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PERCEPTION OF SENSORY ATTRIBUTES AND MARKETING TOOLS OF SELECTED MILK BRANDS

Alexandra Krivošíková, Ľudmila Nagyová, Andrej Géci

ABSTRACT
The research has shown that in the last 5,000 years the human evolution has made the greatest leap in the human history. As a result of these changes, thanks to relatively recent discovery of a specific gene, even adult Europeans can digest milk. In their nutritional guidelines based on the scientific evidence, the official health organizations and institutions recommend drinking milk and eating low-fat dairy products such as yoghurts or cheese. The human body absorbs the necessary amount of calcium in the easiest form from cow's milk. Calcium is the essential element not only for healthy bones and teeth but it is also the important factor for the transmission of nerve impulses, it supports heart activity, helps reduce high blood pressure and "bad" LDL cholesterol levels and alleviate allergic reactions. It has impact on proper blood clotting, affects sperm mobility, helps prevent arthritis or can also contribute to better sleep. Milk is a valuable food not only for calcium content but also for selenium which slows down the aging process and contributes to the protection of the immune system. Acid dairy products prevent the digestive disorders, protect against gastrointestinal infections and improve skin condition. Despite all these positive aspects the consumption of milk, as well as dairy products, has the downward trend in Slovakia. In the last decade, the consumption was at a historical minimum and below the recommended annual dose, which is 91 liters of milk per person. Therefore, the main objective of this research paper was to examine the quality of milk produced by two selected competing companies and identify the various factors affecting consumers´ decision-making process when purchasing milk and dairy products. The attention was concentrated on the sensory attributes (colour, appearance, smell, taste and quality) and marketing tools (brand, packaging, label and price). The primary data were obtained by the questionnaire survey, which was conducted in the Slovak Republic with 284 respondents. For a deeper analysis, the data were evaluated by the statistical methods. Based on the results of the blind testing it was determined that even though the quality of monitored milk is the same, the respondents prefer the sensory attributes of Rajo semi-skimmed milk. When it comes to brand, packaging, label and price Tami semi-skimmed milk also lagged behind.

Keywords: milk; consumers; Slovakia; Rajo semi-skimmed milk, Tami semi-skimmed milk

INTRODUCTION
Milk is a rich source of nutrients and energy. It is one of the complex foods and it can be called as a "superfood" because it contains the numerous nutrients. Most of the ingredients that are present in milk do not act in isolation but in interactions. Milk can contribute significantly to the intake of substances such as magnesium, selenium, riboflavin, vitamin B12 and pantothenic acid. The bioavailability of some nutrients in milk, such as calcium, is very high compared to other foodstuffs, and therefore, drinking milk in childhood is of a great importance in promoting growth and healthy bone development. Milk sugar, called lactose, participates in the formation of brain cells. Among other things, milk has a low sodium content and contains up to 87% water what makes it suitable for maintaining a daily drinking regime. In addition, milk does not contain the substances that inhibit the bioavailability of minerals such as phytates or oxalates. The recent research has highlighted the beneficial effects of milk on the health of the subjects **(Weaver, 2014)**, body weight **(Wang et al., 2014)**, and obesity related diseases including type 2 diabetes and cardiovascular disease **(Markey et al., 2014; O'Connor et al., 2014).** Therefore, the role of milk and dairy products has been the subject of debate in the recent years, both in the scientific and popular-scientific literature.

However, the opinions on the issue of drinking milk are divided into two contradictory streams today. According to **Norton (2015)** the most common reasons why people who can drink cow's milk tend to choose alternative sources of milk (plant based drinks) or even completely exclude milk and dairy products from their diet are following:

- milk quality – industrial packaged milk has the different taste and consistency and also lower nutritional value,
- the cows´ life quality (moral aspect) – life of cows on farms and in large-scale production

enterprises is often distinguished by suffering, because the animals are not treated properly,
- the impact of milk on human health – milk increases the pH level of organism and causes acidification. Then it uses calcium as one of the most effective means to achieve alkalinity when trying to balance pH,
- humans are "mammals" – they should drink just human breast milk during breastfeeding,
- veganism – not consuming meat or any other animal products.

On the positive side, the actual research done by **(Golian et al., 2019)** marks these upper mentioned reasons as myths and scientifically refuses them.

Milk and dairy products have been a traditional food of the people in our country since the time immemorial. This fact was confirmed in the publication written by authors **Podolák and Mjartan (1974)** who wrote about the ancestors of the Slovaks as breeders, since the history of dairy production has been developed for around more than 100 years. Milk along with cheese and yoghurt are three most commonly consumed dairy products. Most countries have the quantitative recommendations that usually range from 2 to 3 servings or cups of milk or yoghurt, or sometimes the equivalent serving of cheese a day. In 1989, according to **Kubicová, Kádeková and Dobák (2014)**, Czechoslovakia consumed nearly 80 kg of milk per capita but during 17 years (1995 – 2012) milk consumption as well as dairy products per capita had a downward trend. In the last decade, consumption **(VUEPP, 2019)** hit the historical lows (Figure 1) and it was below the recommended annual dose, which according to **Chlebo, Šrámková and Harasník (2009)** is 91 liters per person. The Slovak Republic has considerable reserves in this indicator, hence it is important to examine quality and marketing tools which can persuade people **(Chandon, and Wansink, 2012)** to buy and subsequently consume milk.

Scientific hypothesis

We assumed that:
- logos are easier to remember for people who know the chosen brands,
- there are differences in assessing of the selected categories related to packaging,
- the pricing strategies have the different effects.

H_0: there is not a correlation between awareness of brand and memorability of a logo.
H_1: there is a correlation between awareness of brand and memorability of a logo.

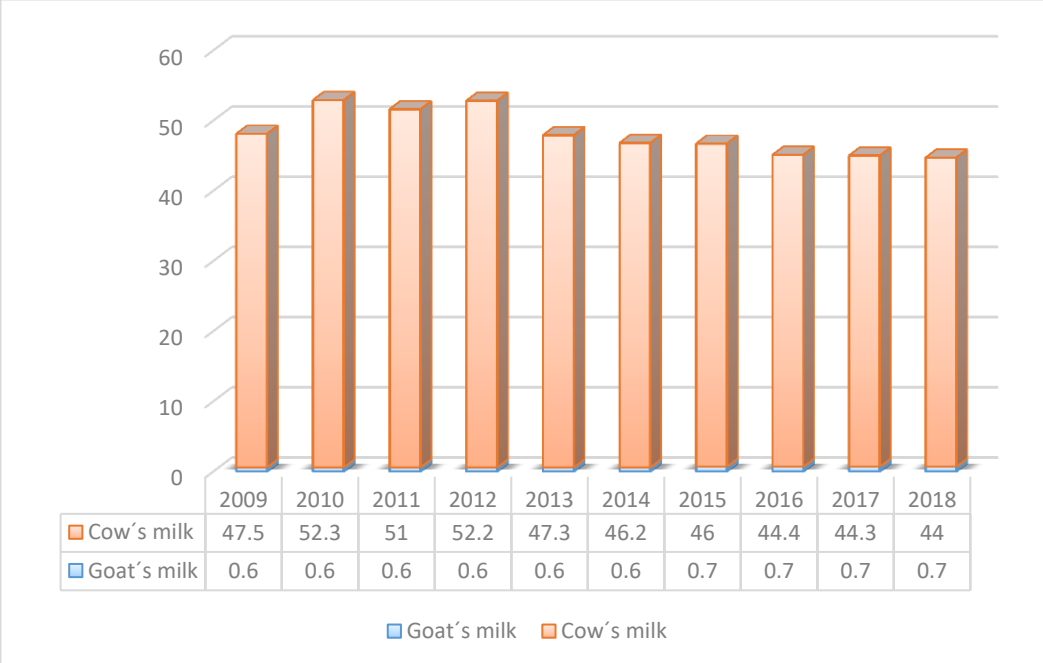
H_0: there are no differences in assessing of the selected categories.
H_1: there are differences in assessing of the selected categories.

H_0: The pricing strategies are identical.
H_1: The pricing strategies are different.

MATERIAL AND METHODOLOGY

The main objective of this research paper was to examine the quality of milk produced by two selected competing companies and identify various factors affecting consumers´ decision-making process when purchasing products. The focus was targeted at the sensory attributes (colour, appearance, smell, taste and quality) and marketing tools (brand, packaging, label and price).

The first part of this paper is a theoretical overview that allowed a better understanding of the topic. The secondary information was obtained by using the method of collecting data from publicly available information, the internet sources, literary sources of domestic and foreign authors, as well as articles by experts on consumer behavior on milk market.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cow´s milk	47.5	52.3	51	52.2	47.3	46.2	46	44.4	44.3	44
Goat´s milk	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7

Figure 1 Total consumption of drinking milk in Slovakia in liters per capita.

Since many authors are currently devoted to this topic, we have sorted the data by using selection and processed it into the appropriate form for this paper via deduction, analysis and synthesis. This theoretical overview became the basis for the realization of questionnaire surveys which served as a source of primary information and was supplemented with a blind testing. The aim of the questionnaire survey was to determine consumer habits in the process of purchasing and consumption of milk and sensory preferences of milk. The respondents were addressed in person and they filled in the electronical questionnaire form which was created in the Google Forms. Firstly, people were asked 8 classification questions and then 22 factual questions, which were primarily open or semi-open, with pre-selected options for answering. The data were collected from 284 respondents in the period from 4 February 2019 to 19 October 2019.

In total, 135 men and 149 women participated in the questionnaire survey. Maintaining representativeness was also important when categorizing respondents by age. The respondents of all ages were approached in order to copy the structure of the population of the Slovak Republic. The respondents aged from 36 to 45 (20.42%) represented the largest share. The same percentage of respondents (15.85%) identified the options 'from 46 to 55 years' and 'from 56 to 65 years'. 2% more (17.96%) were over the age of 66 years. The lowest representation was in the age category over 18 to 26 years. Only 32 respondents were included, which represents 11.27% of the sample in terms of percentage. The remaining 18.66% belonged to the age group from 26 to 35 years. The questionnaire form also included the question asking about the highest achieved education. 7 respondents (2.46%) completed only the elementary education. The secondary education without a school-leaving exam was marked by 16.20% and the similar education which ended with school-leaving exam by 53.87%. In the case of the higher education, the respondents had the choice of three alternatives. 11.27% completed university education of bachelor´s degree, 15.14% of master´s degree and 1.06% the doctoral university education. The fourth classification question was devoted to the economic activity of the respondents. The smallest groups were economically inactive respondents without any job (3.52%) and mothers in the maternity leave (4.93%). They were followed by 'self-employed or entrepreneur' with 8.45%. The category 'student' was the third biggest group with 15.85% and the second biggest group was that of pensioners (22.89%).

The majority of respondents (44.37%) were employed, who were also asked to write what position they were working at. Since this additional question was open, we received the different answers. The total income of household depended on the economic activity of the respondents. The most numerous groups earned from 1,001 to 1,500 € (30.28%) and from 501 to 1,000 € (26.06%). In terms of place of residence, 54.93% came from villages and 45.07% identified with the option city. All of these respondents were inhabitants of Slovakia.

Statistical analysis

Every question in the questionnaire was described verbally and some of them were also evaluated graphically. For a better understanding of the correlation, the methods of qualitative statistics were also used. The statistical evaluation program XLStat 2019.3.1 Build 60464 was used by Addinsoft to realise the following tests:

- Chi-Square Goodness of Fit Test,
- Chi-Square Test of Independence
- McNemar´s test,
- Friedman´s test,
- Nemenyi's procedure.

Traditionally, the following approach was applied to test the hypotheses:

- formulation of hypotheses H_0 and H_1 and determination of significance level α,
- after evaluating the distribution of relevant test statistics, the definition of the critical area at the significance level α,
- calculation the value of the test statistics based on empiric data,
- evaluation whether the value of the test statistics is from a critical area of the test. If it is, reject H_0 and if it is not, accept H_0.

RESULTS AND DISCUSSION

The consumers are familiar with Rajo and Tami brands in the selected market. Up to 97.54% of them knew the Rajo brand and 85.56% Tami. This high representation can be due to the fact that customers can find milk or other dairy products from at least one of these brands in almost every grocery store in Slovakia.

Majority of the respondents liked and were satisfied with the design of the Rajo and Tami logos. Only 13.03% are dissatisfied with the design of Rajo and 19.36% with the Tami design. In the following open question this minority stated that the Rajo logo is too simple, lacks colour and the used red color is very aggressive. On the other hand, the Tami logo is old-fashioned and many people have described it as "retro". In addition to the above-mentioned suggestions, the respondents who disliked logos agreed on an overall redesign that would change the font type and size, and in their opinion, it also lacked the slogan and image of something associated with milk (according to many respondents, it would be appropriate to add an image of cows).

According to the results of the questionnaire survey, the logos of selected brands are relatively easy to remember. Only 3.87% have trouble remembering the Rajo logo and 13.38% the Tami logo. Marketing and advertising agency **Navigation Advertising (2018)** claims that a logo must be easy to read, recognize, remember and reproduce. We tested this question using chi-square test for independence:

H_0: there is not a correlation between awareness of brand and memorability of logo.
H_1: there is a correlation between awareness of brand and memorability of logo.

Rajo: *p*-value = <0.0001
Tami: *p*-value = <0.0001

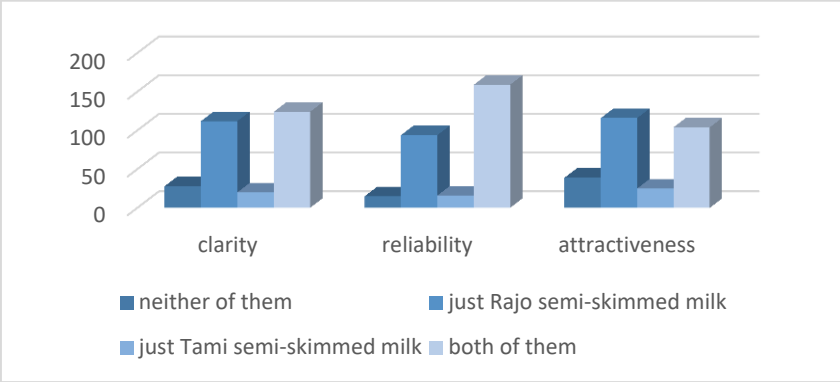


Figure 2 Assessment of packaging.

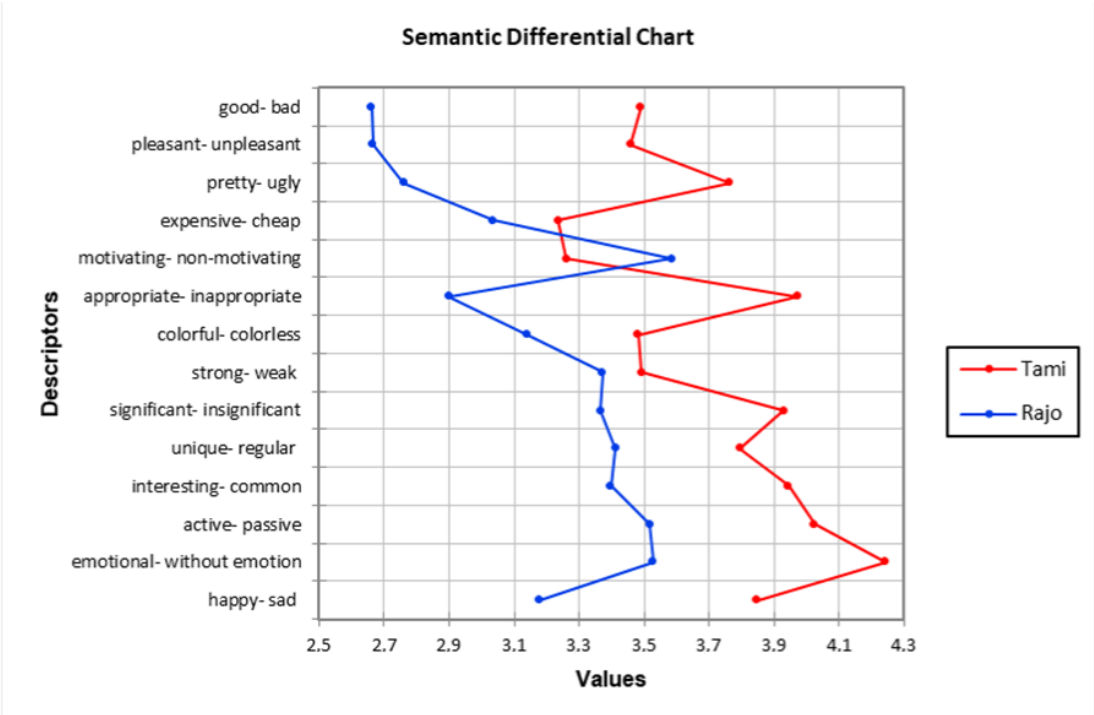


Figure 3 Assessment of selected categories.

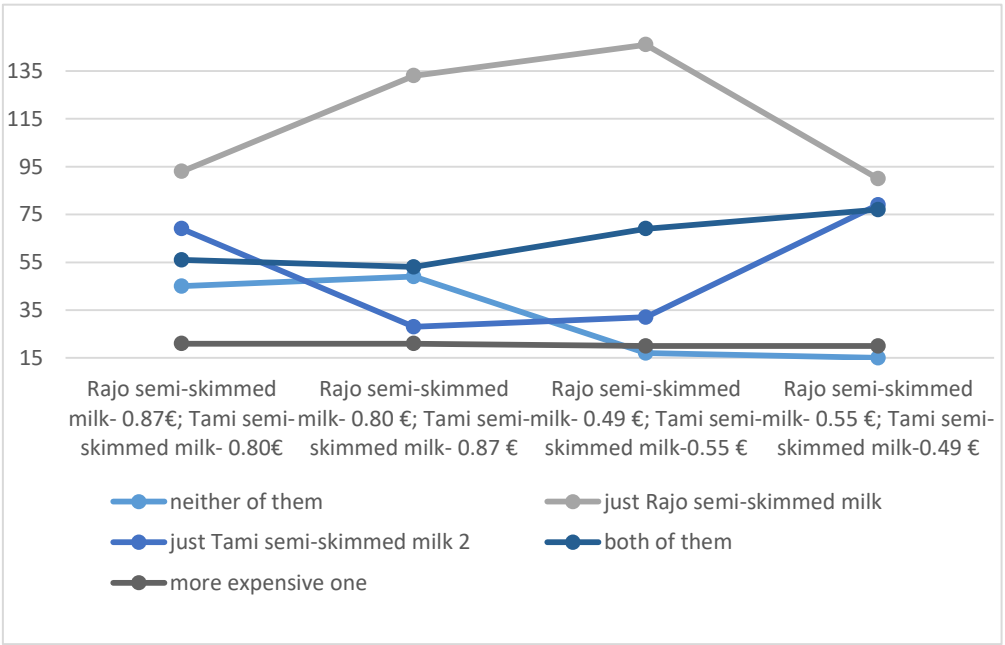


Figure 4 Selection of milk based on price.

Both tests showed that there is a correlation between awareness of brands and memorability of logos because *p*-value was smaller than alpha and we accepted the alternative hypotheses.

Approximately 60% of milk purchases are made based on brand. 21.83% of respondents targeted exclusively at Rajo and 9.51% at Tami Packaging.

Packaging

Three following questions of the questionnaire form were related to the expression of the respondents´ opinion on the clarity, readability and attractiveness of competing milk packaging, because when the right visual features and the right communication with the different segments of consumers are used, the promoted product can be successful in the market and consumers can be persuaded to make beneficial choices as well **(Rybanská, Nagyová and Tkáč, 2019)**. From the graph (Figure 2), it is evident that the direct comparison of chosen milk brands referring to clarity of packaging, more consumers inclined to Rajo (39.43%) and Tami was chosen just by 7.04%. In terms of readability, the situation is exactly the same, as Rajo was marked by 33.09%, while Tami just by 5.63%. The results of the packaging attractiveness are similar to the clarity.

In general, the respondents assessed both packaging and the ease to read, having appealed labels containing information useful to the customer, and last but not least, they appreciated the usage of an attractive blue-white color combination, which is also best suited for milk packaging according to **Clark (2016)** and **Rybanská et al. (2019)**. Moreover, blue is a favourite colour of 57% men and 35% of women, which also plays in favor of these types of packaging **(Ciotti, 2020)**. The majority agreed that "both types of packaging are attractive, even though they present milk differently and each of them addresses a different group of customers". The research conducted by **Horská et al. (2018)** showed that Slovak consumers prefer traditional packages connected with Slovak customs and traditions associated with nature, farming, home production and high quality **(Rybanská, Nagyová and Horská, 2019)** to more modern packages of milk.

The semantic differential was also used to further assessment of the appearance of the packaging, which consisted of a 7-degree scale by which individuals evaluated 14 bipolar pairs of adjectives. The adjectives by which the respondents expressed their attitude were categorized into dimensions: evaluation, strengths and activities. The dimension of evaluation is most important because it reflects the impression of packaging. The second dimension (strengths) represents the energy charge and the last dimension (activity dimension) focuses on dynamics assessing. The picture shows that Rajo was evaluated by respondents as a better one in almost all categories except for the motivation, where Tami won (Figure 3).

The Friedman´s test was used for each packaging to test the statistically proven difference in assessing each category:

H_0: there are no differences in assessing of the selected categories.
H_1: there are differences in assessing of the selected categories.

Rajo: *p*-value = <0.0001
Tami: *p*-value = <0.0001

The level alpha significance (0.05) is greater than the calculated *p*-values in both cases, so we confirm the alternative hypothesis, and the results of Nemenyi's procedure confirmed these differences too, since the variables were categorized to different groups where A was rated as the best (Table 1 and Table 2).

Price

According to **Kurajdová and Táborecká-Petrovičová (2015)** and **Kubicová, Predanocyová and Kádeková (2019)**, there is a relationship between the price factor and consumer behavior applied by Slovak consumers when purchasing milk, so for this reason the perception of the different price combinations of selected products and purchase decisions made by them were examined. If both types of milk were sold for the same price, more respondents (75.35%) tended to purchase Rajo semi-skimmed milk and Tami semi-skimmed milk was chosen by only 24.45%.

Subsequently, 4 situations were discussed (Figure 4). Two of them were real: Rajo semi-skimmed milk – 0.87 € and the pricing strategies are different in effect, Tami semi-skimmed milk – 0.80 €, when the current prices, which were observed on 21th January 2019 at Tesco were used and the discount prices (Rajo semi-skimmed milk – 0.49 € and Tami semi-skimmed milk – 0.55 €), and two simulated situations (Rajo semi-skimmed milk – 0.80 € and Tami semi-skimmed milk – 0.87 €; Rajo semi-skimmed milk – 0.55 € and Tami semi-skimmed milk – 0.49 €) when milk prices were exchanged. Approximately 7.39% of the respondents would buy another more expensive type of milk. Almost 50 respondents would not have bought any of the products during the assessment of current prices, but after a price reduction these numbers fell to one fourth. Quite the opposite situation occurred in the answer “I would buy both products" because when the prices changed to reduced ones, the numbers of respondents increased by almost a half. Looking at the exclusive purchase of the individual brands, Tami's deep drop of 59.42% was seen in the second situation (Rajo milk – 0.80 €; Tami milk – 0.87 €), when more questioned people would choose Rajo brand. A further increase in Rajo to 52.76% of the sample was due to a stock price lower than that of Tami milk. When Rajo was more expensive than Tami (in the last simulated situation), Rajo was also chosen by 14 customers more than Tami. We can assume that some consumers are price-sensitive so even those who have previously chosen Rajo would prefer to buy more affordable milk.

The effectiveness of price levels was tested by McNemar´s test, where the pairs of situations (normal price level with simulated replaced price level) were compared.

H_0: The pricing strategies are identical.
H_1: The pricing strategies are different.

p-value = <0.0001
alpha = 0.01

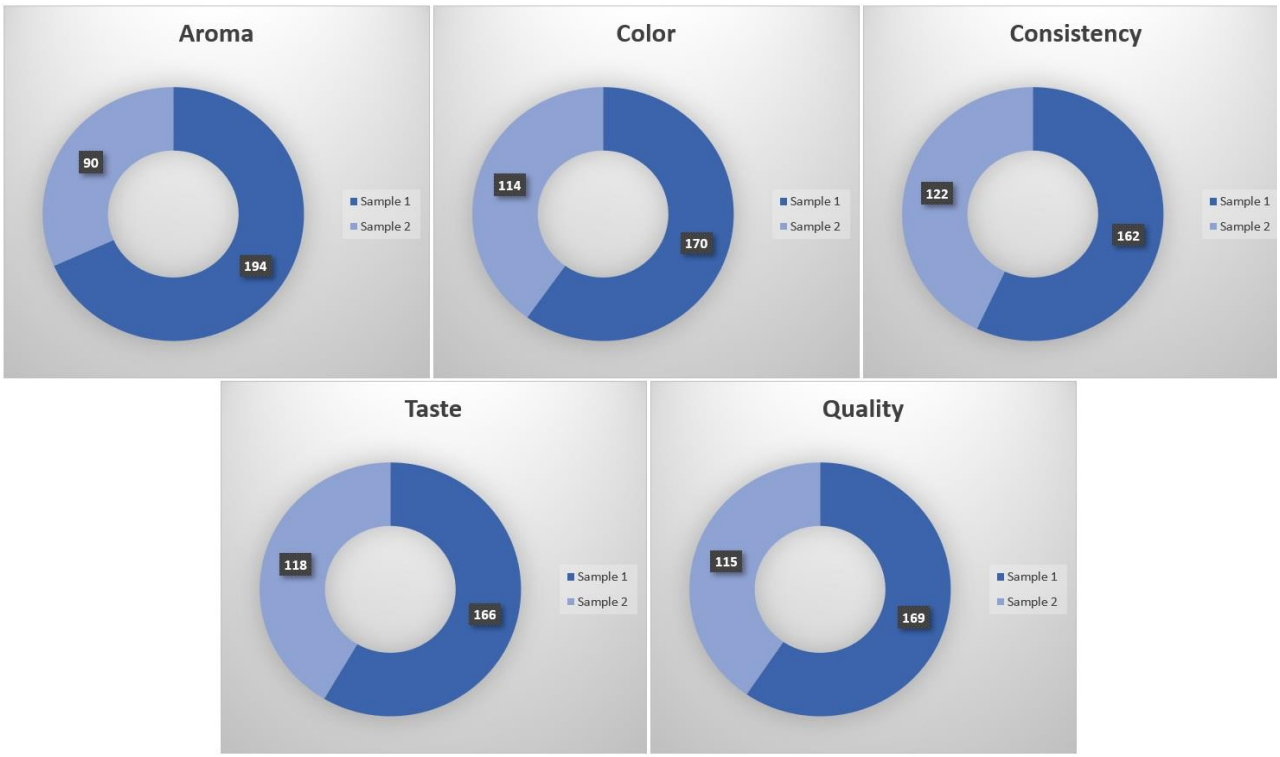


Figure 5 Results of blind testing.

Table 1 Classification of selected adjectives when evaluating the package of Rajo milk.

Rajo	Frequency	Sum of ranks	Mean of ranks	Groups					
good – bad	284	1,588.500	5.593	A					
pleasant – unpleasant	284	1,597.500	5.625	A					
pretty – ugly	284	1,671.000	5.884	A					
appropriate – inappropriate	284	1,800.000	6.338	A	B				
colorful – colorless	284	2,049.500	7.217		B	C			
happy – sad	284	2,105.500	7.414		B	C	D		
significant – insignificant	284	2,269.000	7.989			C	D		
interesting – common	284	2,269.500	7.991			C	D		
unique – regular	284	2,283.000	8.039			C	D		
strong – weak	284	2,297.500	8.090			C	D		
emotional – without emotion	284	2,349.500	8.273			C	D		
motivating – non-motivating	284	2,415.500	8.505				D	E	
active – passive	284	2,416.500	8.509				D	E	
expensive – cheap	284	2,707.500	9.533					E	

Table 2 Classification of selected adjectives when evaluating the package of Tami milk.

Tami	Frequency	Sum of ranks	Mean of ranks	Groups					
pleasant – unpleasant	284	1,807.500	6.364	a					
expensive – cheap	284	1,821.500	6.414	a	b				
good – bad	284	1,869.000	6.581	a	b	c			
appropriate – inappropriate	284	1,882.500	6.629	a	b	c	d		
colorful – colorless	284	1,885.500	6.639	a	b	c	d		
pretty – ugly	284	2,146.000	7.556		b	c	d	e	
significant – insignificant	284	2,179.500	7.674			c	d	e	f
happy – sad	284	2,210.000	7.782				d	e	f
unique – regular	284	2,262.000	7.965					e	f
motivating – non-motivating	284	2,264.500	7.974					e	f
interesting – common	284	2,292.500	8.072					e	f
strong – weak	284	2,300.000	8.099					e	f
active – passive	284	2,394.500	8.431					e	f
emotional – without emotion	284	2,505.000	8.820						f

Table 3 Nutrition facts of chosen milks per 100 mL.

Nutrition facts per 100 ml			
Rajo semi-skimmed milk		**Tami semi-skimmed milk**	
Energy	200 kJ/48 kcal	Energy	194 kJ/46 kcal
Fat	1.5 g	Fat	1.5 g
of which Saturates	0.9 g	of which Saturates	0.9 g
Carbohydrates	4.9 g	Carbohydrates	4.9 g
of which Sugars	4.9 g	of which Sugars	4.7 g
Protein	3.4 g	Protein	3.2 g
Salt	0.15 g	Salt	0.2 g
Calcium	125 mg	-	

The results of both tests showed that with 99% probability the pricing strategies have statistically proven the different efficiencies (*p*-value is less than 0,0001), so we accepte the alternative hypothesis that there is the difference in efficiency of pricing strategies. In the first pair of situations, the Rajo brand is preferred and in the second pair the respondents inclined to purchasing a cheaper type of milk.

More than three quarters of the research sample (78.17%) is convinced that the price level at which selected products are sold in stores is adequate to their quality. According to the remaining 62 respondents, the price does not reflect the quality of neither examined product. **Andocsová (2019)** explains this difference in perception of prices as a result of the economic activity of respondents.

The respondents who marked the price as inadequate in the previous question were asked for an acceptable price level. 12.90% of respondents indicated the possibility of over 80 cents, paradoxically, as Rajo milk is sold for 0.87 € and Tami for 0.80 €, so these 8 respondents are most likely to be poorly informed about the current prices at which the selected products are realized on the market. The corresponding price of 71 to 80 cents sees 2.47%, from 61 to 70 cents 7.42% and 26.86% indicated the possibility of 51 to 60 cents. According to the majority of 36.04%, the common price should be the stock price, and 22.26% are in favor of not paying more than 40 cents for these products.

Blind testing

The authors **Kurajdová, Táborecká-Petrovičová and Nedelová (2019)**, **Krivošíková et al. (2019)** and **Kubicová, Predanocyová and Kádeková (2019)** emphasize that consumers living in Slovakia derive the quality of milk based on the real experience with its freshness and sensory perceptions. For this reason a blind testing was also used. It involved all 284 respondents who received 2 samples of room temperature milk in the same translucent plastic cups labeled 1 (Rajo semi-skimmed milk) and 2 (Tami semi-skimmed milk). It is important to highlight that the respondents did not know which number contained which brand during the testing. This information was provided after the testing was finished.

From the perspective of the conscious perception of the individual sensory attributes (Figure 5), which are the most important for consumers **(Krivošíková, Géci and Nagyová, 2019)**, up to 68% of the respondents preferred Rajo milk based on aroma. 60% of them selected Rajo milk semi-skimmed according to colour too, and it was also chosen by the majority because of its consistency (57%). Following this question, the respondents were asked to taste the submitted samples. Similarly, to the results of the previous questions, Rajo (58%) was repeatedly considered as tastier and higher quality product. An interesting finding was that most of the respondents, regardless whether they liked Rajo more or not, could clearly identify this brand of milk. After a personal interview, we found out that according to them it has a specific taste and smell. An unusual finding that although Tami is a big competitor of Rajo, it lags in the monitored milk properties, as the respondents chose the sample number 1 in all categories.

As Rajo semi-skimmed milk won the blind testing in all categories, we wondered whether there was a difference in nutrition facts per 100 mL of Rajo semi-skimmed milk and Tami semi-skimmed milk (which were also compared in the blind test). Table 3 shows that these two brands of milk are almost the same, nevertheless, Rajo is preferred.

CONCLUSION

The results of the questionnaire survey, the conducted blind testing and microbiological testing showed the following: the majority of respondents liked both logos (Rajo 86.97 % and Tami 80.64 %) and they also thought that they are easy to remember. Packagings were evaluated as clear, readable and attractive, but some respondents would make minor changes. When both types of milk are sold at full price, the respondents prefer Rajo semi-skimmed milk but when it comes to price reductions, they tend to be price-sensitive and purchase milk whichever is available for a lower price **(Merlo, 2015)**. The respondents preferred Rajo semi-skimmed milk in all categories and they identified it as the one with higher quality even though based on microbiological testing there was no difference between the examined samples. All of our assumptions were also confirmed by the statistical methods.

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Contact address:

*Ing. Alexandra Krivošíková, Slovak University of Agriculture in Nitra, Faculty of Economics and Management, Department of Marketing and Trade, Trieda Andreja Hlinku 609/2, 949 76, Nitra, Slovakia, Tel.: +42137 641 4835,

E-mail: xandocsovaa@uniag.sk

ORCID: https://orcid.org/0000-0003-3771-6312

prof. Ing. Ľudmila Nagyová, PhD., Slovak University of Agriculture in Nitra, Faculty of Economics and Management, Department of Marketing and Trade, Trieda

Andreja Hlinku 609/2, 949 76, Nitra, Slovakia, Tel.: +421 37 641 4102,
E-mail: ludmila.nagyova@uniag.sk
ORCID: https://orcid.org/0000-0002-5220-2857
Ing. Andrej Géci, Slovak University of Agriculture, Faculty of Economics and Management, Department of Marketing and Trade, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, Tel.: +42137641 4835,
E-mail: geci.andrej@gmail.com
ORCID: https://orcid.org/0000-0001-7684-0418

Corresponding author: *