## Study of The Quality of "Twinings" Tea

by Sabka Pashova, Kristina Nikolova, Georgi Dimitrov University of Economics, Department of Commodity Science, 77, Kniaz Boris I blvd., 9002 Varna, Bulgaria, spashova\_uev@abv.bg, christina\_nik@abv.bg, g.dimitrov@knowhow-office.com

*Abstract:* Production and consumption of tea worldwide is about 300 billion cups yearly and the first place is occupied by Great Britain, followed by Ireland, China, India, and USA. The tea and its infusion are not only with pleasant flavor and refreshing properties, but with valuable dietary qualities. All these properties are connected with the variety of the plant and with the content of the main substances: phenolic substances, caffeine, aroma substances, organic acids, carbohydrates, vitamins and minerals. The aim of the current research is to examine the quality of five types of black and of five types of green tea, produced by TWININGS OF LONDON, in order to see if the consumers' confidence to the company as a producer of high-quality products is justified. Therefore an independent research of some types of tea TWINIGS has been conducted and the results are shown forward in the study.

*Key words:* food policy, quality of food, quality of tea JEL classification: Q17, Q18, Q19

#### **1** Introduction

Writing of the tea story starts in ancient China in 2737 B.C., when the mythical Chinese emperor Shen Nung discovers the tea plant. Since then tea is the most popular drink in the world after water (Genchev, A., 2004). Its popularity is due to the useful substances, highvalued from far antiquity to nowadays. It's been called by the ancient Chinese "fire of life" which strengthens spirit, body and extends life. Tea to the Chinese is like wine to the Europeans: an endless spring of romance and inspiration with delicate variation in colors, aroma and flavor (Sharangi, A., 2009).

Today the consumption of tea worldwide is about 300 billion cups yearly and the first place is occupied by Great Britain – 2.5 kg tea annually, followed by Ireland, China, India, and USA. Major tea producer and exporter is India, followed by China. Nowadays world production of tea reaches 2 million tons per year, 1/3 of which is accounted to India. Also traditional tea producers are Sri Lanka (Ceylon – third largest producer), Taiwan, Korea, Japan, Kenya, Indonesia, Turkey, Russia, USA (The British Tea Council, December 2012).

TWININGS Company is founded in 1706 by Tomas Twining. At the beginning company sells tea infusion (drink) and after that it starts producing its own brand tea. Today company is part of Associated British Foods and one of the leading tea producers worldwide. Its major competitors are PG Tips Tea and Lipton Yellow Label (both owned by the giant Unilever) and Tetley (now property of the Indian company Tata Tea Ltd.). TWINIGS offers about 200 different types of tea, cultivated all over the world – Brasilia, Argentina, Malawi, Kenya, South Africa, China, India, Ceylon (Sri Lanka), Japan, Indonesia and exports the finished product to more than 115 countries worldwide (TWININGS from around the world, December 2012).

Tea itself is an evergreen plant from family Theaceae (kind Thea) (Chuen, L., 2005). Tea plant is cultivated in warm, tropical latitudes. The native country of tea is considered to be Southwest China (the area of Tibet) and its next areas – Burma, Vietnam and India, but nowadays it is being cultivated in over 60 countries worldwide (Griffiths, J., 2007).

The major tea types (derived form the fresh tea leaves of the plant species Camellia sinensis), according to the technology of their production and the oxidation level of some of the components in the teas composition, are four: black, green, oolong and white (Rishi tea, December 2012).

1

100% fermented and is Black tea is characterized by copper-red infusion, high caffeine content and strong aroma. Green tea is obtained after a minimum technological processing. Green tea does not ferment and pale green to gold infusion and soft aroma are typical for it. It is high-valued product because of its constant in quantitative and qualitative terms chemical composition. The *oolong tea* is partly fermented (the level of fermentation varies from 5% to 80%). It is a combination between green and black tea by composition and aroma. It's extremely valuable for its properties to reduce cholesterol and body weight. There is no technological processing in the production of white tea, i.e. after picking tea is left for fading and drying. Compared to the other three types white tea has very low caffeine content, but the antioxidants are as much as they are in the green tea (Tea types – white tea, oolong, green and black tea, December 2012).

*The main aim* of the current research is to examine the quality of black and green tea, produced by TWININGS OF LONDON, in order to see if the consumers' confidence to the company as a producer of high-quality products is justified. Therefore an independent research of some types of tea TWINIGS has been conducted and the results are shown forward in the study.

*Object of the study* are ten different types of tea – five types of black tea ("English Breakfast", "Earl Grey", "Prince of Wales", "Black Tea – Four Red Fruits", "Black Tea – Orange & Cinnamon") and five types green tea ("Gunpowder Green Tea", "Green Tea and Orange", "Green Tea and Mint", "Green Tea and Jasmine", "Pure Green Tea") offered in the trade network of Varna city during March – December 2010.

For achieving the target it's necessary the following *tasks to be performed*:

- 1. To examine the theoretical aspects of composition, nutritional and biological value of the tea;
- 2. To define the quality of some type of "TWININGS" tea;

- 2.1. To define the quality of black and green tea "TWINIGS" by organoleptic indicators;
- 2.2. To define the quality of black and green tea "TWINIGS" based on the results obtained from analysis of physicochemical indicators;
- 2.3. To examine the condition of package and marking thoroughness of black and green tea "TWININGS".

# 2 Composition, nutritional and biological value of tea

The composition of the tea (Table 1) is highly variable and depends on the sort, cultivating conditions, technological processing and the held logistics operations. The base components found in tea are phenolic substances, caffeine, aroma substances, organic acids, carbohydrates, vitamins and minerals.

Maior and most important components of tea are phenolic substances (tannins and catechins), which pass into tea infusion and give it density, certain color and harsh and rough tone in flavor (Engelhardt, H., 2007). Tannin content is higher in green tea. During technological processing of tea the phenolic substances undergo significant changes. They oxidize, form black and browncolored compounds, giving the tea drink certain and specific color. Other important representatives of the phenolic substances are catechins. They are primarily known as extremely powerful antioxidants. It's proven that catechins are more effective in destroying free radicals than the other antioxidants such as vitamins C and E, and that makes them highly beneficial to the human organism (Swanson, B., 2003).

*Caffeine* is another important component in the tea composition. The refreshing effect of tea is precisely because of it (Ukers, W., 2007). The conception that coffee contains more caffeine than tea is totally wrong. Its average content in different types of tea varies from 1% to 4%. There are several significant differences between the impact of tea and coffee caffeine, and exactly – the impact is weaker, does not cause insomnia and palpitation, does not hold

and accumulate in the human body, which excludes the risk of caffeine intoxication, as seen after frequent use of coffee (Liang Y., J. Lu, L. Zhang, S. Wu, Y. Wu., 2003).

Table	1.	Che	emical	compositi	on	of	fres	h	tea	leaves,	
0		1.	1	1.	•	0	•	•	0 /	0.1	

fermented tea leaves and tea infusion, in % of dry matters								
Major	Fresh	Blac	Tea	Contributio				
components in	tea	k	infusio	n to				
tea	leave	tees	n	color/flavor				
composition								
Phenolic	30	5	4,5	Harsh				
substances				flavor				
Oxidized	0	25	15					
phenolic								
substances								
Amino acids	4-5	4	3,5	Insipid				
				flavor				
Caffeine	3-4	3-4	3,2	Bitter flavor				
Organic acids	0,5-	0,5-	Traces					
	0,6	0,6						
Carbohydrate	7	7	4					
S								
Proteins	15-17	15	Traces					
Lipids	7	7	Traces					
Minerals	5	5	4,5					
Pectin	5-6	5-6	2-3					
Volatile	0,5-1	0,5	Traces	Aroma				
substances								

Carbohydrates and organic acids in tea are insignificant on account of vitamins and minerals. Vitamins  $B_1$ ,  $B_2$ , pantothenic acid, vitamin PP (nicotinic acid), vitamin C and vitamin E (only in fresh leaves) are presented primarily (Sharangi, A., 2009). Minerals in tea are between 4% and 7%. They are presented by the salts of potassium, phosphorus, manganese, iodine, fluorine and cuprum.

The studies of many specialists and scientists dietitians have proven that tea and its infusion are not only with pleasant flavor and refreshing properties, but with valuable dietary qualities. The favorable effect of tea infusion over the human organism is proven. Its consumption improves functioning of the cardiovascular and renal systems, holds the energy and efficiency of man, removes fatigue and improves mood. Major therapeutic and diet property of tea infusion is reducing cholesterol in human body. It's found that tea reduces blood pressure and has inflammatory and antivirus activities. The catechins in tea are strong antibacterial agents, which make tea effective in healing some illnesses. Green tea is useful and recommended in the diet of diabetic patients because it reduces blood sugar too (Kuroda, Y., Y. Hara., 2004, Almajano, M., R. Carbó, J. Jiménez, M. Gordon., 2008). Also greatly valued is the anticancer effect of the tea. The researches held prove that the green tea a good impact over the following cancer forms: cancer of the digestive tract, including stomach cancer, pancreas cancer, large and small intestine cancer and also lungs cancer, breast and skin cancer (Kim, R., R. Rajaiah, Q. Wu, et al., 2008).

### **3** Methodology of the study

The authors' choice to the brand "TWININGS" is from one hand due to the circumstance that it is worldwide famous and high-quality and preferred product, and from the other hand that "TWININGS" teas are with wide and various assortment, preferred by the consumers than the other tea brand and correspond to the consumers expectations.

The studied types of green and black tea "TWININGS" have same expiration date and non-damaged package.

The quality of the tea is studied by *organoleptic indicators* – color, smell, tortuosity, exterior, uniformity of particle, degree of drying, particle size, lead buds and impurities, and by *physicochemical indicators* such as – extraction ability, caffeine content, humidity, total ash and phenolic compounds (BDS 9807:86 Rules for sampling and testing methods). The organoleptic evaluation includes: testing of the prepared tea infusion (tasting); testing of the dissolved tea leaves (exterior and color).

The research is made by standard methods, written in certain normative document. Tasting evaluation gives more complete characteristic of the quality of tea. It's made in 10 degree scale by a group of 7 experts. Indicators such as taste, color, limpidity and aroma have been defined. Score of 8-10 degree is awarded only to highquality tea types. The tea with a good quality receives a score of 4-8 degrees. The physicochemical indicators are studied three

3

times for each one type. An average result is calculated for each single of the studied indicators.

The researches are made by the authors in the labs of Commodity science of food in University of Economics – Varna, Bulgaria.

#### 4 Results and discussion

The quality of tea "TWININGS", found in the trade network of Varna city is examined by organoleptic indicators immediately after package opening. The organoleptic evaluation is held in three stages: examination of dry tea, tea infusion and dissolved tea leaves. The results obtained are shown in Table 2 and Table 3.

After examination of *dry leaves of green tea* it was found that they have a good uniformity of

particle (Table 2). The brands "Jasmine green tea", "Pure Green Tea", "Green Tea & Orange" and "Green Tea & Mint", packed in filter bags are with equal particle sizes, and "Gunpowder Tea" is in bulk (packed in a metal box), therefore its particles are of bigger size. In this tea brand the leaves are rolled into little balls. typical for the type of tea. The degree of drying of the leaves is the same in the al 5 types, no deviation is found. The color is typical for a dry green tea, i.e. dark-green. Taste and smell are pleasant, typical, and with no side tones. In additionally flavored brands of green tea there are well-expressed and strong taste and aroma, typical for the assortment. Presence of leaf buds is found only in the brand "Gunpowder Tea".

Table 2 Results of the rese	arch of the quality of	green tea "TWINIGS"	by organoleptic indicators
1 4010 2. 10054105 01 110 1050	aron or the quality of		by of guildieptic maleutors

	Types green tea								
Indicators	Jasmine Green Tea	Pure Green Tea	Gunpowder Green Tea	Green Tea & Orange	Green Tea & Mint				
Homogeneity of particles	homogeneous particles	homogeneous particles	homogeneous particles	homogeneous particles	homogeneous particles				
Particle size	equal (cut in small parts)	equal (cut in small parts)	Particle size 1 - 1,2 cm	equal (cut in small parts)	equal (cut in small parts)				
Torsion of the leaves	Tea is cut	Tea is cut	Leaves are rolled in small balls (typical for the type)	Tea is cut	Tea is cut				
Dry level	dry, do not stick to fingers	dry, do not stick to fingers	dry, do not stick to fingers	dry, do not stick to fingers	dry, do not stick to fingers				
Color	Dark green, typical	Dark green, typical	Dark green, typical	Dark green, typical	Dark green, typical				
Flavor	Pleasantly bitter and harsh, typical	Pleasantly bitter and harsh, typical, with no side tones	Pleasantly bitter and strongly harsh, typical, with no side tones	Pleasantly bitter and harsh, typical, with no side tones	Pleasantly bitter and harsh, typical, with no side tones				
Smell	pleasant, typical, with no side tones and expressed jasmine smell	pleasant, typical, fresh, with no side tones	pleasant, typical, fresh, with no side tones	pleasant, typical, fresh orange aroma, with no side tones	pleasant, typical, fresh mint aroma, with no side tones				
Presence of leaf buds	tea is cut, do not contain leaf buds	tea is cut, do not contain leaf buds	tea is cut, do not contain leaf buds	tea is cut, do not contain leaf buds	tea is cut, do not contain leaf buds				
Presence of impurities	do not contain	do not contain	do not contain	do not contain	do not contain				

The research of the quality of dry leaves of black tea (Table 3) proves that they have a good uniformity of particle. Only two of the examined types are in bulks - "Earl Grey" and "Prince of Wales". The sizes of their particles are in the range of 0,5 to 1,5 mm, as larger are in "Earl Grey". Rests of the specimens are packed in tea bags. The leaves are in the shape

of tightly rolled tubes (the shape is typical for black tea). No deviations in the degrees of drying are found, i.e. the examined tea types are dry and do not stick to the fingers. Color is typical for black tea – dark brown to black, as differently colored particles are found in scented types of tea, due to the added aroma substances. Taste and smell are typical, with no side tones, except the brands with additional taste additives. Also there are insignificant leaf buds in tea "Prince of Wales". In both bulk teas are found stems and branches, which is typical for this types of tea.

Tal.1.2	Dagulta of t	les manageneles of	Cales and liter	af hlash tas	"TWININCO"	less ana ana landia	indiantana
Table 5	Results of L	ne research of	The quality	ог ріаск теа		by organolephic	indicators
1 4010 5.	results of t	ne researen or	and quanty	or oracle tea	1 // 11 /11 / 00	of organoreprie	marcators

	Types of black tea									
Indicators	English Breakfast	Earl Grey	Prince of Wales	Four Red Fruits	Orange & Cinnamon					
Homogeneity of particles	homogeneous particles	homogeneous particles	homogeneous particles	homogeneous particles	homogeneous particles					
Particle size	equal (cut in small parts)	Particle size 1 - 1,5 cm	Particle size 0.5 – 1 cm	equal (cut in small parts)	equal (cut in small parts)					
Torsion of the leaves	tea is cut	leaves are rolled in tubes	leaves are rolled in tubes	tea is cut	tea is cut					
Dry level	dry, do not stick to fingers	dry, do not stick to fingers	dry, do not stick to fingers	dry, do not stick to fingers	dry, do not stick to fingers					
Color	dark brown with a few lighter tones	dark brown to black, typical	dark brown to black, typical	dark brown with a few lighter tones	dark brown to black with a few lighter tones					
Flavor	Pleasantly bitter and harsh, typical, with no side tones	Pleasantly bitter and harsh, typical, with light citrus tones	Pleasantly bitter and harsh, typical, with no side tones	Pleasantly bitter and harsh, typical, with no side tones	Pleasantly bitter and harsh, typical, with no side tones					
Smell	pleasant, typical, fresh, with no side tones	strong, pleasant, typical, fresh bergamot aroma, with no side tones	strong, pleasant, typical, with no side tones	strong, pleasant, typical, with no side tones, pleasant aroma of forest fruits	strong, pleasant, typical, tea is cut, do not contain leaf buds					
Presence of leaf buds	tea is cut, do not contain leaf buds	presence of golden tails	presence of golden tails	tea is cut, do not contain leaf buds	tea is cut, do not contain leaf buds					
Presence of impurities	do not contain	Presence of twigs and stems	Presence of twigs and stems	do not contain	do not contain					

Second stage of the organoleptic evaluation is studying the quality of the ready tea infusion. The results obtained show that none of the five types of black tea is of high-quality, because there is not a single maximum assessment. Close up to the maximum is the evaluation of "Earl Grey" tea of 9.5 points, due to the presence of sediment. This in turn is probably due to the fact that the tea is loose and little particles are possible to fall in during production or the wholeness of the tea leaves is impaired during logistics. The black tea "English Breakfast" and "Black Tea - Orange and Cinnamon" were evaluated with 9 points. There is certain deviation in color and aroma in these two types of black tea. Taste additives can

be a possible reason. The low evaluation of "Black Tea – Four Red Fruits" – 8 points, compared to the other types of tea is explained by the found brown tones in color. The flavor and smell receive low evaluation because they are not enough harmonic.

During the study of tea infusions of five types of green tea was determined that two types – "Pure Green Tea" and "Green Tea & Mint" are with maximum values of 10 points. The infusion "Green Tea & Jasmine" is with lower value of flavor only, because it's not enough harmonic. The infusion of "Gunpowder Tea" has a very light sediment caused by the fact tea is loose (through logistics operations the dry tea leaves crush and the dust content is higher than

5

in regulations). Tea "Green Tea & Orange" is with lowest evaluation (8 points), because its infusion has light sediment, not thin but strong aroma with pleasant and certain taste of orange. The last third stage of the organoleptic

evaluation of tea TWININGS is determination of *the quality of the dissolved tea leaves*. It was found that all studied types have a pleasant smell, the color of their leaves is copper-red, and the leaves of the green tea are golden, like a linseed oil.

The summarized and analyzed results from the research by organoleptic indicators held prove that the black and green tea TWININGS meet the requirements, specified in regulations and are of high-quality.

Results of the research by physicochemical indicators of black and green tea TWININGS are shown in Table 6 and Table 7.

The results of *black tea "English Breakfast"* (Table 4) prove that it has low moisture content

due to the high-quality packaging materials and conducted logistics operations. properly Content of total ash is 3.45% lower than in regulations. It means that minerals content is low, which in turn leads to the conclusion the tea is high-quality. The high content of extractive substances is another proof for that. "English Breakfast" tea has high caffeine content, which is in full compliance to its name. The tea is preferred by the connoisseurs early in morning. The phenolic substances the (minimum 15% in black tea) are with the highest amount than in all other studied teas (Table 4). This is probably due to the slow and continuous fermentation of the dry leaves, through which oxidation process of the phenolic substances have completed. This high content of phenolic substances gives the tea certain strong tone of its infusion and the extractive substances form the density and dark red color of the infusion.

Indicators	Requirements in BDS 9807-86	English Breakfast	Earl Grey	Prince of Wales	Black Tea Orange & Cinnamon	Black Tea – Four Red Fruits
1. Moisture, %	not more than 10	4,00	5,10	4,10	4,80	4,20
2.Total ash, %	not more than 8	4,55	4,52	4,80	3,71	3,41
3. Extractive	not less than 25	53,18	28,75	57,50	38,82	57,50
substances, %						
4. Phenolic	not regulated	20,96	15,85	17,85	13,29	18,99
substances, %						
5. Caffeine, %	not regulated	1,81	1,98	1,55	2,07	1,47

Table 4. Results from the research of black tea TWININGS by physicochemical indicators

The black tea "Earl Grey" (Table 4) has a lower moisture and ash content than regulated. Extractive and phenolic substances are lower than in "English Breakfast", which directly affects color (strongly copper-red) and flavor (dense, pleasantly bitter and harsh) of the infusion. Caffeine content in "Earl Grey" tea is 0.17% higher than the found in "English Breakfast". It determines the refreshing properties of the infusion, which is greatly valued by the consumers.

*The black tea "Prince of Wales"* (Table 4) answers the requirements in Bulgarian normative documents. Its moisture is 1% lower than in "Earl Grey" tea, and the total ash is 0.25% and 0.28% higher than in black tea

"English Breakfast" and black tea "Earl Grey". Extractive and phenolic substances are also higher than in "Earl Grey". These results determine color, density and flavor of the infusion. The caffeine content in low and forms the strength of the drink and matches its elegant name.

From the held studies of *black tea "Black Tea – Orange & Cinnamon"* (Table 4) and after the performed analyze of the results it was determined the tea has lowest content of phenolic substances than all studied types of black tea. It directly affects the density of the infusion and gives pleasant flavor with no harsh tone. The result for total ash is low, and the

caffeine content is highest from all other studied black teas.

*"Black Tea – Four Red Fruits"* (Table 4) has lowest caffeine content which is explained by mistakes made during production process and by the additives of red forest fruits. The content of extractive and phenolic substances is higher than the found in *"Black Tea – Orange and Cinnamon"*. They determine the deep copperred color and density of the infusion.

In Table 5 are shown the results obtained from the research on five types of green tea. There are no regulations in Bulgaria about the quality of green tea which is the reason why the results are not compared to any requirements in certain normative document.

The results obtained for moisture and total ash (Table 5) for green tea types are close to the results for black tea types (Table 4), but the contents of extractive, phenolic substances and caffeine are higher. The differences in technological processing of tea leaves can explain this fact. Green tea does not ferment and that keep major components in tea leaves unchanged after technological processing.

Indicators	Requirements	Gunpowder Green Tea	Pure Green	Green Tea &	Green Tea &	Jasmine Green
			Теа	Mint	Orange	Теа
1. Moisture, %	not regulated	4,40	4,60	4,00	4,30	4,50
2.Total ash, %	not regulated	3,96	4,26	4,34	4,00	3,27
3. Extractive	not regulated	57,50	57,50	60,37	60,37	57,50
substances, %						
4. Phenolic	not regulated	23,70	25,03	18,04	23,80	22,19
substances, %						
5. Caffeine, %	not regulated	2,94	1,67	1,07	1,72	2,73

Table 5. Results from the research of green tea TWININGS by physicochemical indicators

It's found in the research of green tea "Gunpowder Green Tea" by physicochemical indicators that the contents of extractive and phenolic substances are higher than in black tea (Table 4). The caffeine content is at lowest level from all studied types green tea (Table 5) which is due to the botanical species (tea leaves) and technological treatment. The results obtained directly affect the flavor of the infusion of "Gunpowder Green Tea". The strong bitter and harsh taste is established by the organoleptic The high caffeine evaluation. content determines the physiological and refreshing effects of tea infusion to the consumers.

The quantity of extractive and phenolic substances in green tea "Pure Green Tea" (Table 5) are, respectively, equal and 1,33% higher than in the green tea "Gunpowder Green Tea". The studied green tea differs from the other types with its highest content of phenolic substances which give the infusion its density and a pleasant, strongly bitter and harsh taste. Caffeine content is 1,27% lower than the found in green tea "Gunpowder Green Tea". In the research of *green tea* "*Green Tea* & *Mint*" was found that moisture is 0,40% lower, total ash is 0,38% higher and the content of extractive substances is 2,87% higher than in the green tea "Gunpowder Green Tea" (Table 5). The content of phenolic substances and caffeine are lower, respectively, with 5,66% and 1,87% than in "Gunpowder Green Tea". Former results for the components of green tea "Green Tea & Mint" affect directly the properties of its infusion – it is with pleasantly harsh and bitter harmonic flavor.

The summarized results of green tea "Green Tea & Orange" (Table 5) prove that tea is with high content of extractive and phenolic substances. Caffeine content is 0,65% higher than the found in green tea "Green Tea & Mint". The components established in tea "Green Tea & Orange" gives the infusion its taste, aroma and refreshing properties.

The green tea "Jasmine Green Tea" has lowest ash quantity from all studied species of green tea (Table 5). This result is proved by the low mineral content – typical for high-quality tea.

The content of extractive substances is lower with 2,87% than in the two types with mint and orange. "Jasmine Green Tea" has 4,15% more phenolic substances than "Green Tea & Mint" and 1,61% less than "Green Tea & Orange". The content of caffeine is higher, respectively, with 1,66% % and 1,01% than the found content in the two types of green tea with mint and orange.

From the research held by physicochemical indicators it was determined that five types of black and five types of green tea of TWINIGS brand, offered in the trade network and chosen for the study, are standard (they meet the requirements in Bulgarian regulations) and high-quality. A relatively low content of moisture and ash is determined in the studied types of tea which is typical to high-quality tea, offered to the consumers by worldwide famous brands. Higher contents of extractive and phenolic substances are established in the black tea types. The main reason for that is technological processing, and exactly the fact that green tea does not ferment and the phenolic substances remain in tea composition. Contrary to the information in the studied literature was found, that some of the green tea types contain more caffeine than in the black tea. This fact is probably due to the botanical species of the tea plant, from which feedstock is acquired and to the technological treatment of the tea leaves.

#### **5** Conclusions

Lastly, in the experimental research of black and green tea of "TWININGS" brand was determined: all studied tea types, offered on the Bulgarian market are in packages, which meet the regulations; a full marking on Bulgarian is missing (it does not contain necessary details, stipulated in the normative documents). Single information about the producer, importer and expiration date is given in Bulgarian. An information about month and year of packaging is missing and about the normative document. These skipped details in the marking are possibility for the consumers beings misled in their choice and recognition of the desirable tea kind and quality. The organoleptic evaluation of all studied tea "TWININGS" prove, that the black types correspond to regulation. The same information is given by the results of the research by physicochemical indicators. The results obtained for the green tea types are compared to data, found in literature, because there are no regulations about green tea. The results match the data found in the specialized literature. This fact gives us a reason to propose to the Oualified Bulgarian Institutions to develop such a normative document, which will give certain requirements to the quality of green tea and to emphasize the need of such regulation. It will guarantee that if the tea has the normative document on its marking, then it is standard and match the requirements of the modern consumers.

#### References

Almajano, M., R. Carbó, J. Jiménez, M. Gordon. (2008), Antioxidant and antimicrobial activities of tea infusions. Food Chemistry, Volume 108, Issue 1, pp. 55-63.

Chuen, L. (2005), Road of Tea. Elementi publisher, pp. 143.

Engelhardt, H. (2007), Chemistry of Tea. Institut für Lebensmittelchemie, Braunschweig, Germany. Chemistry and Biology. Volume 3, pp. 999-1032

Genchev, A. (2004), The Tea, http://www.sivosten.com/content.php?mode=article&id= 87&ttl=chaqt

Griffiths, J. (2007), Tea: the drink that changed the world. Carlton Publishing Group.

Kim, R., R. Rajaiah, Q. Wu, et al. (2008), Green tea protects rats against autoimmune arthritis by modulating disease-related immune events. The Journal of Nutrition. 138(11):2111:2116.

Kuroda, Y., Y. Hara. (2004), Health effects of tea and its catechins. Springer.

Liang Y., J. Lu, L. Zhang, S. Wu, Y. Wu. (2003), Estimation of black tea quality by analysis of chemical composition and colour difference of the tea infusions. Food and Chemistry. Volume 80, Issue 2, pp 283-290.

Sharangi, A. (2009), Medicinal and therapeutic potentialities of tea (Camellia sinensis). Food Research International. Volume 42, Issue 5-6, pp 529-53.

Swanson, B. (2003), Tannins and polyphenols. Washington State University Pullman, WA, USA.

Encyclopedia of Food Science and Nutrition (Second edition). pp 5729-5733.

Ukers, W. (2007), All About Tea. Caffeine. Institute of Food Technologists' Expert Panel of Food Safety and Nutrition.

BDS 9807:86 Rules for sampling and testing methods.

Rishi tea - http://www.rishi-tea.com

#### Authors description

Tea types – white tea, oolong, green and black tea - http://www.rishi-tea.com

The British Tea Council - www.tea.co.uk.

TWININGS from around the world - http://www.twinings.com/int/l2c\_around\_the\_world.php.

Sabka Pashova, PhD, Associate Professor at the Varna University of Economics, Faculty of Economics, Commodity Science Department, Head of the Quality Education Center; field of research: quality and safety of foods, plant waxes, edible films and coatings, customs policy.

Kristina Nikolova, BD student at the Varna University of Economics, Faculty of Economics, Commodity Science Department; field of research: quality of foods.

Georgi Dimitrov, PhD student at the Varna University of Economics, Faculty of Economics, Commodity Science Department; field of research: quality of foods, edible films and coatings.