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A Chinese Tea Phenomenon: Trends of Consumption in Poland in Relation to Pro-Ecological Behavior

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Abstract:

Purpose: *Poland is the third tea consumer in Europe and after World War II it became beloved beverage of Poles. The study aimed to determine the knowledge, preferences, and habits of Polish consumers regarding the consumption of Chinese tea. Due to urgent need of currently shaping pro-ecological awareness of single consumers become the important trend allowing for implementation of sustainable development rules trough "acting locally and thinking globally".*
Design/Methodology/Approach: *The article presents the results of a survey conducted in Poland in the years 2016-2017 among 622 respondents.*
Findings: *The results showed that Chinese tea, especially green tea, is a popular tea infusion in Poland. Most often it is purchased in shops and tea houses, in the form of dry leaves, due to its taste and health properties. Teas are prepared according to individual preferences.*
Practical Implications: *Spreading the knowledge on the consumption of Chinese tea in Poland may be beneficial both for active participants of health-promoting market and those who are involved in the production, distribution, and sale of teas. In a broader sense it may also contribute to satisfying the needs of sustainable development oriented consumers.*
Originality/Value: *Regarding the pro-ecological behaviour of Chinese tea consumers in Poland it was revealed in the research that economic factors influenced positively larger amounts of tea were bought at one time as it generated lower costs. Knowledge and ecological awareness among tea consumers affected negatively on pro-ecological behavior regarding the number of brewing from the one portion of tea as well as the amount of tea prepared at one time.*

Keywords: *Chinese tea, tea consumption, consumer behavior, pro-ecological behavior, sustainable development, economic culture.*

Paper Type: *Research paper.*

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1. Introduction

Nowadays, tea is the second most consumed drink in the world, after water. Since the 9th century CE, tea infusion in China has become an alternative to alcohol served to evening guests who visited. Tea continues to play an important role in the development of Chinese identity (Sigley, 2015**)**. For centuries, tea leaves have been a significant driver of the Chinese economy and tea accessories have shaped consumers' expectations, not only among the Chinese. After becoming a currency, tea was taxed by Chinese dynasties and became a source of income for them. Since then, tea has been China's leading product exported by land and sea. Currently, tea is a Chinese national treasure, which is the most popular gift, also when travelling abroad.

A Chinese tea phenomenon in Poland is caused by the fact that original, good quality Chinese tea become commonly available after end of the communism in 1989. Since 1990 Poland become open to international trade and foreign products. It gave the possibility to taste from the variety of Chinese tea types. During the communism period, after 1945, the tea was widespread, but its quality was poor. The only legal source to buy original tea products were Pewex and Baltona shops, but only for hard currency. Thus, at this time tea was considered to be a luxury good. The first tea prosperity in Poland started in the Interwar period, in 1918, when Poland regained its independence after 123 years. During this time tea trade, tea shops and teahouses begun to be organised, despite the fact that the society was poor. Before 1918, since 1795 Poland was under partitions and tea consumption was dependent on the ruler.

In the Russian partition tea was imported mostly from China via the Chinese-Russian customs house. In the Austrian partition the tea market collapsed due to the trade blockade during World War I. Thus, replacements for tea were used. The most popular as ersatz tea were dried woodland strawberry leaves. The first mentions of tea in Poland are dated to the 17th century, however till the end of the 18th century it was considered almost like a medicine (Kasprzyk-Chevriaux, 2019).

Previous research indicated that teas exhibit plenty pro-health properties including reducing obesity and blood glucose levels (Jigisha *et al.*, 2012; Shi and Schlegel, 2012; Hosoda *et al.*, 2003; He *et al.*, 2009; Panagiotakos *et al.*, 2009; Oba *et al.*, 2010), concentration and immunity (Hammer, 2007), lowers total cholesterol levels (Sinija and Mishra, 2008), preventing several types of cancer (Huang *et al.*, 2014; Michalak-Majewska, 2011; Seow *et al.*, 2020; Sinija and Mishra, 2008; Jigisha *et al.*, 2012; Shi and Schlegel, 2012), brain strokes (Arab *et al.*, 2013), furthermore make possible more efficient heart muscle (Stańczyk, 2010; Jigisha *et al.*, 2012; Shi and Schlegel, 2012), expansion of coronary and brain vessels and of bronchi, increasing body temperature (Stańczyk, 2010), diarrhea prevention (Doustfatemeh *et al.*, 2016), contraction (Einöther and Martens, 2013), anti-inflammation (Sanliera *et al.*, 2018; Sinija and Mishra, 2008; Shi and Schlegel, 2012), bactericidal and bacteriostatic effects, alleviation of burning and itching (Stańczyk, 2010; Jigisha *et*

al., 2012), protects against solar radiation (Michalak-Majewska, 2011), antiviral and anticaries effects (Michalak-Majewska, 2011; Sanliera *et al.*, 2018; Sinija and Mishra 2008; Jigisha *et al.*, 2012), protection of the nervous system (Steptoe *et al.*, 2007; Unno *et al.*, 2017), slowing down the aging process (Stańczyk, 2010; Sanliera *et al.*, 2018; Jigisha *et al.*, 2012), lessening the symptoms of depression.

In the past, it was even believed that drinking tea made possible to achieve immortality (Nicolin, 1993; Ling, 2013). Moreover, other research indicated the lack of adverse health effects related to the environment pollution i.e., with heavy metals (Gruszecka-Kosowska and Mazur-Kajta, 2016; Sun *et al.*, 2019; Zhang *et al.*, 2020) and pesticides (Lu *et al.*, 2020; Yao *et al.*, 2020).

Research on the consumption of Chinese teas has been carried out both in China and outside the People's Republic of China (PRC) (Teh and Jaafar, 2020). Customers' decisions to purchase Chinese teas are influenced by demographic variables such as: gender of the consumer, size of the household, area of residence (urban/agricultural areas), level of education and income (Chen *et al.*, 2020; Watanabe *et al.*, 1998; Guan and Yang, 2014; Yen, 2005). As mentioned above, little is known about the consumption habits of Poles with regard to Chinese teas. Apart from individual information on total tea consumption in Poland published by the Central Statistical Office of Poland (GUS), scientific papers discussing the consumption of tea in Poland tend to be general and are not specifically related to the area of the tea's origin.

Although Poland does not produce tea leaves, it is the third largest consumer of tea in Europe. Polish consumption of tea is estimated at 1% of global tea consumption (Szalaniec, 2015). The data available on tea consumption in Poland is very limited. However, some studies have shown that in 2012, the average Pole drank more than 1.2 cups of tea a day (Ratajczak and Siuda, 2012). Furthermore, Poles preferred black teas 58.9%, to herbal teas 14.2%, Earl Grey 10.2%, green 8.1%, fruit 7.1% and herbal teas (State of the Polish tea market, 2015). They also prefer teas in tea bags – 90%, to leaf tea 30% (Drewnowska, 2015).

More recent data on the total consumption of tea in Poland are available in the reports provided by the GUS, but they only present the average monthly expenditure on tea in households (in 2018: PLN2.49/US $0.66), average monthly tea consumption (in 2018: 0.05 kg), price indices for black leaf tea (in 2018: PLN4.49/US $1.19) and import volume (2019: PLN476.9 million/US $126.7 million, 37,990 tonnes) (GUS, 2019a, 313, 316; GUS, 2019b, 230). Poles also reach for the so-called fruit teas; however, they are fruit infusions, without tea leaves. Most popular fruit infusions include raspberry, cranberry and rose hip "teas" (Adamczak *et al.*, 2017). Although Assam teas dominate among teas available in Poland, no data exist on consumption preferences of teas from PRC.

Despite the common belief that Assam teas are most popular in Poland, it has been assumed that Chinese teas are increasingly popular among Polish consumers, who have become increasingly knowledgeable about them. It was also assumed that by providing information on the preferences and habits of Polish consumers, the results of the conducted research may encourage further scientific research. The results of this study may also be used by a wide group of Polish entrepreneurs, who plan to establish business cooperation with companies from the PRC or those who are already engaged in such cooperation and aim at adapting their offer of imported food products to the needs and expectations of the inhabitants of Poland.

Many scientific reports, for instance latest IPPC report (IPPC, 2021) alarm that human activities have disturbed the Earth so much that radical steps are needed immediately and broadly and maybe human existence on the Earth could be saved. The issue is not only in the context of climate change, but also in term of energy production and consumption, air quality, water supplies, waste generation, consumerism, and more. Sustainable development has to be followed by countries, organizations and so on. But we have to have in mind that real change starts with individuals, according to the rule "think globally, act locally". It seems to go easy when people would become real friends of the Earth. Therefore, based on detailed research on trend of consumption of the original Chinese tea types in Poland the goal of the study was to analyse pro-ecological behaviour of Polish consumers related to the consumption of Chinese teas.

2. Materials and Methods

2.1 Sample Size

This study is not-experimental research conducted on the Polish consumers of the Chinese teas, who declared regular tea consumption. According to the Department of Statistics (GUS, 2018) Poland had a population of 38,433,000 in 2016, when the survey was conducted. Based on the sample size calculation using the formula of Yamane (1967) initial sample size was 400. A total of 622 respondents were included in further investigations. The survey was conducted between the second half of 2016 and the first half of 2017.

2.2 Research Instrument

The conducted survey was a primary, non-interference, monothematic, partial, and one-time study involving structured interviews based on a questionnaire using the eBadania.pl application available via the Internet. Data collection was carried out by means of an unassisted questionnaire based on closed and open questions. The link to the questionnaire was distributed three times among adult Poles who live in Poland and who declared that they consume Chinese tea and/or tea in general. To narrow down the target group and reach people who consume Chinese teas, the authors contacted randomly selected Polish tea shops which offer products

originating from the PRC (Opolskie and Małopolskie voivodships), as well as all the Confucius Institutes located in Poland (cities: Opole, Krakow, Wroclaw, Poznan, and Gdansk), bringing together a group of people interested in Chinese culture, including Chinese teas. Information about the study was also posted on the website's pages of the above institutions, as well sent via e-mail to people involved in Chinese culture (students and course participants), and then propagated further using the snowball method.

Questionnaire consisted of the two following sections. The first section was the main part of the survey. The aim of this part of the survey was to determine the preferences of Polish consumers, their knowledge and habits related to the consumption of Chinese teas. The research questions were designed to explore the following issues: the frequency of Chinese tea consumption, the type of preferred tea, the form in which it is bought, the method, temperature and time of brewing, multiple brewing, the amount of dry leaves used during brewing, additives used during brewing, the reason for choosing Chinese teas, the place of their purchase and the province of origin of the tea leaves.

The second section of the survey investigated the socio-demographic profile of respondents. These questions included gender, age, marital status, educational level, region (voivodeship) and place (city, town, village) of residence in Poland, and indicative net income.

2.3 Data Analysis

A total of 622 data from respondents were analysed using Excel spreadsheet. Descriptive statistics were obtained for both trends in Chinese tea consumption (mean and standard deviation) and socio-demographic profile (frequency (n) and percentage (%)) of Polish consumers.

3. Results

3.1 Characteristic of Chinese Tea Types

Due to the rich cultural history of tea brewing and the fact that tea leaves are grown on several continents, there are many different types of tea. The knowledge of different types of tea is important for further potential possibility to compare research results from the same types of tea. Thus, the brief characterization of tea classifications is given in this section. The most typical division of types of teas is presented as follows:

1. Based on the variety of tea species: Chinese Camellia, Cambodian Camellia, Assam Camellia.
2. Based on the country of the origin: Chinese, Indian, Indonesian, Iranian, Japanese, Burmese, Thai, Turkish, Vietnamese, etc.

3. Based on location of a plantation (including examples of selected Chinese provinces (China Tea Net, 2015): Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shanxi, Shandong, Sichuan, Yunnan, Zhejiang.
4. Based on tea harvesting season: spring, summer, autumn, winter.
5. Based on the degree of tea fermentation: non-fermented (white teas [白茶], green teas [绿茶]), light- fermented (yellow teas [黄茶] – in between green and oolong teas, oolong teas [乌龙] – in between green and black teas), semi-fermented (black teas [红茶] – fully-fermented, dark teas – post-fermented pu'erh [普洱]), flower teas [花茶] (all of the above types additionally flavoured or non-camellia tea).
6. Based on the part of a tea leaf used to prepare the infusion: Leaf Tea – whole leaves (e.g., Tippy Golden Flowery Orange Pekoe (TGFOP), Flowery Orange Pekoe (FOP), Orange Pekoe (OP), Pekoe (P), Pekoe Souchong (PS), Souchong (S), Broken Tea (B) – leaves broken/cut into smaller pieces (e.g., Tippy Golden Flowery Broken Orange Pekoe (TGFBOP), Flowery Broken Orange Pekoe (FOP), Broken Orange Pekoe (BOP), Broken Pekoe (BP), Broken Pekoe Souchong (BPS), Broken Souchong (BS), Fannings Tea (F) – leaves broken into smaller pieces of lower quality; this also includes Dust (D) – very finely crushed tea leaves, tea dust (e.g., Orange Fannings (OF), Orange Pekoe Fannings (OPF), Pekoe Fannings (PF), Fannings (F).
7. Based on the location of the tea leaf on the tea shrub and its types: Tip (T) – undeveloped leaf buds, "tips", Flowers (F) – the youngest tea shoots with flowers and first two leaves, Orange (O) – second leaf, long leaves, Pekoe (P) – third and fourth leaves, shorter and thicker leaves, Souchong (S) – the thickest leaves with frayed edges, Pekoe Flowers (FP) – shorter and thicker leaves, Orange Pekoe (OP) – long and thin leaves, Pekoe Souchong (PS) – wide leaves.
8. Based on the homogeneity of tea: blend – a mixture of different teas, Pure – one type of tea, without any admixture of other types.
9. Based on method of brew preparation: soaked teas – tea leaves flooded with hot water, nowadays, a popular method (e.g., in Poland and China), boiled teas – tea leaves are boiled in teapots, a popular method (e.g., in Morocco), frothy teas – ground tea powder mixed with water and frothed with a special broom/brush (in China known as chaxian [茶筅]), a method popular in Japan.
10. Based on the brewing method: in a zisha-type pot ([紫砂] clay pot with lid, in a gaiwan-type pot ([盖碗] – usually a ceramic dish resembling a small bowl with a lid and a saucer, in a teapot, in a samovar, in a thermos, in a cup, etc.
11. Based on the recommended water temperature when brewing the tea: 75-85°C – white teas, green teas, 90-95°C – oolong teas, floral teas, 100°C – black teas, dark teas.

When discussing Chinese tea, the authors of this article refer to tea originating from the bushes of Camellia sinensis (camelia sinensis) planted on Chinese hills, often mountain slopes at about 300-2500 m above sea level, which prefer a humid climate

and a temperature between 10 and 30°C. The typology used in the article is mainly based on the degree of fermentation.

3.2 Socio-Demographic Characteristics of Respondents

Out of 622 Polish respondents, 63.3% were women. Most respondents were aged 18-54, 87.1%. In terms of marital status, almost half of the respondents were married (i.e., married/in partnership: 48.7%) and unmarried (44.7%). Nearly 1/4 of the respondents lived in Opole Region (25.4%) and Małopolskie Region (21.7%), followed by the regions, Dolnośląskie (9.8%), Mazowieckie (9.2%), Śląskie (9%), Łódzkie (5.6%), Kujawsko-Pomorskie (4.7%), Lubelskie (4.5%), Wielkopolskie (3.9%), Podkarpackie (1.8%), Pomorskie (1.4%), Świętokrzyskie (1.3%), Warmińsko-Mazurskie (1%) and Podlaskie (0.8%).

The respondents lived mostly in large urban areas populated by over 101,000 inhabitants (90% of indications). Their monthly net income was between PLN1000/US $265.8 and PLN4000/US $1063 (Table 1).

Table 1. *Socio-demographic characteristic of Polish consumers of Chinese teas.*

	Demographic factor	**Frequency (n=622)**	**Percentage (%)**
Gender	Male	394	63.3
	Female	228	36.7
Age (years)	18-24	157	25.2
	25-34	177	28.5
	35-44	123	19,8
	45-54	85	13.7
	55-60	59	9.5
	>61	21	3.4
Marital status	Single	278	44.7
	Married/in relation	303	48.7
	Separation/ after divorce	31	5.0
	Divorced/widowed	10	1.6
Educational level	Junior high school	3	0.5
	Basic vocational	1	0.2
	Secondary education	56	9.0
	Secondary vocational	69	11.1
	Post-secondary	31	5.0
	Higher vocational	10	1.6
	Bachelor degree	117	18.8
	Master degree	322	51.8
	Other	13	2.1
Region (voivodeship)	Dolnoslaskie	61	9.8
	Kujawsko-pomorskie	29	4.7
	Lubelskie	28	4.5
	Lodzkie	35	5.6
	Malopolskie	135	21.7
	Mazowieckie	57	9.2
	Opolskie	158	25.4
	Podkarpackie	11	1.8

	Podlaskie	5	0.8
	Pomorskie	9	1.4
	Slaskie	56	9.0
	Swietokrzyskie	8	1.3
	Warminsko-mazurskie	6	1.0
	Wielkopolskie	24	3.9
Place (city, town, village/ number of inhabitants)	Countryside agricultural area	36	5.8
	Countryside, industrialized area	26	4.2
Indicative net income	City, up to 20,000	53	8.5
	City, 21,000 – 50,000	66	10.6
	City, 51,000 – 100,000	69	11.1
	City, 101,000 – 150,000	225	36.2
	City, over 151,000	147	23.6
	Up to PLN 1,000 (US $271.9)	76	12.2
	PLN 1,001-1,500 (US $271.9-407.5)	53	8.5
	PLN 1,501-2,000 (US $407.7-543.3)	57	9.2
	PLN 2,001-2,500 (US $543.5-679.1)	68	10.9
	PLN 2,501-3,000 (US $679.3-814.8)	45	7.2
	PLN 3,001-3,500 (US $815.1-950.6)	43	6.9
	PLN 3,501-4,000 (US $950.9-1,086.5)	40	6.4
	PLN 4,001-4,500 (US $1,086.7-1,222.2)	16	2.6
	PLN 4,501-5,000 (US $1,222.5-1,358)	13	2.1
	PLN 5,001-5,500 (US $1,358.3-1,494.1)	12	1.9
	PLN 5,501-6,000 (US $1,494.4-1,629.9)	11	1.8
	Over PLN 6,001 (US $1,630.2)	23	3.7

Source: *Own study.*

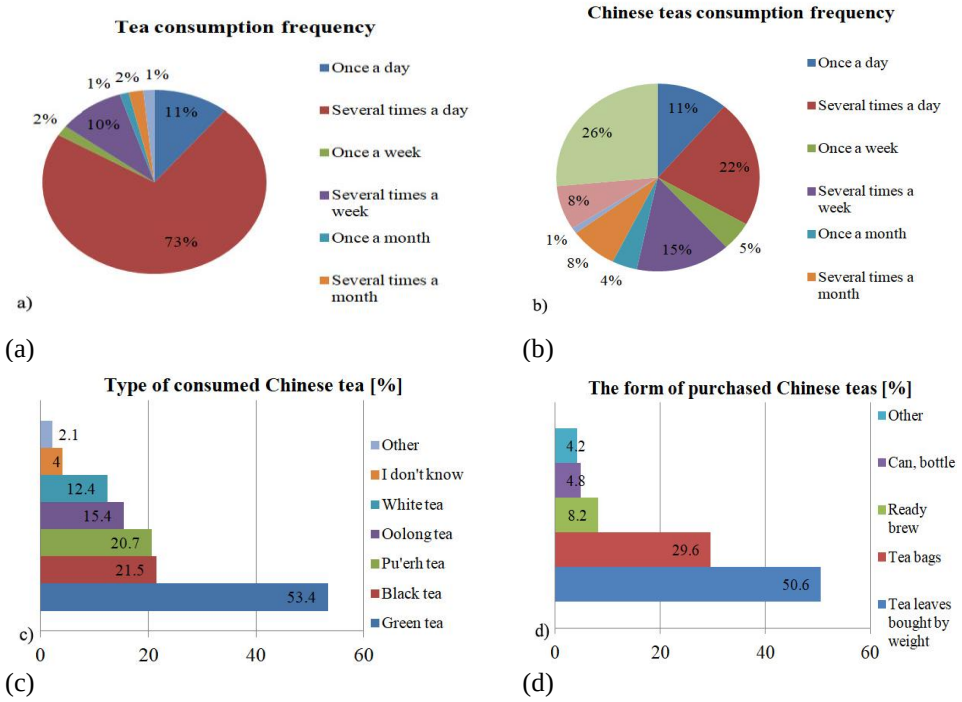
3.3 Trends of Chinese Tea Consumption in Poland

Questionnaire responses regarding the frequency of tea consumption showed that more than 80% of respondents drink tea daily (Figure 1a). Most often tea (in total) was consumed several times a day (73% of answers). Only about 10% of respondents drank tea once a day (11%) or several times a week (10%). Almost 34% of respondents did not drink Chinese tea at all (26%) (Figure 1b). However, Chinese teas were most often consumed several times a day (22%,), several times a week (15%) or once a day (11%, women twice as often as men).

In terms of Chinese teas, more than half of the respondents drank green teas (53.4% of responses), followed by black teas, in China known as red teas (21.5%) and pu'erh teas (20.7%) (the details are shown in Figure 1c).

Most often Chinese teas were purchased as dry tea leaves bought by weight (50.6%) and in packaging containing tea bags filled with a portion of finely ground tea leaves (29.6%) (Figure 1d). The category "can, bottle" referred to ready-to-serve cold products, available e.g., in grocery shops and vending machines, while "ready brew" referred to tea served hot, available e.g., in tea shops and restaurants. The category of "other forms" included mainly diced/brick teas also known as "rectangles" or "cookies". This method is often used to portion pu'erh teas.

Figure 1. *Trends in Chinese tea consumption: a) tea consumption frequency, b) Chinese tea consumption frequency, c) type of consumed Chinese tea, d) form of purchased Chinese teas.*

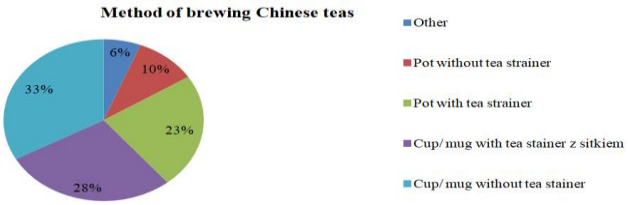


Source: *Own study.*

3.4 Brewing Trends of Chinese Teas in Poland

Purchased teas were mainly brewed in a traditional Polish cup or mug without a tea strainer (33%), in a cup or mug with a tea strainer (28%) or in a pot with a tea strainer (23%). Details are presented in Figure 2. The category of "other methods" of brewing referred mainly to: Chinese and most often ceramic gaiwan-type teapot with a lid and saucer (3%), Chinese clay teapot with a zisha-type lid (2.1%), drip tea maker/drip brewer (0.3%), thermos with a strainer (0.2%), pot with a paper filter (0.2%) and Japanese shiboridashi-type teapot used mainly for brewing green teas (0.2%).

Figure 2. *Brewing method of Chinese teas*



Source: *Own study.*

In general, participants of the study brewed tea at a temperature between 20 and 100°C (Figure 3a). The respondents were not always able to determine exactly at what temperature they prepared their tea. More than 25% of the respondents were not able to explain it at all (28.5% of the answers), whereas the detailed answers indicated, 80°C (16.4%), 90°C (16.2%), and 100°C (9%). Some of respondents provided only approximate temperature ranges included in the category of "other", i.e., 61-80°C (7%), 81-100°C (6.7%), 51-60°C and 40-50°C (0.2% each).

Similarly, brewing time significantly varied in the examined group of participants. More than 25% of the respondents were unable to determine the time they spent on brewing their tea (28.9% of indications), detailed answers included the temperature range from 30 seconds to 80 minutes, within which most answers were, 5 minutes (14.3%), 3 min (10.8%), 10 min (5.9%) and 2 min (4.2%) (Figure 3b). The "other" category was the second most frequently selected by the respondents (24.6%) who defined only approximate time slots: 3-5 min (11.4%), 1-3 min (7.3%) and 5-10 min (2.7%) (Figure 3c).

Among respondents, who were able to determine the number of teaspoons (one tea bag is approximately two flat teaspoons) used to brew tea most of them used, 2 teaspoons (17.5% of indications), 1.5 teaspoon and 3 teaspoons (3.4% each) and 0.5 of a teaspoon and 1 teaspoon (2.7% respectively). The category of "other" included the following answers, 1-3 teaspoons (6.7%), 1/2-1 teaspoon (1%), 3-4 teaspoons and 4-5 teaspoons (0.5% respectively) and the broadly understood "at a guess" category (0.2%) (Figure 3d).

Most respondents usually drank the first brew (64% of responses) due to the use of disposable tea bags. Respondents who did not drink the first brew (10% of the answers) believed that it is necessary to "rinse" tea leaves with hot water in order to clean them or open the leaves in order to extract "more" of their essence when brewing them later. These statements referred to teas purchased by weight. Respondents brew one portion of tea several times, usually two or three times (25% of the answers).

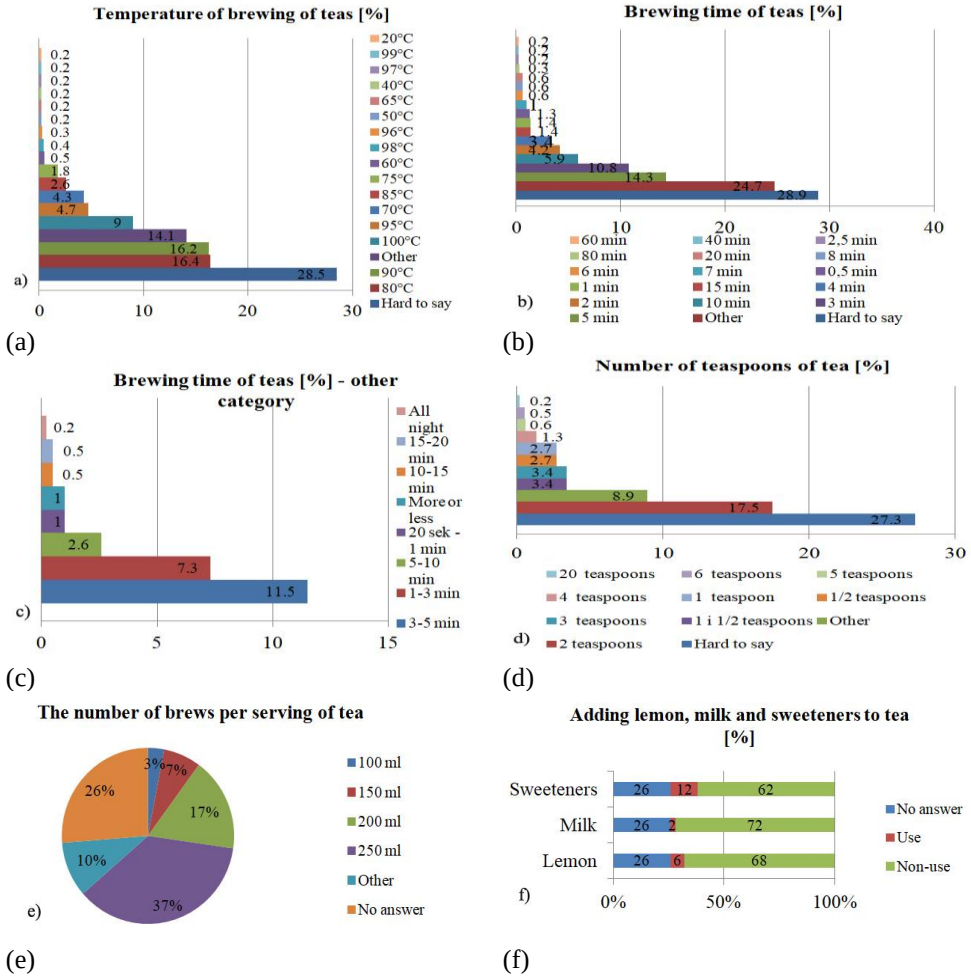
Most often, one serving of tea was used to brew 250 ml of the infusion, i.e. an amount comparable to the content of one cup (36% of responses) and 200 ml (17%) – less than a cup (Figure 3e). For the most part, Chinese teas were consumed without additives such as: lemon (68%), milk (72%) and sweeteners (62%). Among the respondents who sweeten tea, most people used sugar (7% of indications), honey (3%) and natural/artificial sweeteners (2%) (Figure 3f).

3.5 Reasons of Chinese Tea Consumption

Respondents bought Chinese teas mainly because of its taste (60% of the answers), health values (33%) and other properties (5%). In terms of health values, respondents primarily suggested: anti-ageing agent (24.6% of indications), weight

loss support (20.9%), anti-cancer properties (18.3%), bactericidal and bacteriostatic effects (14.6%), protection of the nervous system (11.7%) and anti-inflammatory effects (10%) (Figure 4). The category "other" included, getting used to the teas of a given brand, fragrance, relaxation properties, willingness to test new tastes, availability and interest in Chinese culture.

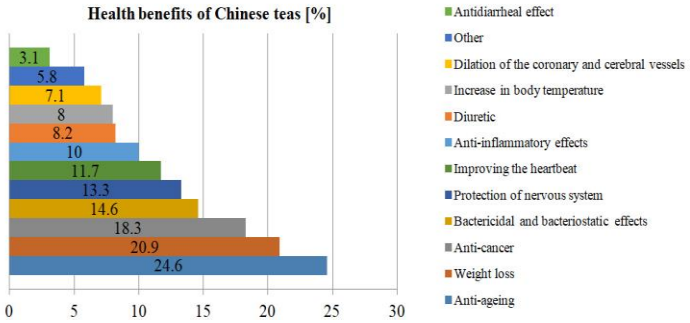
Figure 3. *Factors of Chinese tea brewing: a) temperature, b) time, c) time – other category, d) number of teaspoons, e) number of brews per saving, f) usage of additives.*



Source: *Own study.*

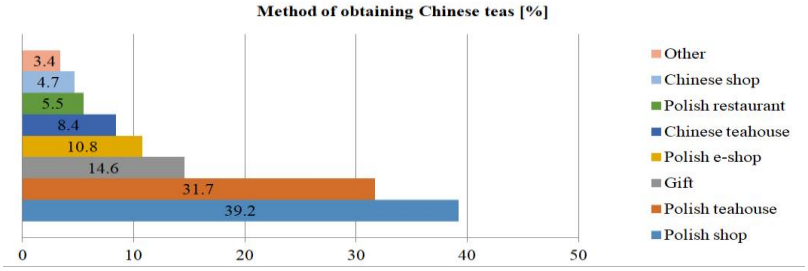
Respondents usually bought Chinese teas themselves, most often in Polish shops (39.2%) and tea houses (31.7%). Tea was also received as a gift (14.6%) and ordered via the Internet (10.8%) (Figure 5). When buying tea, only one fifth of respondents (20.7%) knew in which Chinese province it grows.

Figure 4. *Health benefits of Chinese teas.*



Source: *Own study.*

Figure 5. *Method of obtaining Chinese teas.*



Source: *Own study.*

According to participants, they drank tea which originated from the provinces of: Yunnan (12.7%), Fujian (5%), and Zhejiang (3%).

The research resulted in performing the following trends of Chinese tea consumption in Poland. Tea was found to be very popular in Poland. 83.6% of respondents declared to consume it daily and 72.8% of respondents drank tea infusions several times a day. Most often, they did so once a week or several times a day. 53.4% of the respondents chose Chinese green teas, while respondents chose black teas (21.5%) and pu'erh (20.7%). Half of the respondents (50.6%) bought Chinese tea by weight, and one in three respondents tea bags. Chinese teas were determined to be mainly brewed in mugs and cups (over 60% of the indications) or in a pot (20% of the answers).

Often respondents brew tea automatically i.e., without thinking about the amount of time spent on it. 28.5% of respondents could not tell how long the brewing process last. 16.4% of respondents brew tea in water at 80°C, a similar group of respondents brew tea in water at 90°C (16.2%). Chinese tea was indentified to be increasingly popular in Poland, but brewing details were still unknown to most respondents. This might be caused by the fact that they did not pay attention to this type of detail, habits acquired when consuming other teas, as well as the lack of relevant information about the brewing process. Brewing instructions were not always

provided by the producers in larger print on the packaging or directly by the sellers. Similarly, 28.9% of respondents could not tell how long they brewed their tea.

According to other participants, it took 3 to 10 minutes. Respondents usually used 2 teaspoons of tea or one tea bag (one in six participants) to brew 250 ml of tea. Most often, Chinese teas were drunk without added lemon, milk, and sugar/other sweeteners. The choice of Chinese teas was determined by their flavour and their health benefits, such as: anti-ageing (25% of the answers), weight loss support (25%), anti-cancer properties (25%), bactericidal and bacteriostatic benefits (16.6%), nervous system protection (10%), and anti-inflammatory properties (10%). Respondents bought Chinese teas mainly themselves (60% of the answers), mostly from Polish shops or tea houses. 14.6% of respondents received Chinese tea as a gift. Only 20.7% of respondents knew where the tea they consumed was grown.

3.6 Pro-Ecological Behaviour of Polish Consumers of Chinese Tea

Based on the detailed analysis of the knowledge and trend of Chinese tea consumption among Polish consumers the following pro-ecological behaviour issues of the consumers were revealed. The Chinese tea due to many reasons cannot be replaced. Thus, buying from local producers cannot be applied in this case. However, taking under consideration costs of Chinese tea itself and price of delivery from China to Europe, Polish consumers often choose one-time purchase of large quantities of teas instead of making many purchases in small quantities. This is related with one-time shipment/transport, and therefore entails lower costs associated with it).

In some dimension it contributes to the reduction of supplies delivery that is related with energy consumption. In relation of purchasing large quantities of teas is lower amount of material (mainly plastic or paper) used in large packages for making up packages, bags, boxes, etc. In the case of many small packages the amount of final packaging waste is higher. Polish consumers were choosing teas in the form of dried (by weight) instead of teas divided into bags. It directly lowers the amount of waste generated as tea bags the most common are produced using filter paper or food-grade plastic. It is not just an issue that plastic tea bags are not easily decomposed, but microplastic and nanoplastic are being released during brewing into the beverage that might cause a threat to the human health. The research revealed that Polish consumers brewed the infusion independently as needed, instead of purchasing already brewed teas. That causes avoiding the over-production of ready drinks, not corresponding to the demand, and therefore wasting resources.

The survey indicated that the most popular was one-time brewing of the Chinese tea infusion in a larger vessel (teapot or mug). That eliminates multiple boiling of water, saving electricity or gas consumption. Avoiding multiple boiling of water is reported to be healthier as eluding concentration of certain chemicals that might occur in the water. As Chinese way of tea brewing suggests using the same portion of tea several

times, due to their health-promoting properties, number of wastes of tea leaves is limited. It is opposite to the situation where tea bags where one portion of tea is only brewed once. Chinese recipe requires also brewing the infusion in vessels made from natural materials (stoneware, glass, etc.) instead of plastic. Moreover, using reusable vessels (kettles, thermal dishes, cups, etc.) lowers the number of disposable vessels.

Both cause lowering the amount of very popular nowadays and worldwide spread plastic disposable vessels, that directly after finishing the infusion become waste. In the research we also include positive effect on health as pro-ecological behavior. Thus, Polish consumers mainly used the infusion without flavor enhancers - incl. sugar, as well as selection of teas due to mainly their pro-health values beside other consumer habits, like sentiment, taste, preferences, or curiosity.

4. Discussion

According to GUS information (GUS, 2019a; 2019b) and existing research on Chinese tea knowledge/consumption in Poland (State of the Polish tea market, 2015; Borowiec and Stój, 2016; Dmowski *et al.*, 2015; Rusinek-Prystupa and Samolińska, 2013; Kozirok and Sitkiewicz, 2015; Drewnowska, 2015; Adamczak *et al.*, 2017) it could be concluded that teas (in general) were popular in Poland, black teas were the most popular teas and green teas also were increasingly well-liked (Borowiec and Stój, 2016). On the other hand, according to the research conducted locally, when buying tea, inhabitants of the Tricity area (cities: Gdańsk, Gdynia, and Sopot) were driven by their sense of taste and smell, as well as factors related to the organization of sales and trade (type and brand of tea, its price, advertising, and packaging) (Dmowski, 2015), whereas inhabitants of Lublin chose Lipton and Saga teas, however, female inhabitants boughty Dilmah teas more often than male inhabitants.

Tea infusions were consumed by representatives of both sexes most often at meals (Rusinek-Prystupa and Samolińska, 2013). The results of a study conducted in Bydgoszcz indicated that its inhabitants were most willing to drink black tea, followed by green tea, fruit, herbal, and rooibos teas. When choosing their tea, inhabitants were guided by the flavour and smell of the tea, its type as well as its health-promoting properties and their habits. The residents of Bydgoszcz shopped mostly in specialist shops, large-format shops, and smaller grocery shops (Kozirok and Sitkiewicz, 2015).

Regarding the above, the aim of this study was to not only to carry out a survey, but also to compare factors influencing the selection and preparation of Chinese teas, based on customs acquired by one of the authors during a several years' stay in the PRC. The consumption of Chinese teas (as well as tea in general), apart from their availability (supply) and demographic variables, was influenced by many individual factors. They included the consumer's affection and preferences, taste, circumstances (the so-called momentary needs), physical needs of the body, as well

as curiosity (e.g., the desire to taste something new/recommended/looking or smelling interestingly).

The first factor is availability (seasonal popularity): In China, green teas are brewed in spring. Harvested in spring, green teas are not only the freshest but also the most expensive. In summer, green teas are also popular due to their cooling properties. In autumn and winter black teas, in China known as red teas [红茶] are consumed to warm up.

The second factor is affection towards the place (residence/study/work): For example, oolong teas [青茶/乌龙茶] are mainly grown in Taiwan and Fujian provinces where it is possible to buy dry tea leaves directly from producers, visit plantations and discover the culture of tea. Tea culture is so common there that inhabitants of these provinces interact with it every day and foreigners who stay there for longer associate these places with tea.

The third factor is taste preferences (predilection for delicate or intense flavours): Pu'erh earthy teas [普洱] are recommended to lovers of strong and distinct flavours. Non-fermented white teas [白茶] are exceptionally delicate. Green teas [绿茶], yellow teas [黄茶] and oolong teas may be scented with the aroma of, e.g. jasmine flowers [茉莉花茶].

The fourth factor is the needs of the body or momentary needs (during the season of colds and flu/specific time in a day/accompanying activities): In China, eight treasure teas are popular during the flu or cold season [八宝茶]. Tea leaves are most often supplemented with jojoba (according to Chinese medicine it exhibits calming properties), goji berries (toning liver and kidneys, improving eyesight), nuts (strengthening the brain and delaying the ageing process), longgan fruit (strengthening heart and spleen), sesame seeds (increasing strength and preventing ageing), sultan raisins (strengthening the kidneys) and sometimes sugar (energy support). Flower-fruit infusions are recommended for those who work with their voice [花果茶], as they prevent vocal cords from drying. However, drinking fermented teas – black or pu'erh – is recommended during conceptual work, which requires attention and stimulation. In the evenings, edible chrysanthemum is brewed [菊花茶] as it does not stimulate and makes falling asleep easier.

The fifth factor is curiosity: The aroma of teas smoked in pine smoke is quite unusual in Poland [熏茶]. These teas which are grown around the Wuyi Mountains (Fujian province) are darker in colour than black teas. Their aroma is similar to the smell of a bonfire, a burning cigar or even kabanos sausage. Visually, they surprise with their unusual ball shape, also known as floral or flowering [花茶], which after brewing slowly develops into the shape of blooming flowers. Most often, they consist of green or oolong tea leaves mixed with flower buds.

This survey filled the existing information gap by showing that respondents drank Chinese teas very often, every day and even several times during a day. In addition, it seems that green teas are also quite popular despite the fact that black teas dominate in the general preferences of Poles. Tea is also purchased in the form of dry leaves, not in tea bags, but is brewed once (similarly to tea bags). Most often, respondents brew Chinese teas without a strainer, according to their individual preferences, such as: the amount defined as "tea portion", brewing time and temperature. Most often respondents bought tea by their own in Polish shops or tea houses, but they did not always know where it is grown (they associated tea with the country of origin, but not with the region – province).

According to the relevant literature and the available meta-analyses on health properties of Chinese teas, tea exhibits the following health properties: cognitive benefits, especially related to concentration (eg when switching attention), reduction of anxiety in anticipation of a stressful event, as well as physiological stress indicators and increased alertness (Einöther and Martens, 2013), prevention of lithiasis (green tea, Nasrul and Sehgal, 2020), reducing the risk of lung cancer (black teas, Seow *et al.,* 2019) and head and neck cancer (Huang *et al.*, 2014), positive association between tea consumption and telomere length (Chan *et al.,* 2010), lessening the symptoms of depression (Shen *et al.,* 2019; Niu *et al.,* 2009; O'Neill Rothenberg *et al.*, 2019), reducing the risk of osteoporosis (Sun *et al.,* 2017) and bone health (Li *et al.,* 2018), effect on treatment of chronic periodontitis (Kazem, 2018), reducing the risk of stroke (Arab *et al.*, 2013), anti-mutagenic, anti-viral, anti-oxidant, anti-inflammatory properties (Sanliera *et al.,* 2018).

A healthy attitude has been reflected in the choices of respondents who, apart from the flavor, indicated such properties as: anti-aging, weight loss support, anti-cancer properties, bactericidal and bacteriostatic effects, protection of the nervous system and anti-inflammatory effects as factors determining the purchase.

Most often, respondents drank Chinese teas without lemon, milk, or sweeteners. Apart from individual taste preferences, this might be caused by the fact that sweetening tea (with honey or sugar) minimize its reducing and anti-radical properties (Sady *et al.,* 2016).

Results of our research do not allow for direct comparison of tea consumption preferences with income values as most of the respondents did not answered this question in the socio-demographic part of the survey. In fact, Chinese tea consumption in Poland is related with much more sophisticated features that just simple income and place of living but rather with beliefs and knowledge of Chinese culture.

Results of this study can affect the food multifaceted policy, both within the Polish, Europe and in the international perspective. As part of Poland and Europe, an area inhabited by society constantly striving to achieve the broadly understood level of

luxury, tea as an exclusive product with pro-health properties, well promoted, has a chance to become an important element of international exchange. In the context of internationalization related to the continuation of the One Belt One Road initiative, ie, a geostrategic initiative covering several continents, information on the interest of Poles in Chinese tea and its consumption provides a lot of information on the sales market, possibilities of establishing cooperation for the purpose of future trade, as well as good practices that can be applied by other European countries. The interest of Poles in Chinese teas also indicates that tea (as well as a wide range of accessories related to it) perceived as a commodity and which may be classified as an important element of Chinese economic culture, may also become associated with Poland in the future, where it becomes more and more popular awareness, as well as increasing cultural related to the rich culture of the Middle Kingdom.

Each type of production generates costs, both in purely economic and social-environmental terms. Due to the above, the very purchase of a given good may be treated as a non-ecological undertaking, while activities aimed at sustainable development consumption may manifest themselves by choosing an option that is less burdensome to the environment. Generally, it was revealed that economic factors influenced positively on pro-ecological consumer behavior through buying larger amounts of tea at one time as it generated lower costs. Pro-health issues of Chinese tea impacted also positively as Polish consumers chose them consciously.

On the other hand, knowledge on Chinese receipt on brewing tea could be higher, especially regarding number of infusions from the one portion of the Chinese tea. Moreover, general knowledge of tea types and their origins could be higher. Still for most of the Polish population black tea in tea bags is the most popular association with the term tea. It could be related among older populations firstly with the fact that tea started to be freely available after the end of the communism era since 1990.

Regarding majority of the younger Polish population the trendiest are the goods that are aggressively advertised. Thus, the low knowledge and ecological awareness affected negatively on pro-ecological behavior of Polish consumers of the Chinese tea. Our results confirmed that economic factors are not everything regarding achieving ecological goals. Ecological awareness and adequate knowledge might impact on the increasing activities on pro-ecological consumer behavior in the local dimension. Finally, the observation that Chinese tea is getting more and more popular as it might displace sweet, bottled drinks.

5. Conclusions

This research was a qualitative study and referred mainly to the examined group of the Polish Chinese tea consumers. However, it might provide a starting point for further research and facilitate analysis of the tea market, as well as the habits and preferences of Polish consumers.

Among 622 respondents of the questionnaire surveys over 70% of respondents declared to consume Chinese tea daily, mostly once a week or several times a day. Three the most popular Chinese teas they were drunk in Poland were green teas, black teas, and pu'erh tea. Poles brewed Chinese teas mainly in mugs and cups or in a pot. Most of the respondents did not pay attention to the details of the brewing procedure. Also, most often Chinese teas were drunk without added lemon, milk, and sugar/other sweeteners. Nevertheless, Chinese tea consumption was identified to increase in Poland, even though most of the respondents did not knew the origin of the consumed Chinese tea type. The main reasons of choosing Chinese teas were their flavour and their positive health effects.

Based on the research performed following pro-ecological consumer behavior among Polish consumer of Chinese tea were observed:

- The most often tea leaves were bought. The ready infusions were not popular among Polish consumers. Unfortunately, as the second-choice tea bags were preferred,
- Tea was prepared the most often as follows: brewed in a mug, a cup or a pot (with or without strainer). Vessels for brewing were made from natural materials, without bags. The same tea portion was brewed several times (dry leaves purchased by weight, this does not apply to teabags),
- Tea in the amount of 250 ml was brewed,
- The tea infusions were consumed without flavor enhancers - incl. sugar (pro-health behavior),
- Chinese tea was chosen due to its pro-health properties.

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