

# CONSUMER BEHAVIOUR ON SLOVAK YOGHURT AND FERMENTED MILK PRODUCTS MARKET

Ingrida Košičiarová<sup>1</sup>, Ľudmila Nagyová<sup>1</sup>, Mária Holienčinová<sup>1</sup>

<sup>1</sup>Department of Marketing and Trade, Faculty of Economics and Management, Slovak university of agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic

## Abstract

KOŠIČIAROVÁ INGRIDA, NAGYOVÁ ĽUDMILA, HOLIENČINOVÁ MÁRIA. 2017. Consumer Behaviour on Slovak Yoghurt and Fermented Milk Products Market. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 65(6): 1967–1978.

Milk and dairy products present an important source of essential nutrients which should be a part of human beings nutrition. While the recommended consumption of milk and dairy products is set at the level of 220 kg/person/year, the current studies show that Slovaks consume only 160 kg/person/year. One of the possibilities how to reverse this negative trend is to raise the Slovak consumers awareness of the positive impacts of yoghurts and fermented milk products on their health, as well as to make from them a so-called trendy food. The aim of the presented paper was to determine the consumer behaviour in the purchase of yoghurts and fermented milk products produced in Slovak Republic. As the research methods were used the methods of survey and structured questionnaire consisting of 16 closed and 1 opened question (total number of respondents was 1,131 randomly selected respondents from all regions of the Slovak Republic). For a deeper analysis of the obtained results, there were set out six assumptions and ten hypotheses, which were tested with the use of Pearson's chi-square test, Fisher's exact test, Cramer's contingency coefficient and Phi coefficient. The results of the presented paper show, that despite the fact that almost 77 % of respondents said that they prefer in their purchase yoghurts and fermented milk products produced in the Slovak Republic, only 26.4 % of respondents said that they prefer the local producers of these products; exactly 44 % of respondents said that they always look for the information about the content of fat in the yoghurt they buy; more than 33 % said that they buy yoghurts and fermented milk products marked with the Quality Label "Značka kvality SK"; more than 62 % of respondents said that they purchase yoghurts and fermented milk products produced by ecological farming exclusively and rather and exactly 60.1 % of respondents said they prefer the plastic packages of yoghurts and fermented milk products. Up to the question aimed at determining which flavour consumers actually miss on the market, we have to conclude that these flavours are mostly kiwi, muesli with cranberries, chocolate with mint, coconut and banana.

Keywords: yoghurt, fermented milk products, Slovak consumers, consumer behaviour

## INTRODUCTION

Milk presents an important part of human being's nutrition, with which he gets into the contact exactly at his birth and uses it in different forms across his life. Milk and dairy products are an important source of essential nutrients, including several deficient, especially, in baby food, such as Vitamin D, calcium, and magnesium (Nicklas, 2009). The consumption of milk and dairy products is associated with a reduced risk of mortality, independent of the main causes such as age, poor nutrition, poor health, education

and socio-economic status (Bongard, 2012). They can be unquestionably considered as products that maintain the good health, as the prevention of certain diseases, as well as the support for their treatment (Habánová, 2010) – the beliefs about the health benefits of fermented milk products can be traced back to the early 1900s (Onge, 2000), when e.g. Metchnikoff (1908) wrote that milks fermented by lactic bacteria prevented intestinal putrefaction and helped in the maintenance of the forces of the body, or when Hepner tested the effects of

yoghurt supplementation on plasma cholesterol concentrations in human beings (1979). Because of the fact that the milk delivered to the dairies is processed into a number of fresh products and manufactured products, which are recorded in terms of weight, it is difficult to compare the various products (for example, fresh milk and milk powder). Despite this fact, it can be concluded that in the EU in the year 2015 have been processed exactly 151.1 million tonnes of the milk which have been utilised as follows – 36% as cheese, 30% as butter, 13% as fat, 11% as drinking milk, 4% as acidified milk, 3% as powder products and 3% as other products (eurostat, 2017).

Cultured dairy products also known as fermented milk products create an important group of dairy products, which have an irreplaceable role in human nutrition – contribute to the nutrition of children, youth, people of working age and elderly people (Kubicová, 2011). They are the common name of products such as yoghurt, ymer, kefir, cultured buttermilk, filmjöl (Scandinavian sour milk), cultured fat and koumiss (a product based on mares' milk) (dairyprocessinghandbook.com, 2017).

The two most common fermented milk forms available in the Eastern Europe which contain probiotics are yoghurt and kefir. While yoghurt is produced when milk (usually cow milk) is fermented with *Lactobacillus bulgaricus* and *Streptococcus thermophilus* under defined conditions of time and temperature, kefir is fermented milk with a characteristic fizzy, acidic flavour, which originated in the Caucasus and accounted for 70% of the total amount of fermented milk consumed in the countries of the former Soviet Union (Komai, 1992). Their history can be dated back to ancient times and it is said that the first yoghurts were originally prepared from sheep and buffalo milk and partly from goat and cow once. It was used in the human nutrition for direct consumption and

later it was fortified by other ingredients such as vegetables, fruits and spices, and used for cooking and baking (Šulcerová, 2007). The first yoghurt was for the first time industrially prepared in the year 1922 by Danone company and the development of its production can be dated after the World War II (Snášelová, 1999).

Yogurt has long been recognised as a product with many desirable effects for consumers, and it is also important that most consumers consider it to be 'healthy' (Lourens-Hattingh, 2001). In recent years, there has been a significant increase in the popularity of yogurt (Hamann, 1983), what is driven by three major food trends – the health, convenience respectively snacking and protein (foodstuffs.co.za, 2015). This is also confirmed by a survey commissioned by DSM in 2015, which has found out that yoghurt is viewed by the majority of consumers as a snack "to bridge the gap" between meals and that while 57% of French respondents has declared that they consume yoghurts once a day, only 6.5% of Chinese respondents do so (machineryworld.com, 2015).

While in Slovak Republic the consumption of all dairy products after conversion into milk is only 163 kg per person per year, in developed countries the consumption is about 300 kg. While only in the "western" Europe, but also in the east, it is consumed for about three times more milk fermented beverages and a minimum of twice more cheese as in Slovak Republic. For these reasons, we must therefore be increasingly interested in the composition of milk and milk products and for their social and health benefits (mlieko.sk, 2017). This is why the presented paper deals with the issue of yoghurts and fermented milk products produced in the Slovak Republic, their consumption, factors leading to their purchase, perception of their quality, preference of local producers, preference of higher quality products, as well as the preference

#### I: Characteristics of respondents

Category of respondents	Number	Age structure of respondents	Number
Male Female	487 644	15–20 years	109
		21–30 years	197
		31–40 years	543
		41–50 years	150
		Over 51 years	132
Economic activity of respondents	Number	Educational structure of respondents	Number
Employed	734	Primary education	23
Unemployed	58	Secondary education without A level	191
Student	199	Secondary education	532
Other (retired / on maternity leave)	140	Higher education	385
Region	Number		
Banská Bystrica	134	Prešov	75
Bratislava	217	Trenčín	110
Košice	106	Trnava	99
Nitra	246	Žilina	144

Source: Results of the research

of type of packaging, what can serve as a helping point not just of marketers, but also of producers, to know, how the Slovak consumers behave and decide on the yoghurt and fermented milk products market – what influences them in their purchase, which information they take into the account in their purchase, what type of packaging they prefer, what do they think about the available flavour of yoghurts and fermented milk products etc. – and by that to benefit from these in their marketing decision making (Kretter, 2010)

## MATERIALS AND METHODS

The aim of the presented paper was to determine the consumer behaviour in the purchase of yoghurts and fermented milk products produced in Slovak Republic. In order to achieve the formulated aim, as research methods, there were used the methods of survey and structured questionnaire consisting of 16 questions formulated as closed, so that respondents (total number of respondents was 1,131 randomly selected respondents from all regions of the Slovak Republic, Tab.I) had the possibility to choose one, or more options and 1 question formulated as open, so that respondents could explain their own opinion.

The questionnaire was evaluated with the use of contingency tables, which were prepared by Excel, under which they were subsequently developed graphic representations. For a deeper analysis of the obtained results, there have been set out the following assumptions:

- assumption no.1 – Slovak respondents prefer rather Slovak producers of yoghurts and fermented milk products;
  - assumption no. 2 – Slovak respondents prefer rather the local producers of yoghurts and fermented milk products;
  - assumption no.3 – Slovak respondents are rather conservative in their choice of yoghurts and fermented milk products;
  - assumption no.4 – the perception of quality of yoghurts and fermented milk products produced by Slovak producers is from the Slovak consumers' side at a good level;
  - assumption no. 5 – one of the most important factors leading to the purchase of yoghurts and fermented milk products produced by Slovak producers is their price;
  - assumption no. 6 – Slovak respondents prefer rather the one piece packaging of yoghurts and fermented milk products.
- and the following hypotheses:
- H1: there is a relationship between the frequency of purchase and the respondents' gender.
  - H2: there is a relationship between reading the information about the percentage of fat in the bought yoghurt and the respondents' gender.
  - H3: there is a relationship between reading the information about the percentage of fat in the bought yoghurt and the respondents' age.

- H4: there is a relationship between the purchase of yoghurts and fermented milk products labelled with the Quality Label “Značka kvality SK” and the respondents' gender.
- H5: there is a relationship between the purchase of yoghurts and fermented milk products labelled with the Quality Label “Značka kvality SK” and the respondents' education.
- H6: there is a relationship between the preference of yoghurts' and fermented milk products' flavour and the respondents' gender.
- H7: there is a relationship between the preference of same sorts of yoghurts and fermented milk products and the respondents' age.
- H8: there is a relationship between the preference of traditional kinds of yoghurts before the functional once and the respondents' gender.
- H9: there is a relationship between the preference of traditional kinds of yoghurts before the functional once and the respondents' age.
- H10: there is a relationship between the preference of packaging size and the respondents' gender.

To test the formulated dependencies, there were used the methods of:

**Pearson's chi-square test**, also known as “goodness of fit” statistic, is one of the first inductive statistical methods, which is based on the frequency table and compares the frequency distribution in the individual categories with the expected magnitudes (it tests the zero hypothesis, which asserts that the abilities in each category are equal to the expected theoretical frequencies), with the only prerequisite for its use – the rule that the expected frequencies may not be very small, less than 5. The mentioned test comes from the relationship:

$$\chi^2 = \sum_{i=1}^k \frac{(n_i - E_i)^2}{E_i}$$

Where:

$n_i$ .....The abundance in the i-th category in the sample,

$E_i$ .....The expected number of the category,

$k$ .....Number of categories.

If the P-value is lower than the chosen significance level (typically 5%, i.e. 0.05), the zero hypothesis is rejected – the difference between the abnormalities found in the sample and the expected abundances is too large to be the result of random selection, i.e. it is statistically significant.

**Fisher's exact test** is based on a 2x2 contingency table (the number in the cross-table cell represents the number of statistical units, one of which gets a value in the header of that line, and the other variable gets the value in the header of the column) and on the testing of the Zero hypothesis. The basic criterion for deciding whether to accept or not to accept a hypothesis is also the so-called P-value, which expresses the likelihood that, assuming equivalence of the proportions of the basic sets, we will select random samples whose absolute value

of the difference in shares is equal to, or greater than we have found. The mentioned test is based on the assumption that all marginal abundances (row/column totals) in the contingency table are fixed and thus the frequency distribution in the table is hypergeometric. In this case, it is possible to test only the relative abundance in the upper left field corresponding to the first row and the first column, because the totals of all other fields are uniquely determined by the marginal frequencies.

**Cramer's contingency coefficient** is considered to be the most appropriate rate of association between the two nominal variables. It takes the values from 0 (interpreted as no relationship) to 1 (interpreted as a perfect relationship). In interpreting the contingency coefficient in psychological research, is used the Cohen scale for the correlation coefficient, which can be interpreted as follows:

- the correlation to 0.1 is considered to be trivial,
- the correlation from 0.1 to 0.3 is considered to be small,
- the correlation from 0.3 to 0.5 is considered to be moderate,
- and the correlation above 0.5 is considered to be large.

As the advantage of the mentioned test can be considered its consistency with the correlation coefficients.

**Phi coefficient** expresses the correlation between the two categorical variables for 2x2 tables. The value of the Phi coefficient may range from -1 to 1, where 0 denotes that the variables do not correlate, and -1 or 1 are completely dependent.

All of the above mentioned tests have been counted in the statistical program IBM SPSS Statistics.

## RESULTS

Milk presents a perfect and at same times the most natural beverage with which the human beings meet immediately after their birth. They consume it in various forms throughout their life and

gradually it becomes an indispensable part of their nutrition – it cannot be avoided, even at an advanced age, in which the milk works like a prevention of osteoporosis (bieleplus.sk, 2017). By other word, the daily consumption of milk and dairy products is important in a healthy balanced diet, during all stages of life. This is why it is recommended to consume daily 2–3 serving of dairy products for adults and 3–4 servings for children (e.g. one serving is represented by 200 ml of milk or 125 g of yoghurts or 20–30 g of cheese) (EDA, 2017).

Human beings eat sour, better said fermented milk, for centuries, whether the precise details about their origin and formation varies (Šulcerová, 2007). Fermented dairy products represent the oldest dairy products, which composition and performance varies up to the geography and region (Simeonovová, 2003). Yoghurts are globally the most widespread and most popular fermented milk products originating in Turkey (Lengyelová, 2010). They contain a number of biologically active components and substances that positively affects the human organism. These are mainly lactic acid bacteria used in their manufacture and products of their metabolism and of substances derived from milk (Kalhotka, 2009). Fermented milk products, including yoghurts, are the products produced from pasteurized cow, sheep or goat milk in fermentation process with suitable, harmless, taxonomically designated microorganisms (Drbohlav, 2000). Despite the fact that yoghurts contain health-promoting lactic acid bacteria, they contain also a quantity of vitamins and minerals, which makes them particularly important part of the children's and elderly's nutrition (Zahoor, 2003).

In Slovak households, yoghurts belong among the most common and most popular fermented milk products. The expansion of yogurts' production has brought a number of different manufacturing technologies and the diversity of the characteristics of the finished product. Depending on the nature of production and the required organoleptic properties, is driven the choice of suitable pure dairy cultures for the provision of biochemical processes

II: 11 Countries That Consume the Most Milk

No.	Country	Milk consumption per person per year
11.	Luxemburg	586 lb–265.9 kg
10.	Romania	586.85 lb–266.19 kg
9.	Albania	619.87 lb–281.17 kg
8.	Denmark	651.73 lb–295.62 kg
7.	Lithuania	668 lb–303.0 kg
6.	Montenegro	674.33 lb–305.87 kg
5.	Greece	693.77 lb–314.69 kg
4.	Switzerland	696.18 lb–315.78 kg
3.	Netherlands	705.81 lb–320.15 kg
2.	Sweden	784.54 lb–355.86 kg
1.	Finland	796.29 lb–361.19 kg

Source: JEV TIC, 2015.



(Hylmar, 1986). According to the technological process of production, yoghurt has a characteristic texture and rheological consistency – white yoghurt is made only from milk ingredients and without added starch, gelatin or other stabilizers. Yoghurts are often flavoured with fruit, chocolate and cereals. Fermented dairy products such as buttermilk and yoghurt are well tolerated even by those people, who are sensitive on the lactose (Kubicová, 2013).

When it comes to understanding the yoghurt market, one thing is very clear – it is the food's amazing many-sidedness that is allowing it to deliver great results centuries after it was first eaten. From a drink to a snack to a meal replacement, from a locally-produced all-natural product to a protein-rich sport drink, from a fat-free dessert to a lactose-free addition to a lunchbox, yoghurt can be whatever the consumer wants it to be and it is just this flexibility that is enabling it to deliver great results around the world, meeting the local preferences and diversity demands (machineryworld.com, 2015).

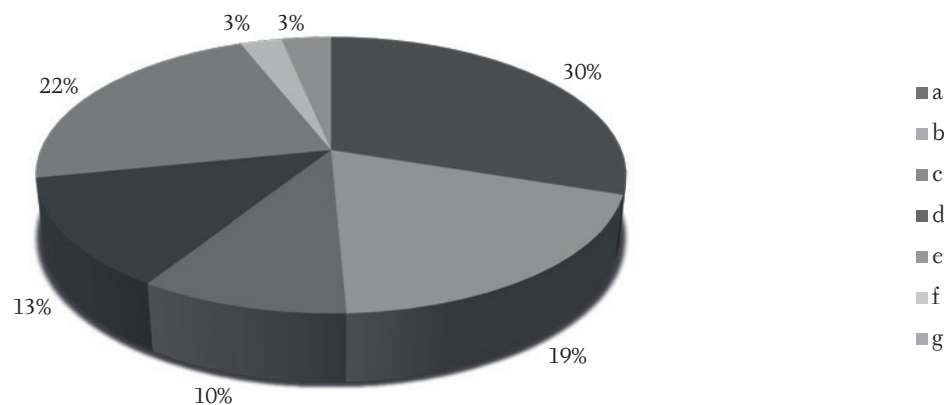
While the consumption of milk and dairy products has a long tradition in Slovak Republic, the nowadays trend shows, that there is a permanent decline in it – the history of manufacturing of dairy products is in Slovak Republic more than 100 years old. In 1989, Czechoslovakia consumed 260kg of milk per person and had 166 dairies which were centrally managed. After Slovak Republic joined the EU, milk quota was allocated for milk production, which was set at the level of 1,061.6 mil.kg in 2009/2010 (Kubicová, 2012) and further increased to the level of 1,115.6 mil.kg in 2014/2015 (Kubicová, 2014). After five years of a preparatory increase in their level, milk quotas disappeared on 1 April 2015 (eurostat, 2015). Despite different advertisement about the importance of milk and dairy products, in the Slovak Republic, there is still a big deficit and we have to learn how to use it better and to consume it and dairy products more often. One of the possible reasons of the declining consumption of milk and dairy products is the more

difficult digestion of lactose. The ways how to consume the milk, which can be less harmful, and can have undoubtedly positive significance for the human beings are the various kinds of noble fermented milks with suitable microorganisms (Kroová, 1992).

To achieve the aim formulated in the section Material and Methodology, the questionnaire survey was realized in the time period of month October 2016 to February 2017. As it can be seen from the Tab. I, the main groups of respondents were represented by women (56.9% of respondents), people with the age between 31 and 40 years (48% of respondents), employed (64.9% of respondents), people with secondary education (47% of respondents) and people from Bratislava and Nitra region (19.2% and 21.7% of respondents).

Because of the need to determine the situation on the Slovak yoghurt and fermented milk products market (frequency of their purchase, factors leading to their purchase, importance of information printed on their packaging etc.), in the questionnaire, there were formulated not just the questions aimed at the place and frequency of yoghurt's and fermented milk products' purchase, but also the questions about the preference of yoghurts and fermented milk products produced by Slovak producers, respectively by local producers, preference of yoghurts and fermented milk products labelled with the Quality Label "Značka kvality Sk", as well as about the respondents perception of the quality of the yoghurts and fermented milk products produced by Slovak producers.

From the evaluation of questions formulated in the questionnaire it is clear, that most of our respondents prefer as the place of yoghurts' and fermented milk products' purchase the hypermarket or supermarket (44.8% of respondents) respectively the shop in their vicinity (43.1% of respondents) where they do their everyday shopping and most of our respondents purchase the yoghurts and fermented milk products once in a month (33.6% of



1: Factors leading to the purchase of yoghurts and fermented milk products

Explanatory notes: a – price; b – quality; c – packaging; d – advertisement; e – previous experience; f – recommendations from the family and friends; g – other forms of promotion, e.g. tasting

respondents) respectively a few times in a week (32.5% of respondents). Regarding the factors leading to purchases, it can be stated, that most of our respondents think that the most important factors leading them to the purchase of yoghurts and fermented milk products are the price (assumption no.5 was confirmed), quality, interesting packaging, previous experience and recommendations from the family and friends (Fig. 1).

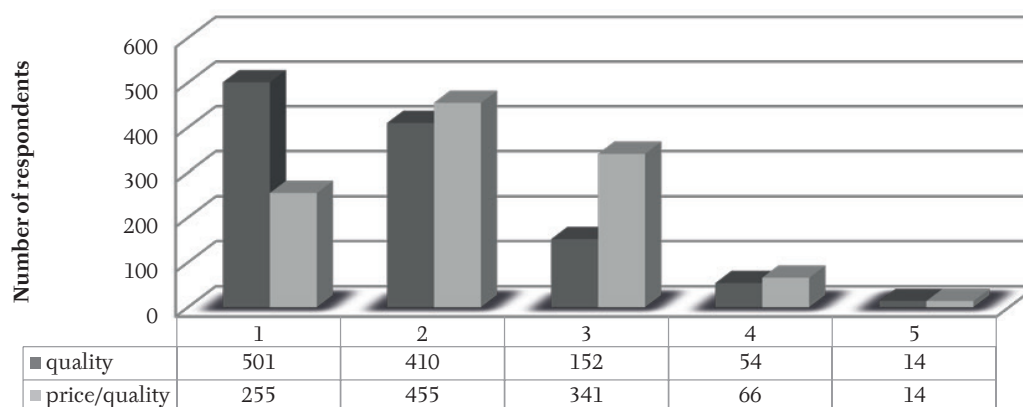
Connected to the question about the frequency of purchase, as well as the question of factors leading to the purchase of yoghurts and fermented milk products, there has appeared not just the question about that, whether women purchase the yoghurts and fermented milk products more frequently than men (the first hypothesis formulated in the part Material and Methodology), but also the question, whether consumers are in their purchase also affected by the communication at the place of purchase, e.g. by the testing. While according the evaluation of the formulated hypothesis we must conclude that there does not exist any dependence between the tested variables, in the case of the impact of communication at the place of purchase we must conclude that it is effective because exactly 42.7% of respondents said that they are affected by it always.

Regarding question of respondents opinion about the quality of yoghurts and fermented milk products produced by Slovak and local producers, as well as their preference, respectively the preference of yoghurts and fermented milk products labelled with the Quality Label "Značka kvality Sk", it can be stated, that the situation is pretty good – most of our respondents stated that they prefer yoghurts and fermented milk products produced by Slovak producers (39.5% of respondents prefer them exactly and 37.1% of respondents rather prefer them; assumption no.1 was confirmed), only 18.2% and 8.2% of respondents prefer the local producers exactly and rather (assumption no.2 was false), only 1.2% and 4.8% of respondents think that the quality of yoghurts and fermented milk products produced by Slovak producers is very poor, respectively poor

(assumption no.4 was confirmed), exactly 40.2% and 22.5% of respondents think that the ratio between the price and quality is preferred and advantageous (Fig. 2), most of our respondents prefer in their purchase the yoghurts and fermented milk products labelled with the Quality Label "Značka kvality Sk" (40.6% of respondents prefer them rather and 33.6% of respondents strongly prefer them) and most of our respondents prefer in their purchase the yoghurts and fermented milk products produced by ecological farming (37.8% of respondents prefer them rather and 24.8% of respondents strongly prefer them).

Because of the need to determine, whether there exist a dependence between the purchase of yoghurts and fermented milk products labelled with the Quality Label "Značka kvality Sk" and the respondents' gender (the forth hypothesis formulated in the part Material and Methodology), respectively between the purchase of yoghurts labelled by the Quality Label "Značka kvality Sk" and the respondents' education (the fifth hypothesis formulated in the part Material and Methodology), we formulated the two zero hypotheses connected to the mentioned issues and tested them with the use of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient. From their evaluation it is clear that there does not exist dependence between the tested variables, which means that there are no differences between that whether women or more educated people buy rather the yoghurts and fermented milk products labelled with the Quality Label "Značka kvality Sk".

As it is also clear from the results of our own research, one of the most important factors leading to the purchase of one, or another product is its flavour and packaging. This is why our research dealt also with the mentioned issues. From their evaluation it is clear that our respondents look for the information printed on the yoghurts' package – 44% of respondents look for the information about the percentage of the fat in the yoghurt, which they want to buy always and



2: Respondents' perception of the quality and ratio between the price and quality of the yoghurts and fermented milk products produced by Slovak producers

43.4% of respondents look for this information sometimes.

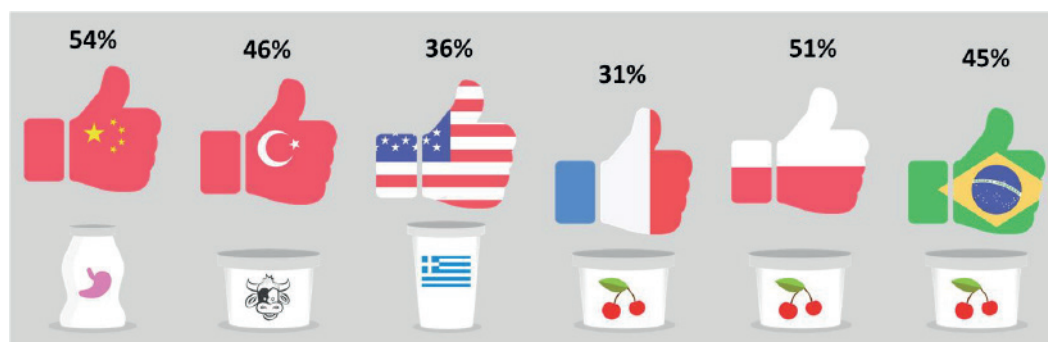
The nowadays trends shows that consumers buy products not only for their core function, but also for the other, added, functions, as well as for that what the products mean to them (Turčínková, 2009). They start to think more also about their health (Turčínková, 2006; Nagyová, 2009) and about the positive impacts of food on them and up to that they start to eat more so called functional foods. This kind of food is said to have a potentially positive effect on the health and its proponents say that it promotes the optimal health and helps to reduce the risk of disease (Zeratsky, 2015). Generally, the functional food is defined as any food which, apart from its nutritional value, has a positive impact on health, physical performance and mental state of the consumer. It is therefore a food which has (compared to "normal" foodstuffs) increased physiological effect (Burdychová, 2007). One of the mostly known and between consumers more and more preferred sort of functional food is the yoghurt or better said are the dairy products with probiotic culture. This is, why the research was also focusing on the Slovak consumers' preference of functional kinds of yoghurts and fermented milks products before the "traditional" ones.

Results of a survey done in 2015 on the sample of 6000 women and men from China, Turkey, USA, France, Poland and Brazil have shown that there are big differences in the preference yoghurts' flavours – while Chinese respondents prefer mostly the probiotic (so called functional) kinds of yoghurts, the Polish respondents prefer rather the flavoured yoghurts (Fig. 3) (machineryworld.com, 2015).

In the case of Slovak respondents preferences we can conclude that they are rather conservative in their choice of yoghurts and fermented milk products, because when they are used to one sort of them, they prefer to buy it regularly (44.5% of respondents buy strictly the same kinds of yoghurts and fermented milk products), they prefer the traditional kinds of yoghurts before the functional once (38.7% of respondents), they prefer the chocolate flavours (39.2% of respondents), white yoghurts (25.1% of respondents) and yoghurts with fruity flavour (18.7%

of respondents) (assumption no.3 was confirmed). Because of the need to determine, which flavour of yoghurts and fermented milk products is now missing from the market, respectively which flavour of yoghurts and fermented milk products could be produced by Slovak producers who want to bring something new, what the Slovak consumers want, in the questionnaire was also formulated an open question, where the respondents could explain their own opinion, which flavour they actually miss. From the evaluation of the mentioned open question it is clear, that most of our respondents are satisfied with the actual assortment of yoghurts and fermented milk products produced by Slovak producers, but some of them miss the flavours of coconut, banana, muesli with cranberries, chocolate with mint, kiwi, nutella, banana, respectively the coffee flavours and the flavour of rosehip jam.

Up to the evaluation of the mentioned block of questions, there have appeared also the questions of dependence respectively independence between reading the information about the percentage of fat in the bought yoghurt and the respondents' gender (the second hypothesis formulated in the part Material and Methodology), as well as their age (the third hypothesis formulated in the part Material and Methodology); between the preference of yoghurts' and fermented milk products' flavour and the respondents' gender (the sixth hypothesis formulated in the part Material and Methodology); between the preference of same sorts of yoghurts and fermented milk products and the age of respondents (the seventh hypothesis formulated in the part Material and Methodology); between the preference of traditional kinds of yoghurts before the functional once and the respondents' gender (the eight hypothesis formulated in the part Material and Methodology) and between the preference of traditional kinds of yoghurts before the functional once and the respondents' age (the ninth hypothesis formulated in the part Material and Methodology). All of the mentioned hypotheses were tested (significance level of  $\alpha = 0.05$ ) with the use of methods of Pearson's chi-square test, Cramer's contingency coefficient and Phi coefficient. According to the results it can be stated that while in the case of the dependence between



3: Preference of yoghurts' flavour (machineryworld.com, 2015)

reading the information about the percentage of fat in the bought yoghurt and the respondents' gender, respectively the respondents' age, as well as in the case of dependence between the preference of same sorts of yoghurts and fermented milk products and the respondents' age and between the preference of traditional kinds of yoghurts before the functional once and the respondents' age there exist a weak, but statistically still significant dependence (the result of Cramer's contingency coefficient was equal to 0.080, 0.282, 0.221, respectively 0.200 and the result of Phi coefficient was equal 0.080, 0.199, 0.128, respectively 0.115), in the case of other tested variables there does not exist any dependence.

The last block of questions formulated in our questionnaire was aimed at the determination of

the preferred type as well as size of packaging of bought yoghurts and fermented milk products. From their evaluation it is clear that Slovak respondents are rather frugal types of people because they prefer to purchase rather the plastic packaging of yoghurts and fermented milk products (60.7% of respondents) and family packs of yoghurts (51.5% of respondents; assumption no.6 was wrong), which could be perceived as economic packaging of yoghurts. Regarding question of dependence between the preferred size of yoghurts' packaging and the respondents' gender it is clear that there exists a weak but statistically still significant dependence – women buy rather bigger packaging of yoghurts and fermented milk products as men (the result of Cramer's contingency coefficient and the result of Phi coefficient were equal to 0.089).

### III: Relation between reading the information about the percentage of fat in the bought yoghurt and the respondents' gender

Reading the information...	Respondent's gender		Total
	Male	Female	
Yes, always	228	270	498
Yes, sometimes	212	279	491
No, never	47	95	142
<b>Total</b>	<b>487</b>	<b>644</b>	<b>1,131</b>

Source: Results of the research

### IV: Relation between reading the information about the percentage of fat in the bought yoghurt and the respondents' age

Reading the information...	Respondent's age					Total
	15–20 years	21–30 years	31–40 years	41–50 years	Over 51 years	
Yes, always	47	41	272	67	71	498
Yes, sometimes	46	99	228	66	52	491
No, never	16	57	43	17	9	142
<b>Total</b>	<b>109</b>	<b>197</b>	<b>543</b>	<b>150</b>	<b>132</b>	<b>1,131</b>

Source: Results of the research

### V: Relation between the preference of same sorts of yoghurts and fermented milk products and the respondents' age

Preference of same sort of yoghurts...	Respondent's age					Total
	15–20 years	21–30 years	31–40 years	41–50 years	Over 51 years	
Yes	52	54	256	79	62	503
Yes, but sometimes I try also the new sort	53	140	257	68	61	579
No, I always try the new sort	4	3	30	3	9	49
<b>Total</b>	<b>109</b>	<b>197</b>	<b>543</b>	<b>150</b>	<b>132</b>	<b>1,131</b>

Source: Results of the research

### VI: Relation between the preference of traditional kinds of yoghurts before the functional once and the respondents' age

Preference of traditional kinds of yoghurts...	Respondent's age					Total
	15–20 years	21–30 years	31–40 years	41–50 years	Over 51 years	
Yes, always	36	76	210	67	49	438
Up to the price	46	62	201	47	40	396
No, I prefer strictly the functional once	19	15	76	25	30	165
I do not care	8	44	56	11	13	132
<b>Total</b>	<b>109</b>	<b>197</b>	<b>543</b>	<b>150</b>	<b>132</b>	<b>1,131</b>

Source: Results of the research



VII: *Relation between preferred size of yoghurts' packaging and the respondents' gender*

Preferred size of yoghurts' packaging	Respondent's gender		
	Male	Female	Total
Family pack	261	287	548
One piece pack	226	357	583
Total	487	644	1,131

Source: Results of the research

## CONCLUSION

The aim of the presented paper was to determine the consumer behaviour in the purchase of yoghurts and fermented milk products in Slovak Republic. To obtain the formulated aim, the questionnaire survey was realized in the time period of four months. As the results of the survey shows, the situation on the Slovak yoghurt and fermented milk products market is pretty good:

- Almost 45 % of respondents prefer to purchase yoghurts and fermented milk products purchase in hypermarkets or supermarkets respectively shops in their vicinity (43.1 % of respondents), which confirms the result of research done in 2008 which has shown that most of Slovak consumers (72 % of respondents) indicate the hypermarket and supermarket as the main place for their shopping (Nagyová, 2008);
- More than 32 % of our respondents purchase the yoghurt and fermented milk products a few times in a week;
- Almost 77 % of respondents stated that they prefer yoghurts and fermented milk products produced by Slovak producers, which confirms the result of research done by GfK in 2012 which has shown that 4/5 of Slovak consumers want to purchase domestic products (Kollárová, 2012);
- The majority of respondents think that the quality of yoghurts and fermented milk products produced by Slovak producers is very high – 44.3 % of respondents evaluated the quality of yoghurts and fermented milk products produced by Slovak producers with the value 1 and 36.3 % with the value 2;
- The most important factors leading to the purchase of yoghurts and fermented milk products are the price, quality, interesting packaging, previous experience, recommendations from the family and friends and also the communication at the place of purchase, which to some extent confirms also the results of research done in 2008, 2013 and 2013, which has shown that increased price of yoghurts, their consumption has declined (Rovný, 2008; Nagyová, 2013; Kubicová, 2013);
- More than 74 % of respondents prefer the yoghurts and fermented milk products labelled with the Quality Label “Značka kvality SK”; more than 62 % of respondents prefer in their purchase yoghurts and fermented milk products produced by ecological farming, what to some extent confirms also the results of our previous research, which has shown that the Slovak consumers prefer the higher quality products (Košíčiarová, 2016);
- Slovak respondents start to think more about their health and they start to prefer also the functional kinds of yoghurts – 14.6 % of respondents prefer exclusively the functional kinds of yoghurts before the traditional once;
- More than 87 % of respondents look for the information about the fat content in the yoghurt, which they want to buy;
- More than 39 % of respondents prefer the chocolate flavour of yoghurts and fermented milk products and over 25 % of respondents prefer the white yoghurts which to some extent confirms the results of a research done in 2012, which has proved that Slovak consumers prefer the white sorts of yoghurts (plnielanu.sk, 2012).

Because of the need to perform a deeper analysis of the issue, in the part Material and Methodology, six assumptions and ten hypotheses were formulated, which have been tested with the use of the methods of Pearson's chi-square test, Cramer's contingency coefficient, Fisher's exact test and Phi coefficient, which have been counted in the statistical program IBM SPSS Statistics. From their evaluation it is clear, that while only two assumptions were not confirmed, exactly five hypothesis has proved at least weak but statistically still significant dependence between the tested variables – while women and the respondents with the age between 21 and 30 years stage read the information about the fat content in the bought yoghurt only sometimes, men and the respondents with lower or higher age read it always (Tab. III and IV); while respondents with the age between 41 and 50 years and over 51 years prefer strictly the same sorts of yoghurts and fermented milk products, respondents with lower age are also opened to the purchase of new sorts (Tab. V); while respondents with the age between 15 and 20 years prefer the traditional kinds of yoghurts and fermented milk products before the functional once up to their price, respondents with higher age prefer them rather always (Tab. VI);

and while women prefer to buy rather the family packs of yoghurts and fermented milk products, men prefer rather to buy the one piece packaging (Tab. VII).

Despite the really promising results of our research we must conclude, that there are still some reserves and ways how to raise the consumption of dairy products and especially of yoghurts and fermented milk products in the Slovak Republic. We know that there is running the program Biele plus, which is the extension of the previous program Objav mlieko (bieleplus.sk, 2017) and which aims to improve the consumption of milk and dairy products, but we think that there is the need to do more programs like that, to improve the knowledge of Slovak consumers about the good qualities and positive impacts of yoghurts and fermented milk products on human health and to support the domestic and local producers of these products. The current consumer is conscious, and from the structure of the answers can be stated that nowadays consumers much more read information on the package, they are interested in products that are from Slovak producers especially that are labelled with Quality Label "Značka kvality SK", because it represents a guarantee of quality.

The government should create the suitable conditions, so that all Slovak producers could use this label, because gain this label is difficult and especially very expensive. Consumers could easier and immediately distinguish foreign and quality Slovak product and thus support domestic production.

#### Acknowledgements

The presented paper is concerned on the detection of Slovak consumers' behaviour and decision making on the Slovak yoghurts and fermented milk products market, what is the extension of author's previous research, which was presented on the 20<sup>th</sup> International Scientific Conference "Enterprise and Competitive Environment" on March 9.–10. 2017 in Brno, Czech Republic.

#### REFERENCES

- AGRÁRNÍ KOMORA ČR. 2017. *Biele plus*. [Online]. Available at: <http://bieleplus.sk/o-projekte#WIot21h97IU> [Accessed: 26 January 2017].
- AGRÁRNÍ KOMORA ČR. 2017. Mliečne výrobky a ich náhrady alebo mlieko a jeho vplyv na ľudí. *Biele plus*. [Online]. Available at: <http://bieleplus.sk/mliečne-výrobky-ich-náhrady-alebo-mlieko-vplyv-na-luďi#WIn9t1h97IU> [Accessed: 2017, January 26].
- BONGARD, V., RUIDAVETS, J. B., SIMON, CH. et al. 2012. Consumption of milk is associated with a reduced risk of mortality in middle-aged men. *Archives of Cardiovascular Diseases Supplements*, 4(1): 100.
- BURDYCHOVÁ, R. 2007. Identifikace a charakterizace bakterií rodu enterododdu určených pro výrobu funkčních potravin. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 55(2): 9–14.
- DRBOHLAV, J. 2000. Mikroflora s dieteticko ochrannými vlastnostmi v mléčných výrobcích. *Zpravodaj – mlékarské listy*, 2000: 16–18.
- DSM. 2015. *Differences in regional yogurt consumption provide new opportunities for dairy companies to bring more yogurt varieties to a growing global market*. [Online]. Available at: <http://www.machineryworld.com/pdfs/dsm-yogurt-trends-consumption-patterns.pdf> [Accessed: 26 January 2017].
- EUROSTAT. 2015. *Milk and milk products – 30 years of quotas*. [Online]. Available at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Milk\\_and\\_milk\\_products\\_-\\_30\\_years\\_of\\_quotas](http://ec.europa.eu/eurostat/statistics-explained/index.php/Milk_and_milk_products_-_30_years_of_quotas) [Accessed: 25 January 2017].
- EUROSTAT. 2017. *Milk and milk statistics*. [Online]. Available at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Milk\\_and\\_milk\\_product\\_statistics](http://ec.europa.eu/eurostat/statistics-explained/index.php/Milk_and_milk_product_statistics) [Accessed: 28 January 2017].
- FFOD STUFF SOUTH AFRICA. 2015. The consumption and opportunities of yoghurt. *FOODStuff*. [Online]. Available at: <https://www.foodstuffs.co.za/the-consumption-and-opportunities-of-yoghurt/> [Accessed: 2017, January 26].
- HABÁNOVÁ, M., LORKOVÁ, M. and KOPČEKOVÁ, J. 2010. The consumption of acidophilus drinks and yogurts in selected population of pupils in years 2004 and 2008. *Potravinárstvo*, 4(3): 19–23.
- HAMANN, W. T. and MARTH, E. H. 1983. Survival of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* in commercial and experimental yogurts. *Journal of Food protection*, 47(10): 781–786.
- HEPNER, G., FRIED, R., St. JEOR, S., FUSETTI, L. and MORIN, R. 2000. Hypocholesterolemic effect of yogurt and milk. *American Society for Clinical Nutrition*, 32(1): 19–24.
- HYLMAR, B. 1986. *Výroba kysaných mléčných výrobků*. Praha: SNTL.
- JEVTIC, A. 2015. 11 Countries That Consume the Most Milk. *Insider Monkey*. [Online]. Available at: <http://www.insidermonkey.com/blog/11-countries-that-consume-the-most-milk-348978/?singlepage=1> [Accessed: 28 January 2017].
- KALHOTKA, L., ŠUSTOVÁ, K., GÖBEL, T. and KVASNIČKOVÁ, B. 2009. Mikrobiologické a senzorické vlastnosti jogurtů a jejich změny po uplynutí doby minimální trvanlivosti. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 57(5): 167–176.

- KOLLÁROVÁ, Z. 2012. Päť mýtov o slovenských potravinách. SME. [Online]. Available at: <http://www.iness.sk/stranka/7497-Pat-mytov-o-slovenskych-potravinach-SME.html> [Accessed: 28 January 2017].
- KOMAI, M. and NANNO, M. 1992. Intestinal microflora and longevity. In: NAKAZAWA, Y. and HOSONO, A. (Eds.) *Functions of Fermented Milk*. London: Elsevier Applied Science, p. 343.
- KOŠIČIAROVÁ, I., NAGYOVÁ, L., HOLIENČINOVÁ, M. and RYBANSKÁ, J. 2016. Quality label as the guarantee of top quality agricultural and food products produced in Slovak Republic – A case study of Slovak food market. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 64(6): 1937–1950.
- KREITER, A., KÁDEKOVÁ, Z. and SEDLÁKOVÁ, J. 2010. Country of origin of the food and consumer preferences in segment of university students. *Delhi Business Review*, 11(2): 59–63.
- KROOVÁ, H. 1992. *Jogurtový receptár*. Praha: Milcomservis, a. s.
- KUBICOVÁ, L. and HABÁNOVÁ, M. 2012. Development of milk consumption and marketing analysis of its demand. *Potravinárstvo*, 6(4): 66–72.
- KUBICOVÁ, L. and KÁDEKOVÁ, Z. 2011. Marketing strategy of the new product introduction on the market. *Polityki Europejskie, Finanse i Marketing*, 5(54): 78–90.
- KUBICOVÁ, L. and KÁDEKOVÁ, Z. 2013. Impact of consumer prices and cash income on consumption of dairy products. *Acta Oeconomia*, 12(3): 61–71.
- KUBICOVÁ, L., KÁDEKOVÁ, Z. and DOBÁK, D. 2014. Trends in consumption of milk and dairy products in Slovakia after EU accession. *Polityki Europejskie, Finanse i Marketing*, 12(61): 90–97.
- LENGYELOVÁ, L., KOZELOVÁ, D., TRSTENOVIČOVÁ, L. and PINTÉROVÁ, S. 2010. Comparison of occurrence lactic acid bacteria in chosen yogurts. *Potravinárstvo*, 4: 38–43.
- LOURENS-HATTINGH, A. and VILJOEN, B. C. 2001. Yogurt as probiotic carrier food. *International Dairy Journal*, 11: 1–17.
- METCHNIKOFF, E. 1908. *The prolongation of life: Optimistic studies*. New York: GP Putnam's Sons.
- NAGYOVÁ, L., ROVNÝ, P., STÁVKOVÁ, J., ULIČNÁ, M. and MAĎAROVÁ, L. 2009. Consumer perception of bread quality. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 57(3): 115–122.
- NAGYOVÁ, L., STÁVKOVÁ, J. and KÁDEKOVÁ, Z. 2013. Income disparities and their impact on the level and development of food expenditures of households in Slovakia. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 61(7): 2569–2575.
- NAGYOVÁ, L., STÁVKOVÁ, J. and TONKOVIČOVÁ, Z. 2008. Selected characteristics of Slovak consumers purchasing behaviour. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 56(6): 69–76.
- NICKLAS, T. A., O'NEIL, C. E. and FULGONI, V. L. 2009. The role of dairy in meeting the recommendations for shortfall nutrients in the American diet. *The Journal of the American College of Nutrition*, 28(1): 73S–81S.
- PACÁKOVÁ, V. et al. 2003. *Štatistika pre ekonómov*. Bratislava: IURA EDITION.
- PECÁKOVÁ, I. 2011. *Štatistika v terénnych pruzkumech*. Praha: Professional Publishing.
- RIMARČÍK, M. 2007. *Štatistika pre prax*. Bratislava: Štatistika pre prax.
- ROVNÝ, P. and DOBÁK, D. 2008. Purchasing prices development and foreign trade development of milk products in Slovakia. [in Slovak: Vývoj nákupných cien a vývoj zahraničného obchodu s mliekom a mliečnymi výrobkami]. In: *Firma a konkurenčné prostredí 2008: medzinárodná vedecká konferencia*. Brno, March 13.–4. 2008. Brno: Mendel University, pp. 320–325.
- SIMEONOVONÁ, J., INGR, I. and GAJDŮŠEK, S. 2003. *Zpracování a zboží znalství živočišných produktů*. Brno: MZLU.
- SKAR. 2017. *Mlieko*. [Online]. Available at: <http://www.mlieko.sk> [Accessed: 2017, January 27].
- SNÁŠELOVÁ, J. and DOSTÁLOVÁ, L. 1999. Jogurty v našej výžive. *Spoločnosť pro výživu*, 54: 39–40.
- ST. ONGE, M.-P., FARNWORTH, E. R. and JONES, P. J. H. 2000. Consumption of fermented and nonfermented dairy products: effects on cholesterol concentrations and metabolism. *American Society for Clinical Nutrition*, 71(3): 674–681.
- Štatistické metódy. 2017. [Online]. Available at: <http://rimarcik.com/navigátor/metódy.html> [Accessed: 28 August 2017].
- ŠULCEROVÁ, H. and BURDYCHOVÁ, R. 2009. Vliv počtu bakterií mléčného kvašení, probiotických kultur a hodnoty pH v kysaných mléčných výrobcích na jejich senzorické hodnocení. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 57(5): 291–304.
- ŠULCEROVÁ, H. and ŠUSTOVÁ, K. 2007. Sledování změn senzorických vlastností bílých jogurtů po dobu jejich minimální trvanlivosti. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 55(5): 187–196.
- TETRA PAK. 2017. Fermented milk products. Chapter 11. *Dairy Processing Handbook*. [Online]. Available at: <http://www.dairyprocessinghandbook.com/chapter/fermented-milk-products> [Accessed: 25 January 2017].
- TURČÍNKOVÁ, J. and STÁVKOVÁ, J. 2006. Chování spotřebitelů na trhu potravin. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 54(6): 199–208.
- TURČÍNKOVÁ, J., STÁVKOVÁ, J. 2009. Changes in consumer behaviour on the market with food. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 57(3): 173–178.

- ZAHOOR, T., RAHMAN, S. U. and FAROOQ, U. 2003. Viability of *Lactobacillus bulgaricus* as Yoghurt Culture Under Different Preservation Methods. *International Journal of Agriculture and Biolog*, 5(1): 46–48.
- ZOZNAM.SK. 2012. Slováci si jogurty oblúbili: Ktoré kupujeme najčastejšie a prečo? *Zoznam.sk: Plní Elánu.sk* [Online]. Available at: <http://plnielanu.zoznam.sk/c/1274/slovaci-si-jogurty-oblubili-ktore-kupujeme-najcastejsie-a-preco> [Accessed: 2017, January 26].

#### Contact information

Ingrída Košičiarová: [ingrida.kosiciarova@uniag.sk](mailto:ingrida.kosiciarova@uniag.sk)  
Ľudmila Nagyová: [ludmila.nagyova@uniag.sk](mailto:ludmila.nagyova@uniag.sk)  
Mária Holienčinová: [maria.holiencinova@uniag.sk](mailto:maria.holiencinova@uniag.sk)