duration of the research, a total of 15 days. After conceiving goals and hypotheses, research required 3 days to create a questionnaire. Then two days were spent on defining the target population and obtaining e-mail addresses for research. Time data collection lasted 7 days, and the average time to complete the questionnaire is 2 minutes.

**Graph 3. Completion of questionnaires**

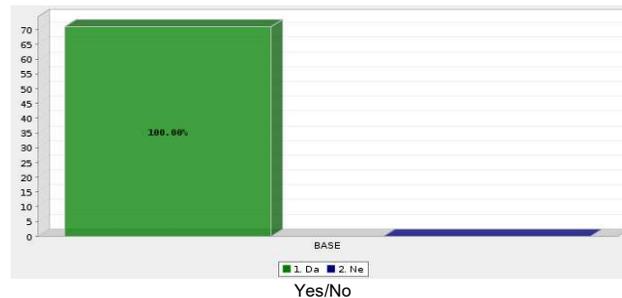


Viewed	Started	Completed	Completion Rate	Drop Outs (After Starting)	Average Time to Complete Survey
149	86	86	100%	0	2 minutes

### 3. Results and discussions

The results of the answer to the first question in the questionnaire indicate the positive attitude of consumers towards the food product in this case to the cheese in Montenegro.

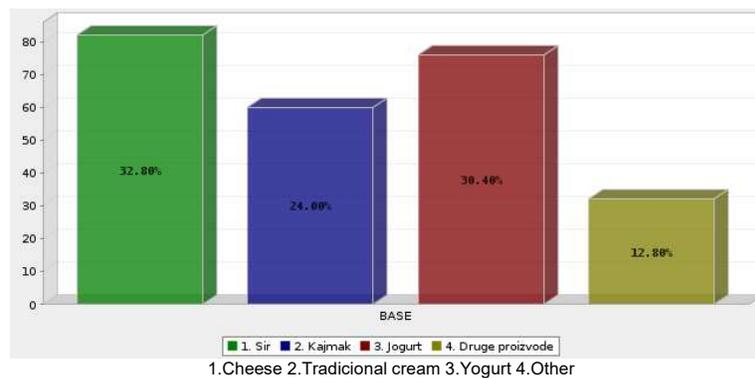
Graph 4: Consumer attitude toward consumption of dairy products



Research has shown that 86 subjects who completed the questionnaire replied all *yes*, that they were consuming dairy products the percentage of occupancy of the answer "yes" is 100%. So what would be my first assumption is that 63 people who looked at a 149 questionnaire probably belong to respondents who do not consume dairy products.

### Consumer behavior when choosing and the frequency of the use of dairy products

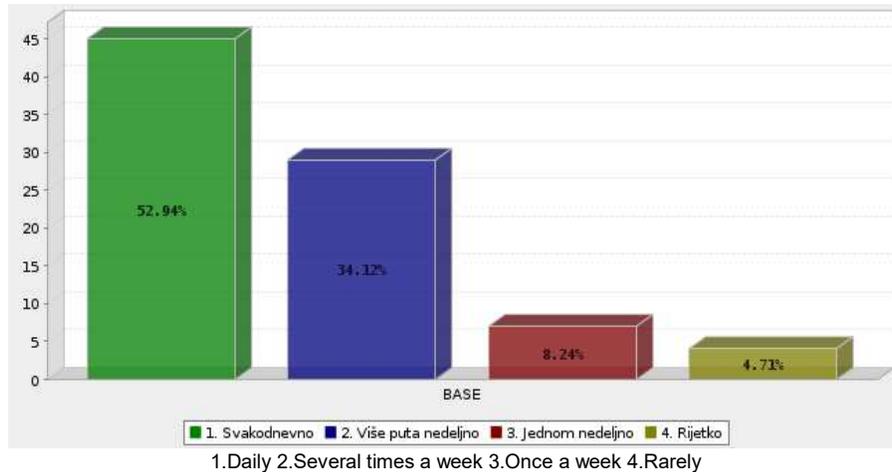
Graph 5: Consumer attitude towards the type of dairy products it consumes



	Answer	Count	Percent
1.	Cheese	82	32.80%
2.	Tradicional cream	60	24.00%
3.	Yogurt	76	30.40%
4.	Other	32	12.80%
	Total	250	100%
Mean : 2.232	Confidence Interval @ 95% : [2.102 - 2.362]	Standard Deviation : 1.046	Standard Error : 0.066

The second question referred to the dairy products consumed by the respondents. In this matter it was possible to give more answers, confirmed by the total. What is of particular importance for the continuation of this study is that there are 82 respondents who confirmed that they consume cheese among other products.

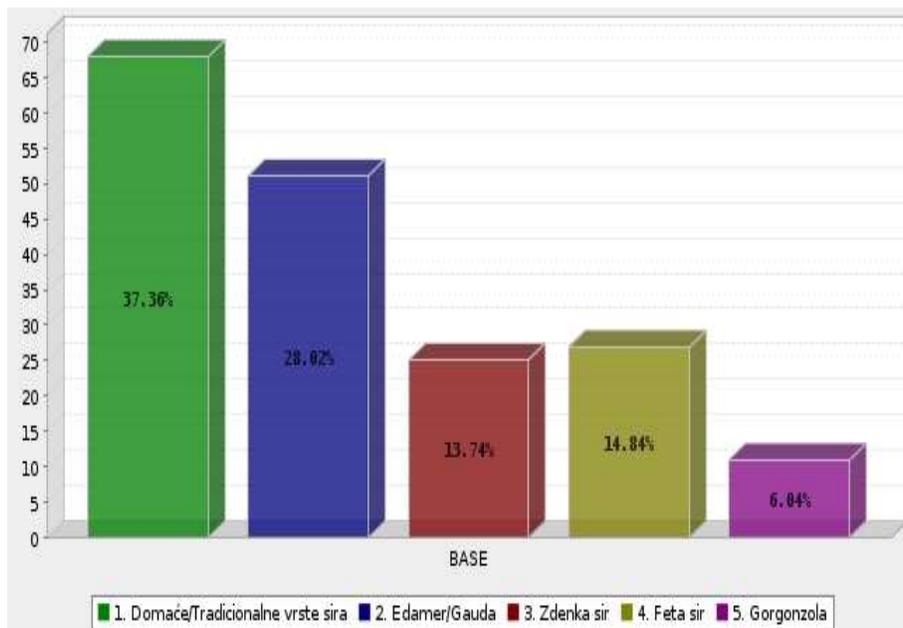
Graph 6. The attitude of the consumer towards the frequency of consumption



1.Daily 2.Several times a week 3.Once a week 4.Rarely

The research showed that more than half of the respondents (52,9%) are consuming cheese every day. About 34.1% of respondents eat cheese several times a week, while 13% of the subjects consume cheese once a week or rarely. The question regarding the type of cheese that the respondents consumed the study showed that 37.4% of respondents answered that they mostly consumed traditional cheeses. Edamer/Gouda cheese consumed 28% of respondents, Zdenka 13.8%, 14.8% Feta cheese and Gorgonzola 6% of respondents.

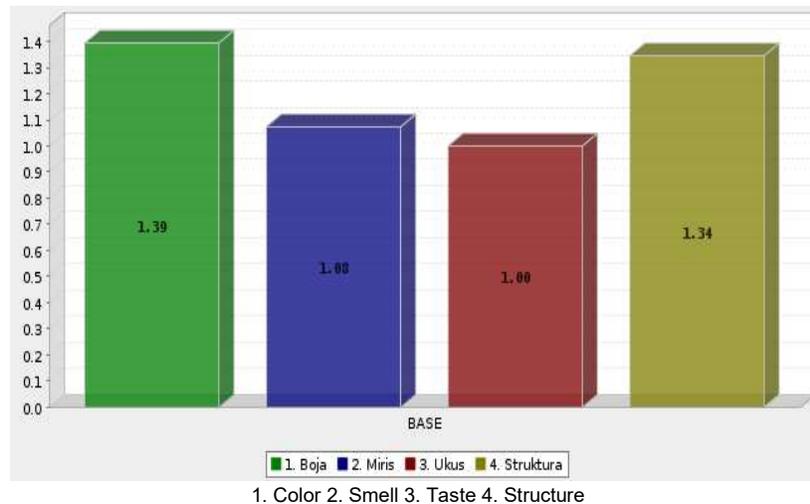
Graph 7. Consumer position by type of cheese



1. Tradicional cheese 2.Edamer / gauda 3.Zdenka cheese 4.Feta cheese 5.Gorgonzola

## Importance of certain characteristics and ways of using cheese

Graph 8. The attitude of consumers towards certain characteristics

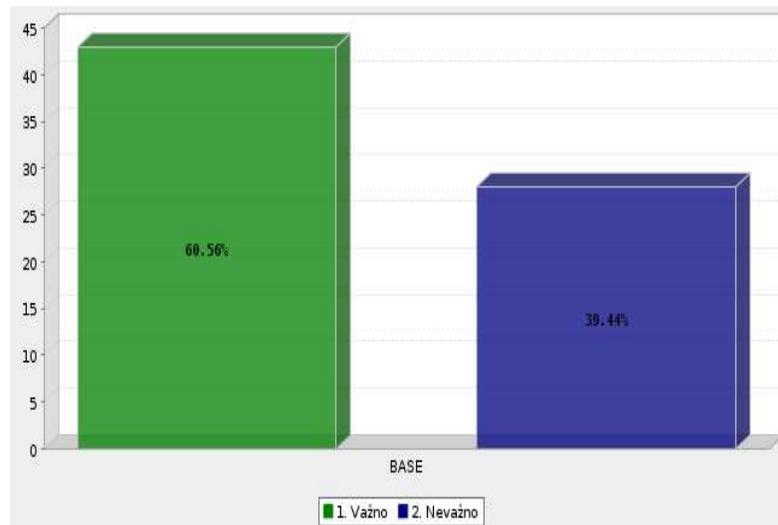


### Overall Matrix Scorecard: When choosing cheese which characteristics are especially important to you?

Question	Count	Score
1. Color	71	1.394
2. Smell	80	1.075
3. Taste	83	1.000
4. Structure	61	1.344
Average		<b>1.203</b>

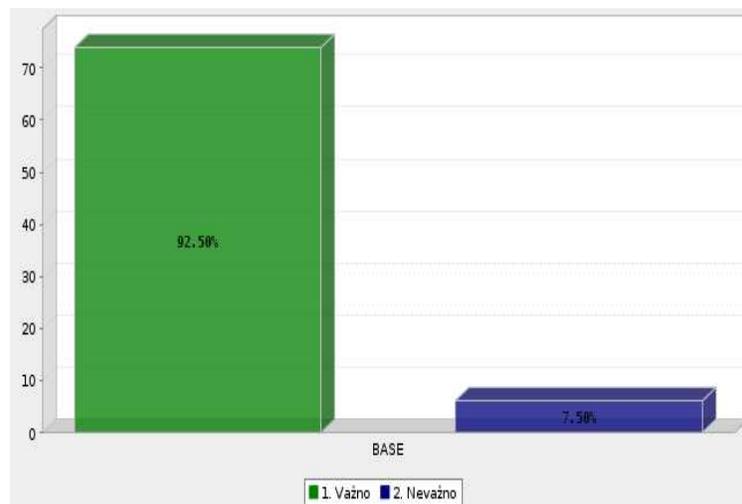
The question regarding the characteristics of cheese that showed important or irrelevant research to the respondents showed that the taste, the smell and the color, are of particular importance to the respondents when choosing a particular type of cheese, and the least important is the structure. However, if we look at the individual characteristics, 69.6% of respondents answered that cheese is an important feature, while 39.4% of respondents answered that it is irrelevant.

Graph 9. Consumer attitude towards te colour of cheese



1. Important 2. Not necessarily

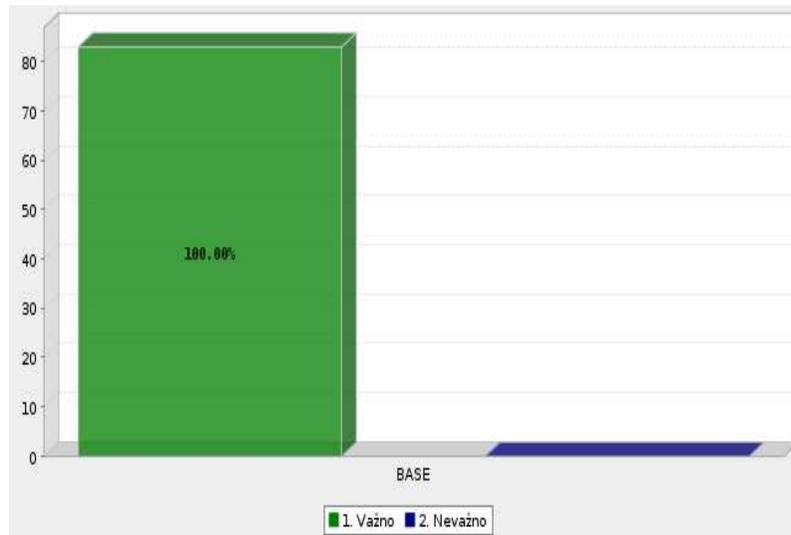
Graph 10. The attitude of the consumer towards the smell of cheese



1. Important 2. Not necessarily

Observing the attitude of the respondents towards the smell of cheese, 92.5% of respondents answered that the selection of a particular type of cheese is a very important characteristic, while 7.5% of respondents answered that their smell is not an important characteristic. The research showed that a separate taste is a crucial characteristic of consuming Certain types of cheese confirmed by respondents with 100% response.

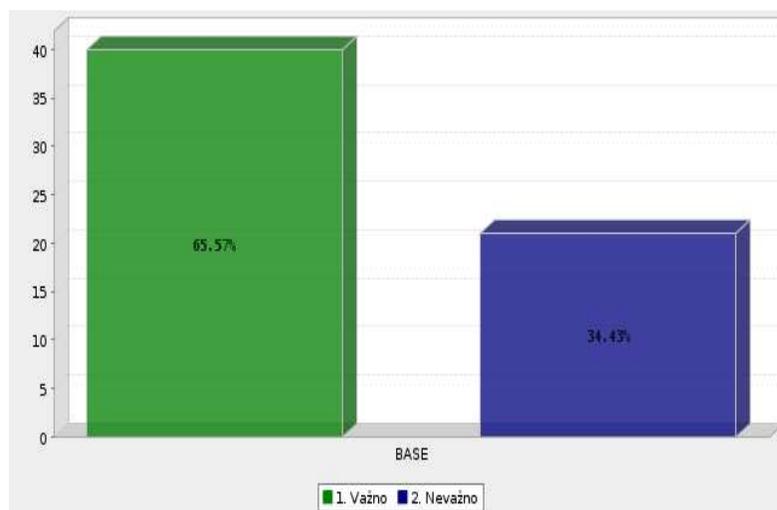
Graph 11. Consumer's attitude towards taste of cheese



1. Important 2. Not necessarily

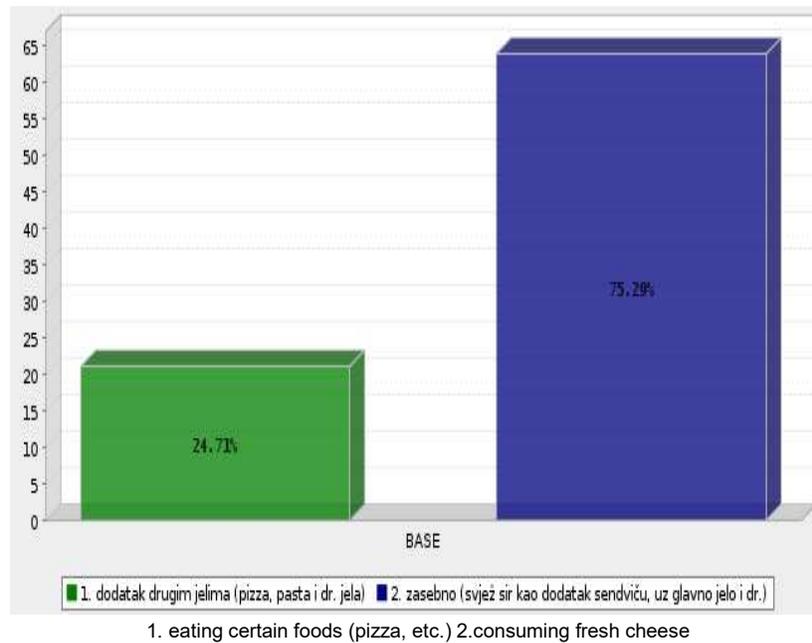
The structure of the cheese as a characteristic for which the respondents answered that it is least important when selecting a particular type of cheese if it is observed separately, 65.6% of the respondents answered that it is an important characteristic, while 34.4% is an irrelevant characteristic.

Graph 12. Consumer attitude towards cheese structure



1. Important 2. Not necessarily

Chart 13. Consumer attitude towards the way cheese is used



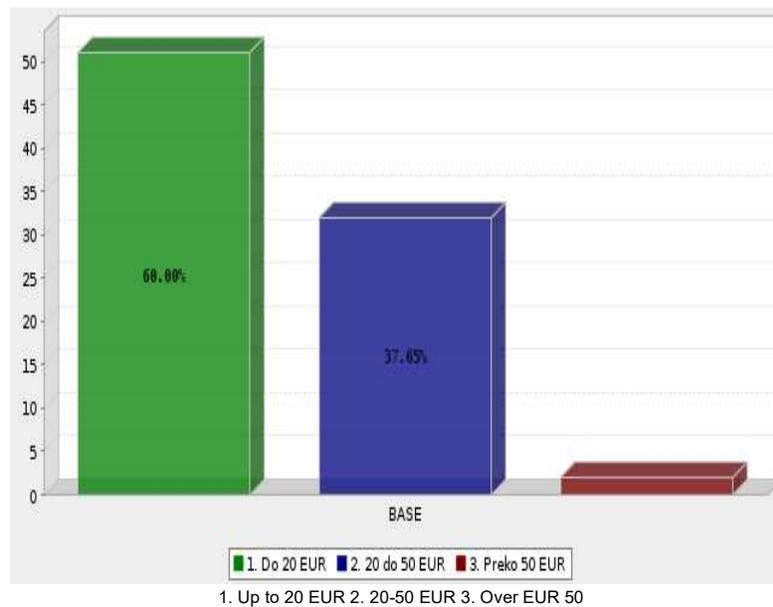
	Answer	Count	Percent
	1. Eating certain foods (pizza, etc.)	21	24.71%
	2. Consuming fresh cheese	64	75.29%
	Total	85	100%
Mean: 1.753	Confidence Interval @ 95% : [1.661 - 1.845]	Standard Deviation: 0.434	Standard Error : 0.047

When asked about the way cheese was used, respondents answered that 75.3% would consume fresh cheese separately, while 24.7% agreed that cheese is most often consumed as an addition to other foods.

However, if we made a filter above the raw base for those who consumed cheese, the type of traditional cheeses and consume cheese separately, we would get information that these are 49 respondents, or 57% of those surveyed consume traditional cheeses separately. In this way, it confirmed one of the goals of this project that higher demand and consumption of cheese produced on family poljoprivrednimgazdinstvima (traditional cheeses) than industrially produced cheeses.

## Socio-demographic characteristics of respondents

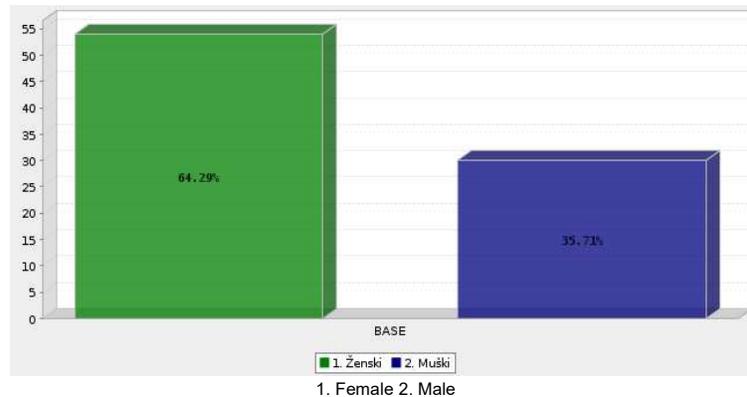
Graph 14. Consumer position according to the amount of money it allocates on a monthly basis for the purchase of cheese



	Answer	Count	Percent
	1. Up to 20 EUR	51	60.00%
	2. 20 - 50 EUR	32	37.65%
	3. Over 50 EUR	2	2.35%
	Total	85	100%
Mean: 1.424	Confidence Interval @ 95% : [1.308 - 1.539]	Standard Deviation: 0.543	Standard Error: 0.059

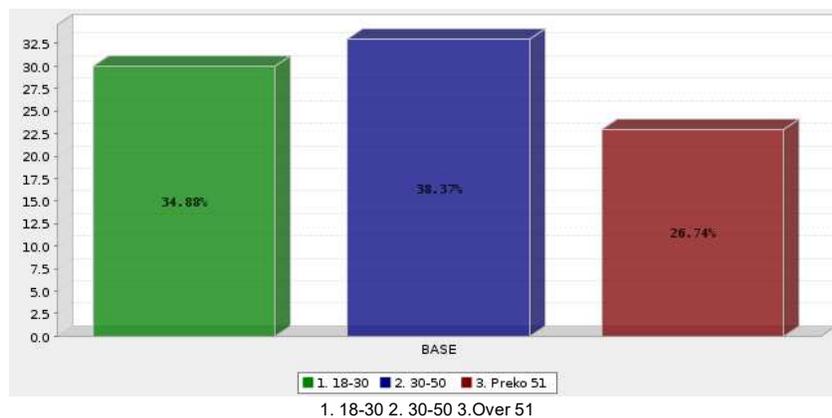
Observing the attitude of consumers towards the amount of money allocated on a monthly basis for the purchase of cheese 60% of the respondents replied that they spend up to 20 EUR per month, 37,7% said they spend 20 to 50 EUR on a monthly basis for purchasing cheese, while 2.4% said that on a monthly basis for the purchase of cheese spend over 50 EUR.

Graph 15. Gender of respondents for cheese research



Further testing found that out of the total number of respondents, females consumed more cheese than men, or more precisely 64.3% of females consumed cheese, while 35.7% of male respondents consume cheese.

Chart 16. Age of respondents for cheese research

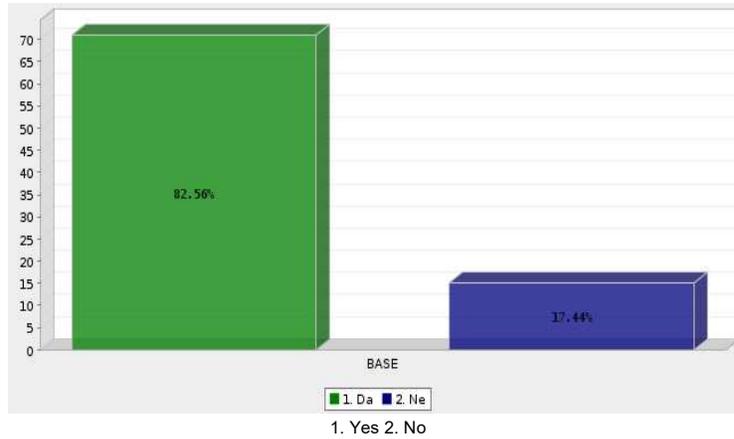


	Answer	Count	Percent
1.	18-30	30	34.88%
2.	30-50	33	38.37%
3.	Preko 51	23	26.74%
	Total	86	100%
Mean: 1.919	Confidence Interval @ 95%: [1.753 - 2.085]	Standard Deviation: 0.785	Standard Error : 0.085

If we observe the years of the respondents, there is a small difference between the first group of subjects aged 18-30 and other groups between 30-50 years. Representation in the sample of the first group of respondents is 34.9%, the representation of the second group is 38.4%, and the representation of the third group is 26.7%.

Research has shown that consumption of cheese and dairy products is common in respondents up to 50 years old.

Graph 16. Employment respondents for cheese research



	Answer	Count	Percent
	1. Da/Yes	71	82.56%
	2. Ne/No	15	17.44%
	Total	86	100%
Mean : 1.174	Confidence Interval @ 95% : [1.094 - 1.255]	Standard Deviation: 0.382	Standard Error : 0.041

Of the total number of 71 respondents, the status was employed while 15 respondents had status unemployed. If we were to cross the number of employed subjects with the years of the respondents who spend most of their research on cheese (18-50 years old), we will get data that 44 employed respondents who are in the age from 18 to 50 consume cheese. If we add the condition to consume traditional cheeses to the same subjects, we will get a number of 33 respondents, that is, that most of the employed examinees consume traditional cheeses from 18 to 50 years old.

## 4. Conclusions

- ✚ Demand for recognizable products and products with additional value is constantly increasing. The determination of factors that influence attitudes and consumer preferences is very important for the preparation of such products intended for the market.
- ✚ This project presents the results of testing consumers who are the starting point for determining the significant characteristics of the cheese, and especially for marketing product design, sales channels and distribution. The results showed that when choosing a consumer cheese is especially important taste, then smell and color and the least important structure.

- ✚ A significant number of respondents are in the age group of 30 to 50, and of these types of cheeses most often they consume traditional domestic cheeses, which is one of the main goals of this project. Also, research has shown that the purchase of traditional types of cheese affects employment as well as a number of other economic factors.

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