Potravinarstvo, vol. 8, 2014, no. 1, p. 62-66
doi:10.5219/325
Received: 6 February 2014. Accepted: 8 February 2014.
Available online: 7 May 2014 at www.potravinarstvo.com

ISSN 1337-0960 (online)

ANALYSIS OF CONSUMER BEHAVIOR AT CHOCOLATE PURCHASE

Dagmar Kozelová, Eva Matejková, Martina Fikselová, Judita Dékányová

ABSTRACT

At food purchase consumer is affected by several factors. In this work analysis of consumer behavior at chocolate purchase was performed involving 277 respondents. Statistical testing of results was performed by Chi - Square statistic, correlations have been tested with use of the Cramer's coefficient. It was found, that 86% of respondents consume chocolate. Factors affecting respondents at purchase were recommendations of friends, acquaintances (32%), brand of chocolate (24%), price (16%), personal experience (12%), health restrictions and allergies (11%). Less important factors when choosing chocolates are flavor (4%), nutritional quality (3%), country of origin (2%) and chocolate packaging (1%). In the consumption of chocolate moderate correlation among various categories of economic activity of respondents was confirmed. Chocolate was consumed mainly by respondents whose monthly income ranges from 801 to 1001 €. We found that consumers prefer milk chocolate followed by dark and white at the end. In terms of gender the most commonly was chocolate consumed by women, once to three times a week. The same frequency of chocolate consumption dominates at the categories of students and employee. Expenses frequently spent to buy chocolates were from 1-3 € per week by young people (18-23 years) and middle age generation of people (46-55 years).

Keywords: chocolate; purchase; preferences; consumption; obesity

INTRODUCTION

Chocolate is a very popular food due to its unique organoleptic properties such as sweet taste and pleasant characteristic aroma **(DeBrito et al., 2004)**. Chocolate consumption has a special relationship with stress: when surveyed about eating during stress, less than half admitted to eating more, and yet the vast majority would admit that they usually ate more chocolate when stressed **(Gibson, 2011)**. Individuals who experience guilt chocolate consumption reported more obsessive thoughts. Precisely why this occurred may depend upon the specific target of obsession, whether over personal failures, diet maintenance, a preoccupation with weight or appearance, etc. **(Tuomisto et al., 1997)**.

Protective effect of cocoa flavonoids on the heart and blood vessels is declared for longer time, and is associated with their ability to change the course of many pathological processes at the development of cardiovascular diseases **(Adriefdjohan et al., 2005; Ding et al., 2006)**.

There is strong evidence that high cocoa intake lowers blood pressure, improves vascular endothelial function, and potentially increases insulin sensitivity. With increased calories in chocolate consumption, further careful risk-benefit analysis is needed to assess whether consuming cocoa in the form of energy-dense chocolate products may yield a net benefit on cardiovascular risks **(Bauer et al., 2011)**.

Consumer behavior at food purchase was observed by several authors. **Zentková and Hošková (2009)** state that the expenditure of households' development in the Slovak Republic follows the development of their income and almost all of their incomes are consumed in a given year. Consumer demand is shifting towards higher prices for better food quality.

Expenses on food and soft drinks in the years 2004 till 2011 were analyzed by **Kubicová et al. (2013)**. They found that during the last 5 years expenses in all population groups decreased. The highest expenses on food in 2011 were spent by retirees (26.15%), followed by employees (20.45%) and the lowest proportion was recorded in the category of self-employed person (19.74%).

Consumers at food purchase in the supermarkets are influenced by several factors. The aim of this paper is an analysis of selected factors in purchasing behavior of consumers at chocolate purchase.

MATERIAL AND METHODOLOGY

The survey was realized from December 2011 till March, 2012. In the questionnaire respondents were asked for 4 questions relating to their opinions on chocolate. Sample of 277 respondents was interviewed. In the structure of respondents by gender, women represented 63% and men 37%. Respondents were divided into six age categories. The sample consisted of 22% of respondents aged 18-23 years, 18% of respondents aged 24-35 years, 12% of respondents aged 36-45 years, 23% of respondents aged 46-55 years, 17% of respondents aged 56-65 years and 8% of respondents aged over 65 years. By economic activity the studied group consisted of 35% of employees, 31% of students, 18% of entrepreneurs, retirees 9% and 7% unemployed.

Basic approaches of descriptive statistics had been used, as well as methods of association measurement. Statistical

significance had been tested by Chi - Square test based on the p-values. Correlations were proved by the Cramer 's V coefficient. Statistical analysis was performed with software package Statgraphics Centurion version XV.

RESULTS AND DISCUSSION

In the first question we were interested in whether respondents consume chocolate. In the questionnaire, 86% of respondents denoted that they consume chocolate and the remaining 14% said the opposite. When consuming chocolate in terms of gender it was confirmed correlation, there is a difference in chocolate consumption between the genders, more chocolate is consumed by women. Based on the Cramer's V coefficient we can state only slight dependency.

Similarly, among categories of economic activity, there were found significant differences. Cramer's V coefficient value is 0.28, which states moderate correlation. Cramer's V coefficient for age is 0.39, which indicates the existence of a higher correlation than at the economic activity of respondents (Table 1). Chocolate is consumed mainly by young people aged 18-23 years, respectively by middle-aged people from 46 to 55 years. Correlation was also confirmed in terms of their income, classification with moderate correlation can be done. Chocolate is consumed mainly by respondents whose monthly income ranges from 801 to 1001 €.

Respondents had the option to indicate the most important factors with the greatest influence at their chocolate purchase (Fig.1). Analysis of the first and the most important factor showed that respondents are mostly affected by the recommendations of friends, acquaintances (32%), followed by brand of chocolate (24%), price (16%). Other factors are personal experience (12%), health restrictions and allergies (11%). Less important factors when choosing chocolates are flavor (4%), nutritional quality (3%), country of origin (2%) and the appearance of chocolate packaging (1%).

The typical chocolate aroma is characteristic for dark, bitter-tasting chocolate and depends on its high proportion of cocoa butter. Dark chocolate and cocoa powder contain several hundred volatile constituents, including pyrazines, thiazoles, oxazoles, pyrrole derivatives, pyridines and furans **(Afoakwa et al., 2008; Bonvehí, 2005)**, and it is still difficult to assess which components really contribute to the specific chocolate aroma **(Voigt, 2013)**. Essential cocoa-specific aroma precursors are generated during fermentation of cocoa seeds by proteolysis of the vicilin-like globulin **(Kratzer et al., 2009)**.

At the evaluation of chocolate quality, crystal structure of cocoa butter causes the characteristic "crunchy" bursting. When held in the hand chocolate should melt away after a few seconds, otherwise it contains too many vegetable fats **(Coady, 1995)**. In our study we found that consumers prefer milk chocolate (Fig. 2).

Consumption of cocoa powder in Slovakia in 2011 was 0.5 kg / person / year and consumption of chocolate and chocolate confectionery 4.3 kg / person / year **(Meravá, 2013)**. In relation to consumption of chocolate, it is necessary to note that some consumers do not consume chocolate at all because of various health restrictions e.g. the incidence of lifestyle diseases such as diabetes, obesity and others. On the other side, in vitro and animal studies suggest that polyphenols in cocoa and chocolate show the potential to protect against diabetes and diabetes-related complications via a variety of molecular and physiological mechanisms. However, data from human and epidemiological studies remain limited **(Almoosawi and Al-Dujaili, 2013)**. Two recent meta-analyses of randomized controlled trials (RTCs) confirmed that flavanol-rich chocolate has a beneficial influence on endothelial function and reduces systolic and diastolic blood pressure (BP) **(Hooper et al., 2008; Hooper et al., 2012)**.

Wolz et al. (2009) performed a questionnaire survey of 274 patients with Parkinson's disease and 234 consumers, who formed the control group. They found that the consumption of chocolate by patients with this disease is higher than in the control group.

In terms of consumption frequency of chocolate it was confirmed statistically significant correlation on gender, economic activity and age of the respondents. By the Cramer's V coefficient we can state the moderate correlation, while the highest correlation (0.24) was determined at age, followed by gender (0.023) and economic activity (0.20). In terms of gender the most commonly is consumed chocolate by women once up to three times per week, respectively occasionally. The same frequency of chocolate consumption (1-3 per week, occasionally) dominates in the categories of student and employee.

In terms of age the highest share was found at young people aged 18-23. In terms of income it has not been confirmed any existence of a statistically significant correlation, e.g. income insignificantly influenced the respondents in terms of frequency of consumption of chocolate.

Childhood and adolescent obesity has been increasing in most middle- and high-income countries, and, as with adult obesity, this has been driven by increasingly obesogenic environments, especially the food environment. This constitutes a “market failure,” signaling the need for government interventions with policies, programs, and social marketing. Population prevention strategies are critical, and children and adolescents should be the priority populations. Food marketing to children is a central policy issue for governments to address, and comprehensive regulations are needed to provide substantive protection for children. The social and cultural shifts that support healthy eating and physical activity occur differentially, and special efforts are needed to reduce the socioeconomic gradients associated with childhood obesity. A positive public health approach encompassing environmental, regulatory, sociocultural, and educational strategies offer the best chance of reducing obesity without increasing disordered eating patterns **(Swinburn, 2009)**. Chocolate generally marketed to children contains approximately 30% fat and up to 45% sugar, giving it a very high energy density (2200 Kj/100 g) likely to engender satiety, making it likely those children will acquire a taste for it without difficulty.

Table 1 Results of statistical analysis at question "Do you eat chocolate?"

	p-value	correlation	Cramer´s V coefficient
gender	0.0017	yes	0.1885
economic activity	0.0005	yes	0.2819
age	0.0000	yes	0.3926
income	0.0241	yes	0.2156

Table 2 Results of statistical analysis at question „How often do you eat chocolate?"

	p-value	correlation	Cramer´s V coefficient
gender	0.0064	yes	0.2268
economic activity	0.0025	yes	0.1952
age	0.0000	yes	0.2365
income	0.2306	no	0.1477

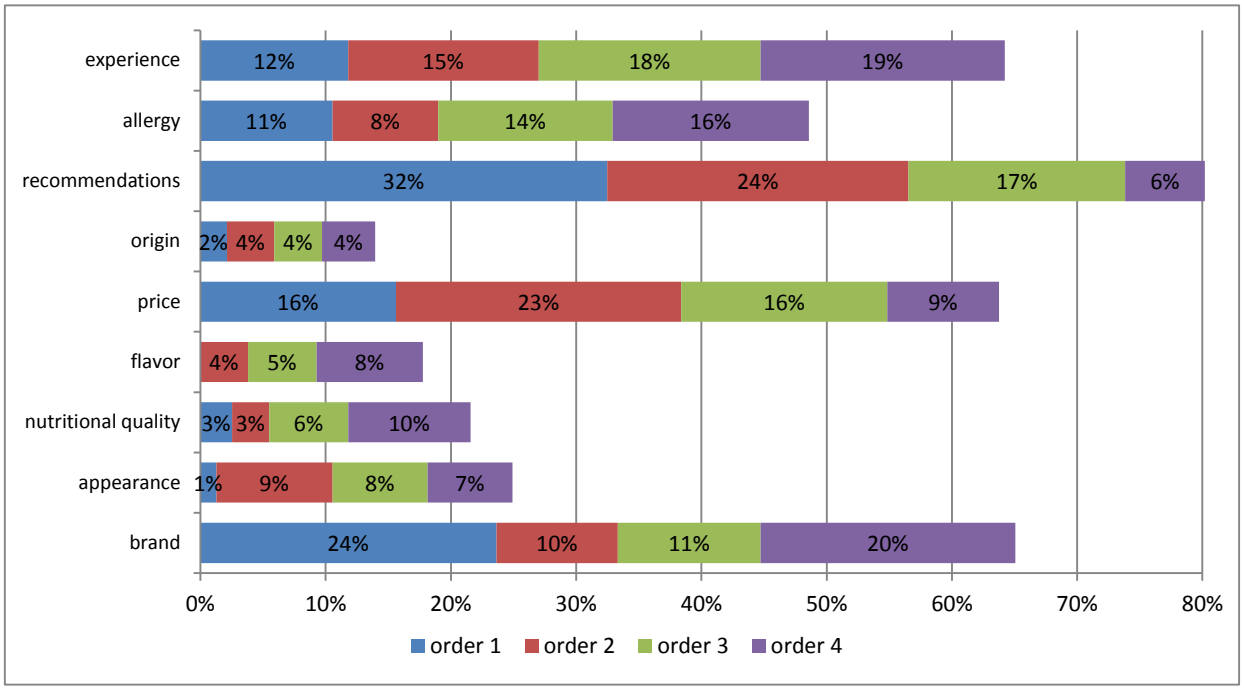

Figure 1 Factors affecting respondents at chocolate purchase
Notice: Respondents had the possibility to select four the most important factors and arrange them in order. Order 1 means that for the respondent is the most important factor.

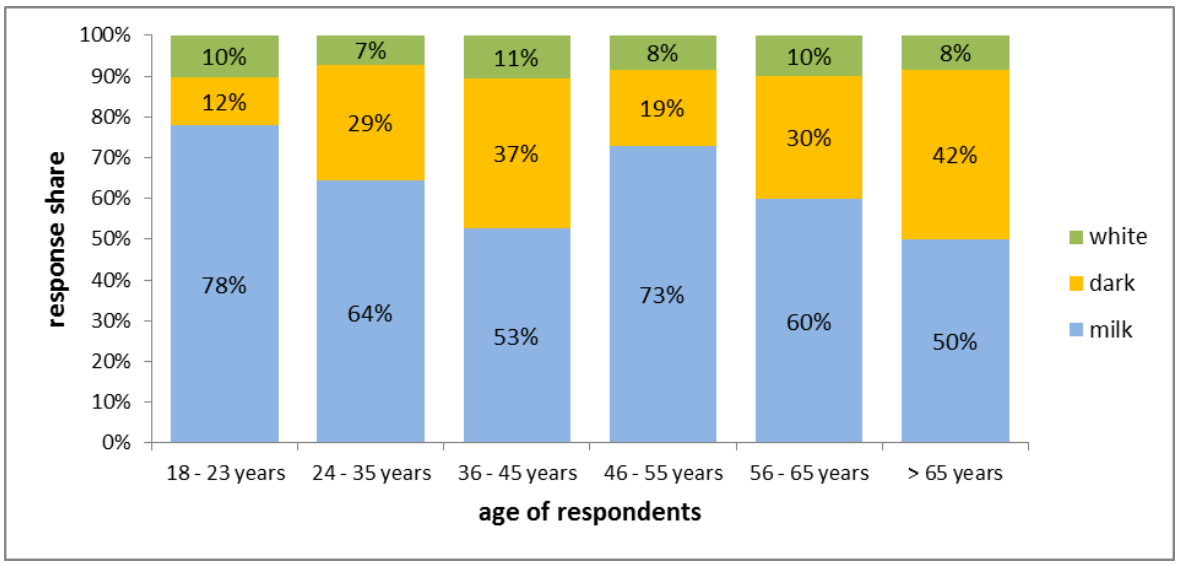

Figure 2 Preferences by type of chocolate and age

Table 3 Results of statistical analysis at question „How much money do you spend per week to buy chocolate?"

	p-value	correlation	Cramer´s V coefficient
gender	0.3036	no	0.1430
economic activity	0.3583	no	0.1512
age	0.0116	yes	0.1976
income	0.0467	yes	0.1828

Severe parental restriction of sweet foods may increase children's liking and desire for them, which can lead to increased consumption when parents are absent **(Standen-Holmes and Liem, 2013)**.

At evaluation of chocolate effect on respondents statistically significant relationship in terms of gender, age and economic activity was demonstrated. Moderate correlation has been demonstrated at age (0.33), followed by economic activity (0.26) and less moderate correlation was detected at gender (0.17). We can therefore conclude that women state the positive action of chocolate. Similarly, positive effect of chocolate declared students and employees. In terms of age positive effect of chocolate is stated by young people aged 18-35 years and people aged 45-65 years. In terms of income it has not been confirmed any statistically significant correlation, income did not significantly affect the respondents in their perception of chocolate.

Results of previous study by **Cramer and Hartleib (2001)** present finding that males felt less guilty after chocolate consumption than females; but unlike past investigations, new study found no evidence for craving differences between male and female respondents.

Assessing the amount of expenses that respondents are willing to spend on chocolate purchase per week, it was not confirmed any statistically significant correlation of the gender and economic activity. Men and women spend almost the same amount of money. Among different categories of economic activity of respondents there are no important differences. Statistically significant difference was determined at age and monthly income. In terms of correlation intensity taking into account both cases, we can state only mild correlation (Cramer's V coefficient = 0.20 for age and 0.18 for income). By age, to buy chocolates € 1-3 is frequently spent by young people (18-23 years) and middle age generation (46-55 years). In terms of income, the same amount of money (€ 1-3 per week) was spent by respondents with monthly income from 801 to 1000 €.

CONCLUSION

Factors affecting respondents at chocolate purchase are the recommendations of friends, brand of chocolate and its price. The others are personal experience, health restrictions and allergies. Less important when choosing chocolates are flavor, quality, and country of origin and the packaging of chocolate. 86% of surveyed respondents consume chocolate. In the consumption of chocolate it was confirmed moderate correlation among various categories

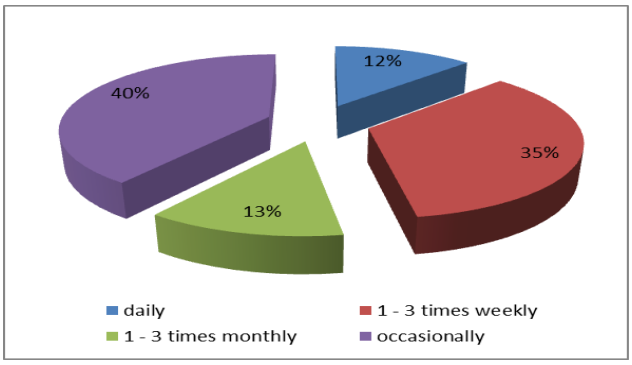

Figure 3 Frequency of chocolate consumption

of economic activity of respondents. In terms of gender the most commonly is chocolate consumed by women and the same frequency of chocolate consumption prevails in categories student, employee. To buy chocolates, expenses spent are € 1-3, once up to three times per week at young people and at middle age generation of people (46-55 years). In terms of income the same amount of money (€ 1-3 per week) is spent by respondents with monthly income from € 801 to € 1000.

REFERENCES

Adriefdjohan, M. W., Savaiano, D. A. 2005. Chocolate and cardiovascular health: is it too good to be true? *Nutrition Reviews*. vol. 63, no. 12, p. 427-430. http://dx.doi.org/10.1111/j.1753-4887.2005.tb00118.x

Afoakwa, E. O, Paterson, A, Fowler, M, et al. 2008. Flavor formation and character in cocoa and chocolate: a critical review. Crit Rev Food Sci Nutr., vol. 48, no. 9, p. 840-857. http://dx.doi.org/10.1080/10408390701719272 PMid: 18788009

Almoosawi, S., Emad Al-Dujaili, E. 2013. Polyphenol-Rich Cocoa and Chocolate: Potential Role in the Prevention of Diabetes. *Chocolate in Health and Nutrition. Nutrition and Health*. vol. 7, p 327-339. http://dx.doi.org/10.1007/978-1-61779-803-0_24

Bauer, S. R., Ding, E. L, Smit, L. A. 2011. Cocoa Consumption, Cocoa Flavonoids, and Effects on Cardiovascular Risk Factors: An Evidence-Based Review. *Current Cardiovascular Risk Reports*, vol. 5, no. 2, p 120-127. http://dx.doi.org/10.1007/s12170-011-0157-5

Büttner, O. B., Florack, A., Serfas, B. G. 2013. A Dual-Step and Dual-Process Model of Advertising Effects: Implications for Reducing the Negative Impact of Advertising on Children's Consumption Behaviour. *Journal of Consumer Policy*, December 2013. http://dx.doi.org/10.1007/s10603-013-9250-0

Bonvehí, J. S. 2005. Investigation of aromatic compounds in roasted cocoa powder. *European Food Research and Technology*. vol. 221, no. 1-2, p. 19-29. http://dx.doi.org/10.1007/s00217-005-1147-y

Cramer, K. M., Hartleib, M. 2001. The attitudes to chocolate questionnaire: a psychometric evaluation. *Personality and Individual Differences.* vol. 31, no. 6, p. 931-942 http://dx.doi.org/10.1016/S0191-8869(00)00195-1

De Brito, E. S., Garcia, N. H. P., Amancio, A. C. 2004. Use of proteolytic enzyme in cocoa (*Theobroma cacao L.*) processing. *Braz. Arch. Biol. Techn.*, vol. 47, p. 553-558. http://dx.doi.org/10.1590/S1516-89132004000400008

Coady, Ch. 1995. *The chocolate companion*. London: Quintet Publishing Limited, p. 192. ISBN 80-88980-22-4.

Ding, E. L., Hutfless, S. M., Ding, X., Girotra, S. 2006. Chocolate and Prevention of Cardiovascular Disease: A Systematic Review. *Nutrion Metabolism (Lond)*. vol. 3, no. 2-3.

Gibson, E. L. 2011. Emotional and Behavioral Aspects of Chocolate Eating. *Handbook of Behavior, Food and Nutrition*. p. 601-620. http://dx.doi.org/10.1007/978-0-387-92271-3_40

Hooper, L., Kroon, P. A, Rimm, E. B, Cohn, J. S, Harvey, I, Le Cornu, K. A, Ryder, J. J, Hall, W. L, Cassidy, A. 2008. Flavonoids, flavonoid-rich foods, and cardiovascular risk: a meta-analysis of randomized controlled trials. *Am. J. Clin. Nutr.*, vol. 88, no. 1, p. 38-50. PMid: 18614722

Hooper, L., Kay, C., Abdelhamid, A., Kroon, P. A., Cohn, J. S, Rimm, E. B, Cassidy, A. 2012. Effects of chocolate, cocoa, and flavan-3-ols on cardiovascular health: a systematic review and meta-analysis of randomized trials. *Am. J. Clin. Nutr.*, vol. 95, no. 3, p. 740-751. http://dx.doi.org/10.3945/ajcn.111.023457 PMid: 22301923

Kratzer, U., Frank, R., Kalbacher, H., Biehl, B., Wostemeyer, J., Voigt, J. 2009. Subunit structure of the vicilin-like globular storage protein of cocoa seeds and the origin of cocoa- and chocolate-specific aroma precursors. *Food Chemistry*. vol. 113, no. 4, p. 903-913. http://dx.doi.org/10.1016/j.foodchem.2008.08.017

Kubicová, Ľ., Nagyová, Ľ., Kádeková, Z. 2013. Comparison and modeling of households food expenditures in Slovakia with regard to the economic status and job position of the head of household. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, vol. 61, no. 7, p. 2377-2384. http://dx.doi.org/10.11118/actaun201361072377

Meravá, E. 2013. *Cukrová repa, cukor. Situačná a výhľadová správa k 30.9.2012*. Bratislava: VÚEPP, 41p., ISSN 1338-7243.

Standen-Holmes, J. E., Liem, D. G. 2013. Chocolate and Children's Food and Flavor Preferences. *Chocolate in Health and Nutrition. Nutrition and Health*. vol. 7, p 491-503.

Swinburn, B. 2009. Obesity Prevention in Children and Adolescents. *Child and Adolescent Psychiatric Clinics of North America*. vol. 18, no. 1, p. 209-223. http://dx.doi.org/10.1016/j.chc.2008.07.015 PMid: 19014868

Tuomisto, T., Hetherington, M. M, Morris, M. F., Tuomisto, M. T,. Turjanmaa, V,. Lappalainen, R. 1997. Psychological and physiological characteristics of sweet food "addiction". *International Journal of Eating Disorders*, vol. 25, no. 2, p. 169-175 http://dx.doi.org/10.1002/(SICI)1098-108X(199903)25:2<169::AID-EAT6>3.0.CO;2-B

Voigt, J. 2013. Chocolate and Cocoa Aroma. Watson, R. R., Freedy, V. R., Zibadi, S. Chocolate in Health and Nutrition. *Nutrition and Health*. vol. 7, p. 89-101.

Wolz, M, Kaminsky, A, Löhle, M., Koch, R., Storch, A., Reichmann, H. 2009. Chocolate consumption is increased in Parkinson's disease. *Journal of Neurology*. vol. 256, no. 3, p 488-492. http://dx.doi.org/10.1007/s00415-009-0118-9 PMid: 19277767

Zentková, I., Hošková, E., 2009. The estimation of the Marshallian demand functions for the selected foodstuff groups according to the households income quartils. *Agric. Econ. - Czech*, vol. 55, no. 8, p. 406-412.

Contact address:

Ing. Dagmar Kozelová, PhD., Slovak University of Agriculture in Nitra, Faculty of Biotechnology and Food Sciences, Department of Food Hygiene and Safety, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, e-mail: dkozelova@gmail.com

Ing. Eva Matejková, PhD., Slovak University of Agriculture in Nitra, Faculty of Economics and Management, Department of Statistics and Operations Research, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, e-mail: eva.matejkova@uniag.sk

doc. Ing. Martina Fikselová, PhD., Slovak University of Agriculture in Nitra, Faculty of Biotechnology and Food Sciences, Department of Food Hygiene and Safety, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, e-mail: martina.fikselova@gmail.com

Bc. Judita Dékányová, Slovak University of Agriculture in Nitra, Faculty of Biotechnology and Food Sciences, Department of Food Hygiene and Safety, Tr. A. Hlinku 2, 949 76 Nitra, Slovakia, e-mail: xdekanyova@is.uniag.sk