

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Tropical AgriSciences



Czech University of Life Sciences Prague

**Faculty of Tropical
AgriSciences**

**Familiarity and attitudes of Czech consumers
towards tropical fruits**

MASTER'S THESIS

Prague 2020

Author: Bc. Dominika Dvořáková

Chief supervisor: Ing. Petra Chaloupková, Ph.D., dr. h.c.

Declaration

I hereby declare that I have done this thesis entitled Familiarity of Czech citizens towards tropical fruits independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague, 14th May 2020

.....
Dominika Dvořáková

Acknowledgements

First and most I would like to thank my supervisor Ing. Petra Chaloupková, Ph.D., dr. h.c. for helpful comments and advices, however most importantly I attribute massive thanks to her patience with my work. She fully guided me to achieve all the goals we set up. Furthermore, she helped me with the path to obtain very high-quality data across the Czech Republic. She motivated me amazingly throughout the whole process of the Master's thesis. She helped me to improve my skills and pushed my limits.

Last but not least, words of thanks go to my family and friends who support me whole time and motivated me.

Abstract

The purpose of this thesis is to analyse and describe the familiarity of the Czech citizens with tropical fruits, their general attitudes and beliefs, the influence of social norm on tropical fruit consumption and to evaluate consumers' purchasing intention of tropical fruits. To gain such information, a questionnaire-based online survey (n = 827) was applied. Familiarity with tropical fruits differs among various sociodemographic aspects. Over 60 percent of respondents do know and consume four to eleven out of twenty-three outlined tropical fruits. Tropical fruits are viewed as well available, tasty, healthy and nutritious, however they are perceived as quite expensive by the respondents. The most preferred tropical fruits are bananas, lemons, tangerines and oranges and among the less known belong rambutan, durian, kumquat or guava. Males consume tropical fruits more on the daily basis, whereas females are more likely to consume tropical fruits on weekly to even monthly basis. Czech consumers prefer consumption of tropical fruit in a form of fresh fruit rather than canned or mixed with yoghurt. Among age distribution, younger generation (up to 35 years of age) draws information about tropical fruits mostly on the Internet, whereas elder generation (54 years and more) acknowledges themselves through vacation experiences more than others.

Key words: Tropical fruit, the Czech Republic, exotic fruit, consumption, consumer behaviour

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List of the abbreviations used in the thesis

| | |
|------|---|
| BBC | British Broadcasting Corporation |
| FAO | Food and Agriculture Organization of the United Nations |
| UNDP | United Nations Development Programme |
| WHO | World Health Organization |

1. Introduction

Tropical fruits have always played an important role world-wide. As a commodity grown mostly in tropical and subtropical area it is traded with, tropical fruits generate income, provide employment opportunities and most importantly provide nutrition to the countries of third world some of which are dependent on the consumption of tropical fruits. The need of new preservation practices and postharvest technologies to maintain quality of tropical fruits needed to be implemented, due to the increase in the demand. Tropical fruit have mostly been a commodity grown for local consumption on either home gardens or small farms (Yahia 2006). Yahia and Singh (2009) revealed that tropical fruits have become horticultural crops very important on the international market. Reasons for such change is the need for exotic products, changes in diet, lifestyle, and increased holiday traveling. However, the prices of such products raise as well. As the globalization penetrates, tropical fruits became widely popular amongst consumers because of many reasons. This commodity emerged significantly since 1970 due to upgrades in transportation, open market and various trade agreements (Altendorf 2017). Since experiencing increased popularity, the global production of tropical fruits worldwide records an approximately 3.6 percent increase every year since 2001, when the global production reached 93.7 million tonnes in 2017 (Altendorf 2019; Prowse 2019). These days regular market records around 50 varieties of tropical fruits, where fruits such as mangoes, papayas, bananas, pineapples and avocados are dominating (Ojeda 2017; Altendorf 2019). Nevertheless, many of tropical fruits of high health importance remain unknown because of the unavailability through the standard massive market chains (CBI 2017b). Tropical fruits are proven to have a positive impact on consumers' health (Johansson & Andersen 1998; Baker & Wardle 2003; Radam et al. 2010). Many factors may influence the consumer behaviour such as sex, age, education, income etc. (Sabbe et al. 2008). Women incline more towards healthy lifestyle than men (Radam et al. 2010). Sharma and others (2014) revealed that people in urban areas are more likely to purchase organic foods than in rural areas while McClelland and others (1998) stated that educated people are more likely to purchase tropical fruits than not educated individuals. The purpose of this study is to reveal the situation of tropical fruits on the Czech market. Due to the fact that the detail information about consumers' familiarity are not known, the

main objective of this research is to analyse and describe consumers familiarity with tropical fruits and what are their attitudes in purchasing behaviour.

2. World-wide consumption of tropical fruits

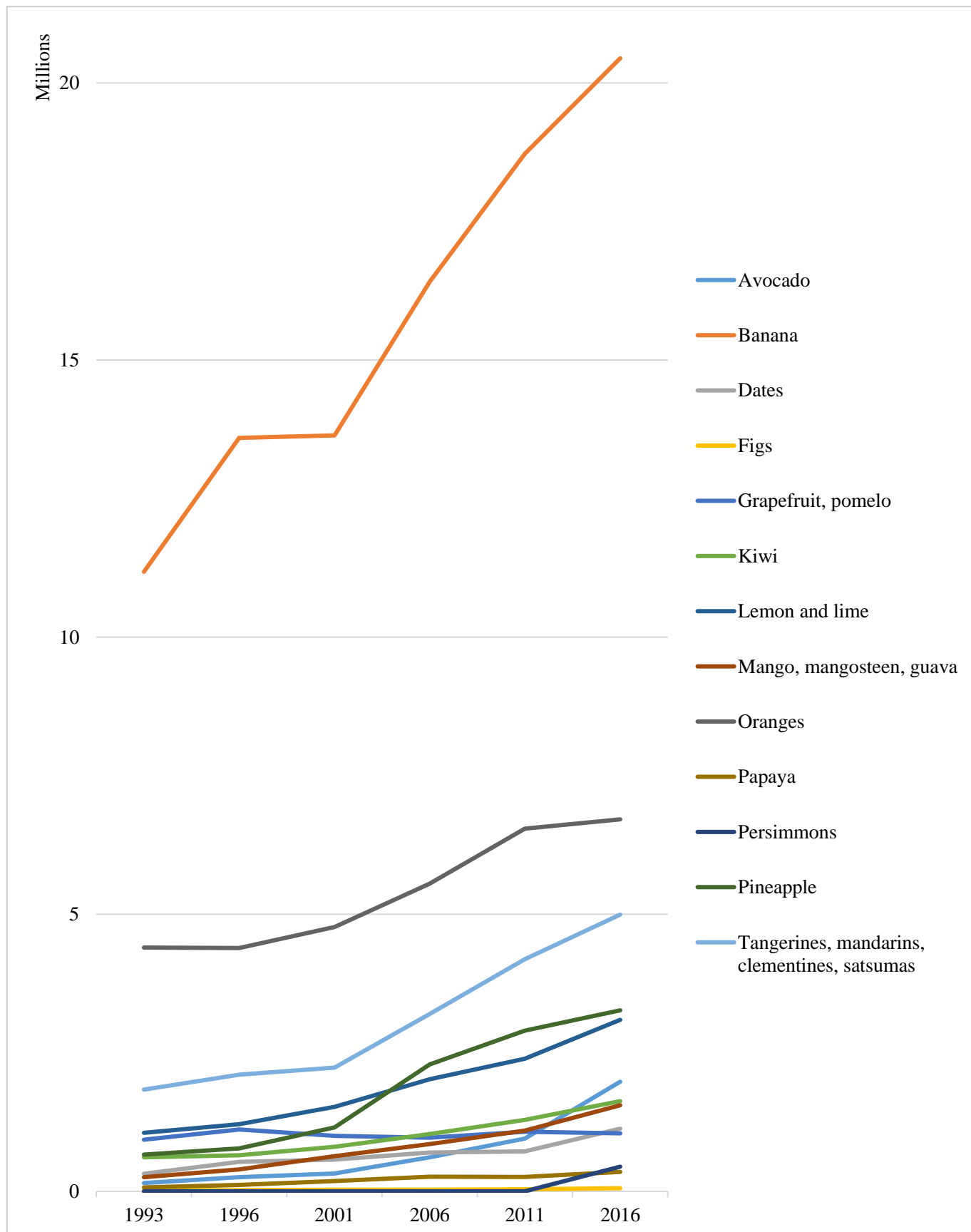
In the past 20 years, the import of tropical fruits has increased; especially during between years 2000 and 2004 where the increase of the global import of tropical fruits by 25 percent has been recorded and furthermore the total production of tropical fruits has raised by 19.2 percent (Ahmad & Chwee 2008). Additionally, large change of production and distribution of tropical fruits experienced trade companies. The situation 20 years ago was that mostly specialized fruit companies took part on the market, meaning tropical fruits to one country were supplied by many countries around the whole world. Nowadays the situation is that the supermarkets begin the buying process of tropical fruits directly from the countries of production, increased the number of imported product and limited the number of countries from which is importing. For this reason, the meaning of fruit companies decreased (FAOSTAT 2018).

One of the tropical fruits which was firstly intensively grown for export was a banana by reason of being one of the most important fruit on the worlds market. Nevertheless only 1/5 of total production of bananas nowadays goes to export. The rest of bananas is a source of nutrition in developing world. Although this mass production for export has its negatives. Through the years the trade structure of a commodity has changed. In early years, the fruit company was responsible for all the processes from growing and packaging through export, import, ripening of the fruit to final sale to chain store. Nowadays, the structure there is divided into a grower, different exporter and from that all the responsibility lays on the chain store. Most profitable position in the selling cycle has the retailer, the hard workers on the plantation gain almost no profit (Trojak & Bílý 2017).

Figure 1 reveals that the import of banana worldwide is rapidly increasing through the years since 1993 to 2016. In contrast with other tropical fruits, the import of banana is massively larger, reaching 20,443,900 tonnes imported worldwide in the year 2016. Furthermore, it can be seen how oranges and mandarins (especially tangerines, clementines and satsumas) are dominating the worlds import with rapidly increasing level

of import since 2001. Furthermore, pineapples, lemons and limes are experiencing high increase on the side of import since 2001. In addition, there are tropical fruits which have been discovered to have great benefits to human body and became trendy later, especially in 2011. Such difference is reported by tropical fruits such as persimmon, dates, avocado and mangoes, mangosteens, guavas. Exclusively, for avocados a high increase of import has been reported (1,313 percent). Over the years 2011 to 2016, persimmon has reported an extreme increase of import by over 31,000 percent. Nevertheless, statistics from previous years are either missing or remain an estimation. However, in the contrast, the import of grapefruits and pomelos was more likely to decrease over time. Many studies (e.g. Barends et al. 2013; BBC 2016; Carruth et al. 2004; FAO 2012; Godrich et al. 2017; Ji et al. 2019; Johansson & Andersen; Liu et al. 2019; Moore & Thompson 2015) reveal the importance of active consumption of tropical fruits, nevertheless, according to Moore and Thompson (2015) the consumption of fruit and vegetables is still not high enough and does not reach the recommended guidelines.

Figure 1 The total import of tropical fruits worldwide between years 1993 and 2016 (FAOSTAT, 2018)



2.1. Exporters of tropical fresh fruits

The main exporters of tropical fruits are Mexico, Costa Rica, Peru, and Chile. However, massive dominants of export trade of tropical fruits are countries such as Netherlands, Belgium, and Spain, even though many tropical fruits are not grown there. That is due to their situation as retailers, because many countries import their tropical fruits in these countries, and these countries afterwards happen to resale those tropical fruits over whole Europe. Additionally, that is the reason, why Netherlands happens to be both: the biggest exporter and importer. For Palestine for example, tropical fruits pledge to have be the top export (Simoes & Hidalgo 2011).

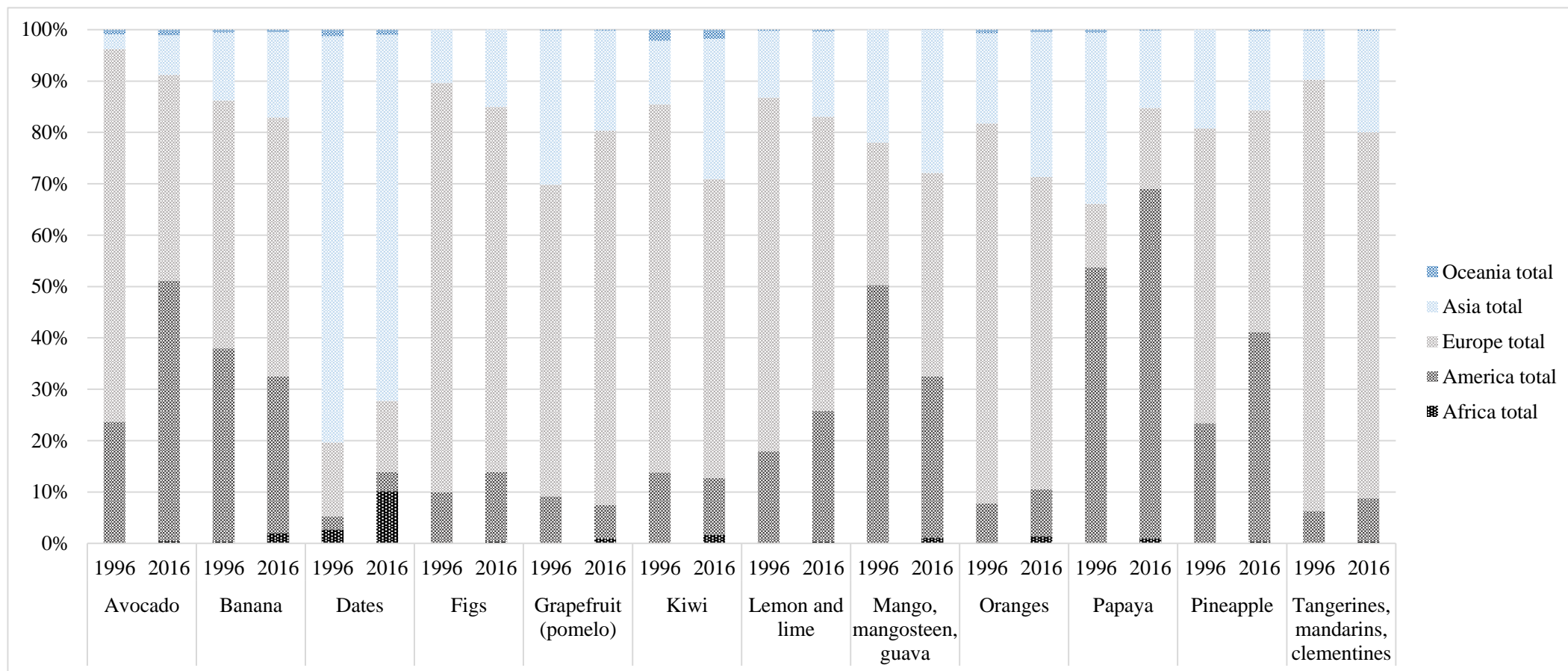
2.2. Importers of tropical fruits

The import of tropical fruit became a high trend in around 2012. Generally, the largest importer of tropical fruits is Europe, followed by United States of America and Asia. European countries which are importing tropical fruit the most are Netherlands, France, and Spain however it is not due to their high consumption, however, at the same time they are also exporters due to their position as trade hubs, they export goods to other countries in Europe. These three countries are covering 86 percent of all European imports. Thus, Spain is mainly exporting their locally grown products, Belgium is a largest known importer/re-exporter of lychee, and Netherlands and France cover majority of tropical fruit (CBI 2019b).

Concerning the case of limes, the import has increased from 2013 to 2017 by 33 percent, originally produced in Brazil and Mexico (CBI 2017a). Avocadoes are imported from Peru, Mexico, South Africa, Kenya and Columbia, when the demand for avocado is rapidly increasing, with the result around one kilo per capita in Europe. The dominating market for avocado is in France, however the largest importer and re-distributor in tonnes is Netherlands (Hass 2017). Not only fresh tropical fruits are imported to Europe, additionally dried tropical fruits are also recording and increase on the import curve. Main importers of dried tropical fruits in general are Austria, Poland and Croatia. Dried mangoes are mostly imported by the United Kingdom and dried bananas by the Netherlands. Surprisingly, the largest European importer of candied tropical fruits is Slovakia (CBI 2019a).

The world importers in years 1996 and 2016 are described in Figure 2. The largest difference between those years was recorded by avocado fruit, which recorded massive increase of import to Northern America due to its increasing demand. Avocadoes became trendy in the past decade, while papaya has become very much imported to Northern America in 2016, when in 1996 the largest importer of papaya was Europe.

Figure 2 World import of tropical fruits in 1996 in comparison to 2016 (FAOSTAT, 2018)



2.3. Consumer's attitudes to tropical fruits

The theory consumer behaviour is essential to understand human acts towards products. As Barnett (2003) stated, “functions and their attendant rankings are cardinal not ordinary; second, because, with respect to the set of bundles relevant to actual human beings, such functions are not continuous and, therefore, not differentiable; and, third, because such functions do not correctly, consistently, and properly include dimensions/units”. The consumption of tropical fruits and the actual decision of consumer is a result of various interactions between different factors. Factors such as socio-demographic, environmental and psychologic situation of a single consumer. Many studies describe the impact of socio-demographic factor towards the consumption of food. For instance, Pollard and others (2002) stated that people in the Northern England and Scotland consume generally less than people living beneath this region. Krebs-Smith and others (1995) revealed that people with higher education have a positive effect on the fruit and vegetable experience. That is supported by Johansson and Andersen (1998) and McClelland and others (1998), who say that people with higher education tend to consume more fruits and vegetables than people with education of lower level. Generally, food consumption of an individual evolves from experiences, as it is a response to social factors and traditions (Pollard et al. 2002). Traditions play very strong role in the food choice and purchasing behaviour in many countries as a result of set values and beliefs towards consumption of different foods. On the contrary, the food choice is a way of expression of an individual, which results in people having their own preferences. Nevertheless, even though there are even food restrictions due to religion in some countries, none of them contain vegetable nor fruit restrictions. In addition, Rozin and Vollmecke (1986) stated that besides cultural impact on the food choice, there still are various taste preferences of food, even amongst one family.

Equally important is a role of gender on the level of consumption of fruits. In general, throughout the studies can be seen that age, gender, age, place of living has an impact on the consumption of fruits, and vegetables as well. For instance, Johansson and Andersen (1998); Baker and Wardle (2003); mentioned that women show more tendencies towards healthy consumption than man, thus they consume more fruits. Furthermore, Radam and others (2010) report that women are even more concussions

than men in terms of healthy lifestyle. According to Dinger and Waigant (1997) males are less likely to consume fruits and vegetables than women and are more in favour of fat meats and snacks. Regarding the household situation, mothers usually eat the highest amount of vegetables, fruit and berries, children eat lower amounts of such products like fathers, however, fathers ate less berries than children (Kähkönen et al. 2020). With the concern to age, Johansson and Andersen (1998) stated that fruit intake was the highest amongst elderly women, which is supported by McClelland and others (1998) where older generations in general consume more fruits and vegetables than younger generations. Theory of planned behaviour states that consumer determines the advantages and disadvantages of particular behaviour prior to making a decision of action (Ajzen 1991).

2.3. Food choice determinants and purchasing intention

Food choice is an aspect, which varies amongst every human being. It is a process evolving whole lifetime, as person is exposed to newer and newer varieties of food (Schwartz et al. 2018). Food preferences can be formed at any age during a lifetime; however, infancy is the most crucial and significant stage where most of the preferences are created (Cashdan 1994; Hendy 1999). This process begins by mother feeding child with a breast milk, not only the mother creates first signs of an infant appetite - as the taste of breast milk can differ by what the mother's diet is (Mennella 1995). After breastfeeding the taste cells begin to evolve. Schwartz and others (2018) even mention that in around 20 months of age, differences amongst gender can be seen. Amongst the types of flavours (saltiness, sweetness, sourness, bitterness, umami) sweetness is the best-accepted flavour, followed in older age by saltiness, which increases with age. Children struggle with vegetables, as their flavour is sour and bitter. Those flavours are not very well accepted, however after adding clear salt or ingredients containing salt, the acceptance increases (Schwartz et al. 2011). Mothers who began complementary feeding with vegetables projected much higher percentage of infant vegetable consumption in further years than mothers who started exclusively with fruits (Barends et al. 2013). By the time children can chew, they are exposed to newer food and thus new flavours. Some studies stated, that when parents see any insecurity with food in their children, they often understand it as rejection, so they exclude it from their home diet (Carruth & Skinner 2000; Carruth et al. 2004; Skinner et al. 2002). Person in adult period does not show

many changes in food preference. However, differences among adults worldwide reaches uncountable values. Understanding the behaviour of consumers is crucial to reveal what has an effect potential buyer, in order to meet the demand. Consumer behaviour is a social science, discovering all activities from purchase, use, handling and disposal of goods. Determinants are divided into two groups: direct and indirect determinants (Zwierzyński 2017). Economic and demographical information of individuals represent indirect determinants, marketing and psychological factors are direct determinants. Income of a consumer influences the expenses significantly. The amount of financial resources and items are strictly defined in every household thus, economic factor determine consumers behaviour at very high level. Demographic factors are age, gender, household size etc. The needs of an individual change with age, more likely than gender and number of individuals in shared household has more of a high impact on the range of goods. Furthermore, marketing has most relevant impact on the making of choice by an individual. Purchasers personality and view on life are very important determinants. Internal influences (also called psychological influences) originate from person's own mind and lifestyle like feelings, attitudes, motivation, thoughts etc. External influences are factors that may affect individual's purchasing intention, like culture, social norms, family roles etc. (Rozin & Vollmecke 1986; Capitello et al. 2015).

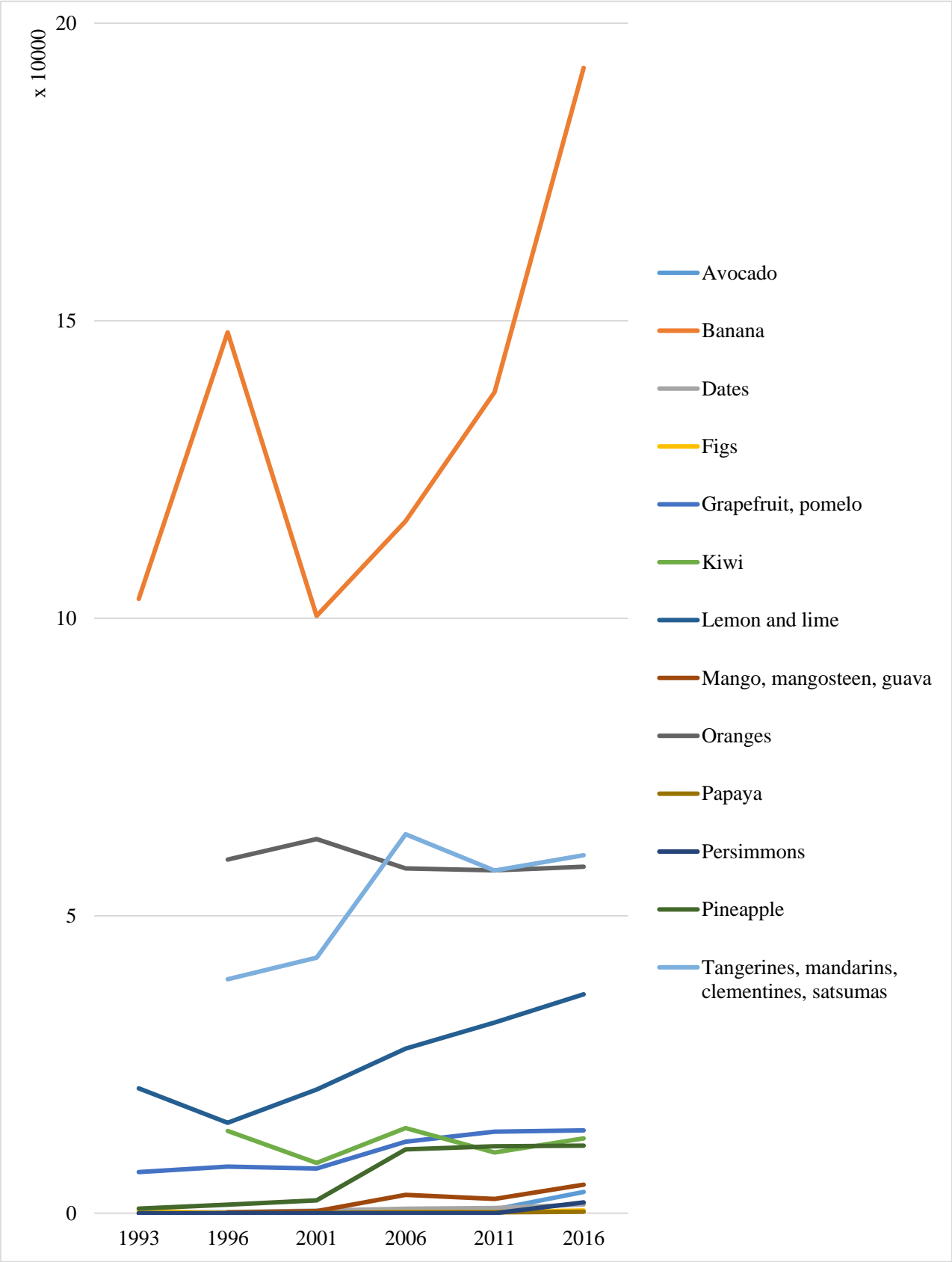
2.4. Tropical fruit market in the Czech Republic

The market in the Czech Republic was rather limited in the ages before the year 1990, fed on mostly domestic products, where there was only scarce chance to obtain some of the fruits from tropics in any forms. Market was dependent on the relationships with the so-called friendly countries, which made it was possible to import/export products only from those countries. Data from FAOSTAT have been used, while searching for import quantities to the Czech Republic since 1993 to the newest data available (Figure 3). The target was exclusively the fresh form of tropical fruits, thus there are many varieties of processed fruits to be found. Following reveals that tropical fruits got popular over the years in the Czech Republic, however further research is still crucial.

The difference over the years is reported in the Figure 3, withdrawn and processed from FAOSTAT, starting from the latest data available (for most tropical fruits) which was the year 1993 to the nearest to presence – 2016. Majority of tropical fruits imported

to the Czech Republic are recording constant increase. Bananas have been imported to the Czech Republic from Cuba, when these countries experienced strong political and economic relations, the number of bananas imported to the Czech Republic is massively higher than other fruits. Additionally, bananas have always been the most traded tropical fruit in the Czech Republic, with an exception in 2001 when bananas experienced massive drop in in trade. However, most of the tropical fruits became highly demanded. For instance, in the case of avocado can be seen an increase by 3,620 percent between the years 1996 and 2016, furthermore, the number of mangoes, mangosteens and guavas imported to the Czech Republic has risen by 3,426 percent. Furthermore, papayas or pineapples record high increase by over 1,300 percent. On the contrary, fruits such as kiwi or oranges recorded decrease in import over the years even though, the import of oranges and tangerines does not differ significantly. Moreover, lemons and limes are recording increased import since 1996, due to growing interest of utility. Lemons and limes are good additives to fresh drinks, alcoholic drink, cakes, but also work well as preservatives (CBI 2017a). Persimmons show very rapid growth on the import level in 2016.

Figure 3: Imported tropical fruits to the Czech Republic throughout the years 1993-2016 in tonnes (FAOSTAT 2018)



2.5. The effect of trends on the consumption of tropical fruits

Eating healthy plays an important role in our life and has always been suggested to do. Nowadays food restrictions and dietary controls are ruling the world. For example, dietary issues such as gluten free diet, lactose intolerance, and many others occur more often than earlier. On the contrary, trends such as eating healthy and workout a lot, being a vegetarian or even vegan became also essential part of human life. Food purchasing behaviour of consumers undoubtable change as a result of e.g. wavering income, globalization, urbanization, adjustment in a lifestyle et cetera (Pingali 2006; Kaur & Singh 2007).

2.5.1. Vegetarianism and veganism

For more than a decade now, vegetarianism became widely popular, though also very health-beneficiary eating practice, but also a part of increasing global trend, while trying to become friendly to the environment. Vegetarians are people who do not consume any animal flesh product. Varieties of vegetarians can be found in the world, for example people do not consume any animal product such as eggs, dairy products, fish/seafood (vegans) or even individuals who allow themselves a piece of meat once in a time (semi-vegetarians/self-described vegetarians) (Juan et al. 2015). This diet appears to be healthier than the omnivore diet, while vegetarian replaces portions of meat with fruits and vegetables. Moreover, it has been shown that vegetarians are experiencing weight loss as most vegetables have less fats than omnivore diet. Although, there are some studies, which prove that, there is no difference in weight, saying the reason might be the difference in number of products intake (Barr & Broughton 2000; Bedford & Barr 2005). Many studies also discuss its ethics, moral norms and the attitudes and even religious impact on food choice. However, that field is missing wider research.

Another growing global trend is to move towards “healthy lifestyle” and to consume more organic food. The tension to eat and life healthy was always meaningful for human being, but not so often practised as it is these in 21. century. In the past decade, social media have gained on importance and takes essential part in everyday life (Duchamp 2017). Social media can influence healthy lifestyle for instance by users taking

pictures of their food, pictures of them being engaged in physical activity, in order to provide support to other users and help them to more motivated and opened towards sports and healthy eating (Zepeda & Deal 2008; Teodoro & Naman 2013; Spence et al. 2016).

2.5.2. Organic and healthy food

The consumer behaviour and pattern are widely changing, and the importance of organic food market is experiencing massive boom. In past few years, the production and thus the availability of organic food have increased (Sharma and Singhvi 2018). Furthermore, the Gustavsen and Hegnes (2019) stated that many studies reveal situation that many people incline towards organic food and organic agriculture as they feel the need to improve the environmental impact, additionally, the pressure situation of modern agriculture is also having an impact. However, Nytrand and Olsen (2019) stated that social pressure is what mostly influences the positive consumption of organic and healthy food. The Food and Agriculture Organization of the United Nations (FAO) even invented term: Sustainable diet where individual regards on the environmental impact, and inclines towards healthy lifestyle for the future, however even present generations. As FAO defines in detail: “Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources (FAO 2012). This is supported by many studies (Mehra & Ratna 2014; Sharma & Singhvi 2018; Gustavsen & Hegnes 2019; Sharma et al. 2014) who reveal that health is a factor of high importance to begin purchasing organic foods. Pearson and others (2013) however, reveal that the concern for the environment is the primary motivation to buy and consume organic foods.

Mehra and Ratna (2014) agrees that women and younger generation inclines towards organic food because its healthier than conventional foods. According to Aydoğdu and Kaya (2020), education, income and gender have the most important impact on consumer behaviour towards organic foods. Furthermore, labels appear to be high of importance, consumers compare labels and care about the information about products whereabouts, composition etc. Thus, that is supported by Loura and others (2018) who reveal that 70 percent of respondents recognize labelling as one of the most important

factors to recognize an organic food. Sharma and others 2014 discovered that people in urban areas are more aware of organic food situation than people living in rural areas. Nevertheless, the high price of organic food still plays a crucial role in purchasing behaviour of consumers (Sharma and Singhvi 2018). This is in a contrast with some studies (Sharma & Singhvi 2018; Pandurangarao et al. 2017) because as their research discovers, the price did not hold an opinion of crucial importance, as the respondents were willing to pay higher price in order to eat healthier. Oberne and others (2020) discovered that the intake of fruits and vegetables is highly related to health literacy among college students. Students with higher general health literacy, disease prevention health literacy and health promotion health literacy were inclined towards healthy diet. However, almost 40 percent of college students in the United States of America are either overweight or obese, therefore health programs among college campus can be implemented, to provide students with crucial health literacy (American College Health Association 2020). Furthermore, students can improve their long-term dietary practices as college students are very likely to develop health behaviours they take into adult life (Oberne et al. 2020). Though, the number of people purchasing organic foods is still very low in comparison with people consuming conventional foods (FAO 2012).

2.5.3. Junk food

The junk food industry is representing a massive business nowadays. The consumption of foods high in sugars and fat such as fast foods is moderately lower amongst older generation compared to younger generation. Young generation, particularly students often incline towards undesirable diet, according to Papadaki and others (2007) students who live far from their families abandon their traditional household habits regarding consumption and are most likely to adopt unhealthy diet. As physical activity is in a positive relation with fruits and vegetables, watching television is highly connected to consumption of fried foods (Pires et al. 2013). Cooking is an activity of great family tradition. Young consumers learn such behaviour from their families, and it has an impact on their future behaviour (Hunter-Jones 2014). Furthermore, cooking may represent a consuming activity, regarding time, money, commodities, activity (Holt 1995). Cooking at home may have a positive impact on body obesity, it demonstrates healthier diet, moreover, enhances the intake of nutrients (Chu et al. 2012; Larson et al. 2006). Almost half of university students from the Czech Republic, Slovakia, Poland and

Hungary showed involvement in physical activities less than 150 minutes per week (Bergier et al. 2018).

British Broadcasting Corporation (BBC) (2016) reported that in younger generation (16 to 20 years old) consumes one in six people on average up to two junk meals per week and in the age group 21 to 34 years old the level is up to one in eight people. However, people are widely influenced by social media in a way of finding recipes or watching video tutorials regarding food on YouTube page. Social media became a crucial part of influence and may have strong impact on its supporters. It is a tool providing a communication space for people who share identical hobbies and interests.

Additionally, if managed well, social media may play a critical part of a positive impact on people regarding health behaviour. Many Apps providing many open exercises, food recipes, eating recommendations, food measurements and many others have been created and are available for essentially everyone who owns a mobile device (Centola 2013). According to Hawn (2009) social media provide resource valuable regarding health behaviours to its customers.

3. Aims of the Thesis

The main objective of the thesis is to analyse and describe consumers' familiarity with tropical fruits, their general attitudes and beliefs towards this fruit category, the influence of social norm on tropical fruit consumption and to evaluate consumers' purchasing intention of tropical fruits. Associations between socio-demographic characteristics and mentioned determinants are also investigated. The specific objective consists in evaluating the role of product familiarity, general attitude, beliefs and social norm as predictors of the purchasing intention of fresh and processed tropical fruit products. Additionally, the situation of the market of tropical fruits in the Czech Republic was described and analysed the consumer behaviour towards tropical fruits among Czech consumers.

The specific aim of the research is to describe the socio-economic characteristics of Czech citizens, which influence the consumption of tropical fruits such as gender, age, education level, marital status, occupation, income level, household size and place of living. In addition, the research is oriented to compare the interactions between different factors influencing tropical fruit purchase decision and to evaluate purchasing behaviour. Moreover, the aim is to reveal the changes in accessibility of tropical fruits on the market over the years and to analyse the constraints of adoption such as high prices of offered products, lack of knowledge, conservativeness etc.

3.1. Hypotheses

Globalization of the whole world has an impact on almost every aspect of modern life. For instance, greater possibilities and allowance of travelling around the world. Younger people are more travelling than elder generations and therefore are more informed about modern world and open to consume more "exotic" food than elders. Younger generation also has higher tendencies towards nutritious food, and care more about ethical and social norms in consuming behaviour (Papadaki et al. 2007; Mehra & Ratna 2014).

1. Null Hypothesis H_0 : *Younger generation (up to 30 years of age) consume tropical fruits more than elder generation (50 years and more).*

Income plays a crucial part in human behaviour towards varieties of products. The level of income affects human wealth – the higher the income is the better-quality food a person purchase. In addition, human wealth affects human health. (Woolf et al. 2015).

2. Null Hypothesis H_0 : *Level of income plays an important part in purchasing behaviour of Czech citizens related to consumption of tropical fruits.*

Women show more tendencies towards healthy lifestyle, higher interest in dietary intake and higher interest in nutritional value of food product than men do. Women usually take care of a household, which also supports their interest in nutrition (Baker & Wardle 2003). According to Prättälä and others (2006) women eat more fruits than men.

3. Null Hypothesis H_0 : *Women in the Czech Republic consume tropical fruits more than men.*

4. Materials and Methods

4.1. Research design

In order to receive high-quality data, a sample of 155 respondents was collected in advance as a pilot test. The questionnaire was conducted via online convenient sampling, on Survio.com. This was in order to build applicable questionnaire appropriate to the Czech consumers. The pilot questionnaire was improved based on the recommendations and pre-analysed results.

The definite collection of primary quantitative data was performed through a questionnaire-based survey. The data collection took place in the Czech Republic amongst the Czech citizens in the middle of July 2019. High quality data were obtained through a company named Ipsos Group. It is a third largest global market research company which provides various researches amongst the global market and provides the most precise measurements in order to share the most accurate and relevant information. A special tool called Instant research has been used, where a set of questions and answers was created and afterwards the research was launched. It took 5 days to obtain requested data evenly throughout the whole Czech Republic and the total number of 810 respondents were collected.

4.2. Study area

This study was conducted in the Czech Republic due to scarcity of information about consumer behaviour towards tropical fruits in this region. The capital city is providing most of the tropical fruits in the whole country, however, to provide quality data on the market of tropical fruits in the whole country, other cities and villages needed to be concerned. The capital city Prague dominates in overall tropical fruit market due to the highest consumption and awareness about these products. The most imported fruits to the Czech Republic are bananas, citrus fruits, followed by fruits that are grown locally, however still required to import such as apples, strawberries, apricots, pears etc. The sample of respondents was prepared specifically, so it would represent all sociodemographic information most equally. Thus, the respondents are from all regions of the Czech Republic. The regions are Praha region, Středočeský region,

Moravskoslezský region, Jihomoravský region, Ústecký region, Jihočeský region, Královehradecký region, Olomoucký region, Zlínský region, Vysočina region, Pardubický region, Plzeňský region, Liberecký region and Karlovarský region.

4.3. Questionnaire survey

Primary quantitative data were collected through an online questionnaire-based survey. The questionnaire was divided into two parts. The first part investigated the demographic characteristics such as age, gender, education, size of residence, level of income. Second part of the questionnaire was composed of fixed measurement scales using the Likert interval (Likert 1932); close-ended questions; multiple choice questions and semantic differential scales (Osgood et al. 1957). Each question was composed for the purpose of gaining information and understanding about consumer behaviour towards tropical fruits in the Czech Republic.

For collection of secondary data, mainly articles and journals from reliable sources were used. The main sources were Web of Science, Science Direct and Google Scholar in order to compare results and provide a discussion to this study. Furthermore, information from relevant institutions (e.g. FAO, UNDP) and official governmental documents were researched. To gain information relevant to this thesis, key words such as tropical fruit, consumer behaviour, health, consumption, the Czech Republic.

5. Results

A total of 840 questionnaires were completed of which 827 were valid for further analysis (Table 1). The total number of 17 respondents stated, they know what tropical fruit is, however they have never tried any, therefore they were reliant only on relevant questions, which were regarding their awareness; meaning the results must have been divided in two parts.

Out of 827 respondents, 810 reported that they know what tropical fruit is and furthermore, they tried them at least once in their lives. Men sample prevailed only by 1 percent above women. This means that regarding gender, the sample was very well balanced. Majority of respondents (26.7 percent) were aged from 54 to 65 years and the smallest representation had the group aged from 18 to 26 years (14.6 percent). Distribution of respondents by size of residence and region were near to even and varied from 18 to 24.7 percent. Nevertheless, education, marital status and employment were dissimilar. Majority of respondents (69.6 percent) went to apprentice or high school, group of respondents attending university was represented by 15.5 percent. Most of the respondents (57.2 percent) were married or living in shared household and 30 percent of respondents were single. Nearly half of the respondents were company employees with no subordinates.

Second group was represented by total number of 17 respondents who stated, they know what tropical fruit is, however they have never tried any, therefore they were reliant only on relevant questions which were regarding their awareness. Women were represented by 52.9 percent and majority of respondents (41.2 percent) were aged from 54 to 65 years. Most of the respondents (17.6 percent) were from Ústecký region and the size of residence reached mostly the category of the population from 20,001 to 100,000 (35.3 percent). Almost half of the respondents (47.1 percent) reported apprenticeship as their level of education and being married or living in a shared household (47.1 percent). Majority of respondents work as an employee without subordinates (70.6 percent).

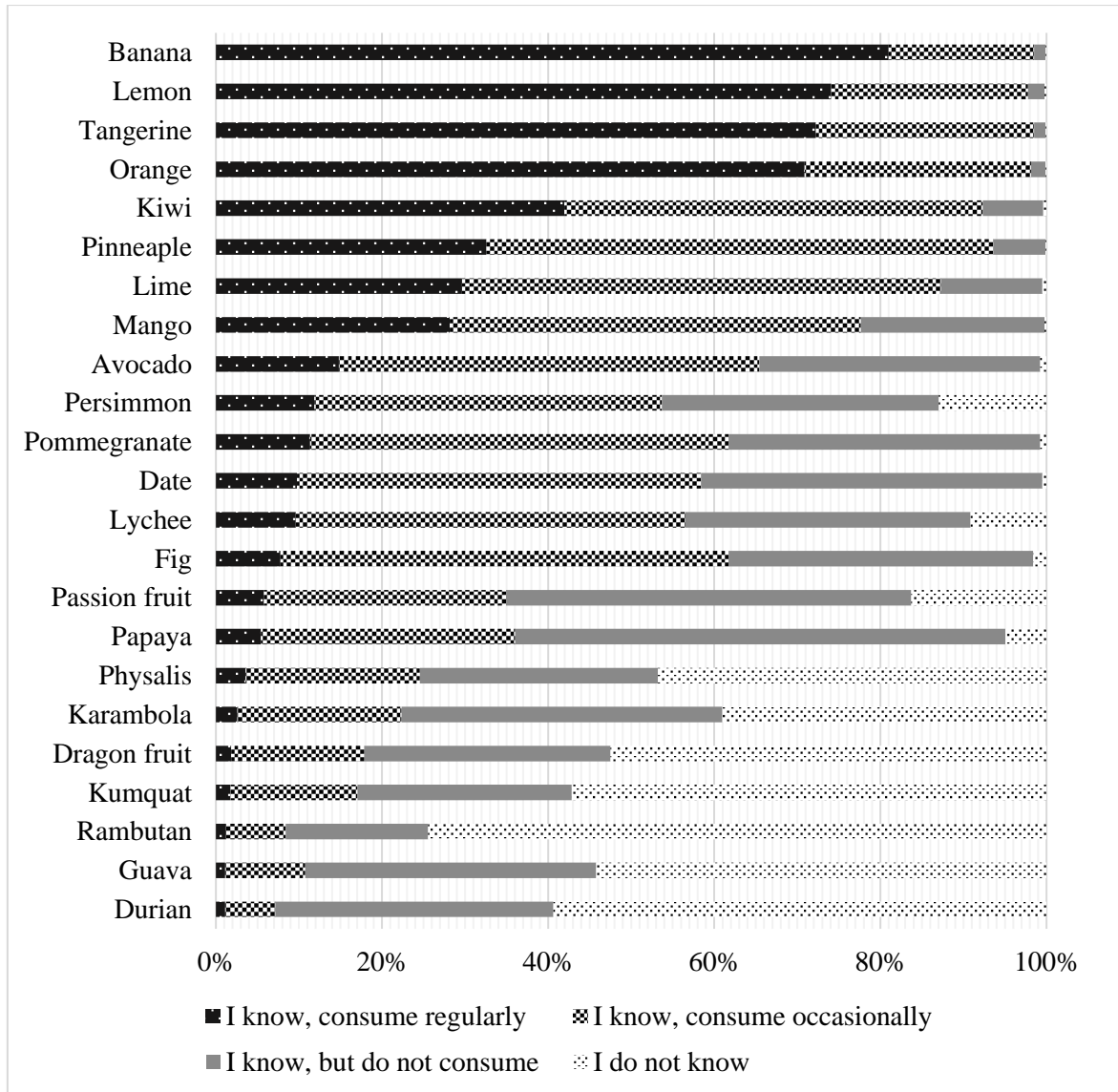
Table 1: Respondents characteristics (n=827)

| Variable | Tropical fruit consumers | | Tropical fruit non-consumers | |
|--------------------------------------|---------------------------------|----------|-------------------------------------|----------|
| | n (810) | % | n (17) | % |
| Age | | | | |
| 18 – 26 | 118 | 14.6 | 0 | 0 |
| 27 – 35 | 159 | 19.6 | 3 | 17.6 |
| 36 – 44 | 164 | 20.2 | 6 | 35.3 |
| 45 – 53 | 153 | 18.9 | 1 | 5.9 |
| 54 – 65 | 216 | 26.7 | 7 | 41.2 |
| Gender | | | | |
| Male | 409 | 50.5 | 8 | 47.1 |
| Female | 401 | 49.5 | 9 | 52.9 |
| Size of residence | | | | |
| Less than 1000 | 146 | 18.0 | 3 | 17.6 |
| 1001 - 5000 | 174 | 21.5 | 4 | 23.5 |
| 5001 - 20 000 | 148 | 18.3 | 1 | 5.9 |
| 20 001 - 100 000 | 172 | 21.2 | 6 | 35.3 |
| More than 100 000 | 200 | 24.7 | 3 | 17.6 |
| Region | | | | |
| Praha | 113 | 14.0 | 1 | 5.9 |
| Středočeský | 100 | 12.3 | 2 | 11.8 |
| Moravskoslezský | 94 | 11.6 | 2 | 11.8 |
| Jihomoravský | 90 | 11.1 | 2 | 11.8 |
| Ústecký | 57 | 7.0 | 3 | 17.6 |
| Jihočeský | 48 | 5.9 | 1 | 5.9 |
| Královehradecký | 47 | 5.8 | 0 | 0 |
| Olomoucký | 46 | 5.7 | 2 | 11.8 |
| Zlínský | 41 | 5.1 | 2 | 11.8 |
| Vysočina | 41 | 5.1 | 1 | 5.9 |
| Pardubický | 41 | 5.1 | 0 | 0 |
| Plzeňský | 37 | 4.6 | 1 | 5.9 |
| Liberecký | 31 | 3.8 | 0 | 0 |
| Karlovarský | 24 | 3.0 | 0 | 0 |
| Education | | | | |
| No education | 2 | 0.2 | 0 | 0 |
| Unfinished primary education | 1 | 0.1 | 0 | 0 |
| Primary education | 83 | 10.2 | 2 | 11.8 |
| Apprenticeship | 290 | 35.8 | 8 | 47.1 |
| Secondary education with GCSE | 103 | 12.7 | 2 | 11.8 |
| Secondary vocational with state exam | 171 | 21.1 | 4 | 23.5 |
| Extension study | 18 | 2.2 | 0 | 0 |
| Higher professional education | 12 | 1.5 | 0 | 0 |
| Bachelor's degree | 49 | 6.0 | 0 | 0 |
| Master's degree | 77 | 9.5 | 1 | 5.9 |
| Doctoral studies | 4 | 0.5 | 0 | 0 |
| Marital status | | | | |

| | | | | |
|---|-----|------|----|------|
| Married, shared household (living with a partner in unmarried cohabitation, living in a registered partnership) | 463 | 57.2 | 8 | 47.1 |
| Widowed | 8 | 1.0 | 0 | 0 |
| Divorced | 96 | 11.9 | 3 | 17.6 |
| Single | 243 | 30.0 | 6 | 35.3 |
| Employment | | | | |
| Employee without subordinates | 390 | 48.1 | 12 | 70.6 |
| Lower manager (1-5 subordinates) | 81 | 10.0 | 0 | 0 |
| Manager (6 and more subordinates) | 37 | 4.6 | 2 | 11.8 |
| Top manager, company director | 1 | 0.1 | 0 | 0 |
| Self-employed | 57 | 7.0 | 1 | 5.9 |
| Private businessman with 1-5 employees | 4 | 0.5 | 0 | 0 |
| Private businessman with 6 and more employees | 4 | 0.5 | 0 | 0 |
| Unemployed | 25 | 3.1 | 0 | 0 |
| Student | 64 | 7.9 | 0 | 0 |
| Retired | 71 | 8.8 | 2 | 11.8 |
| At home, on parental leave, etc. | 76 | 9.4 | 0 | 0 |

Detail analysis of experiences of the Czech consumers with tropical fruits unveil, that over 60 percent of respondents do know and consume 4 to 11 fruits out of twenty-three mentioned tropical fruits (Figure 7). Approximately 50 percent of the respondents reported they do not recognize six fruits out of the list e.g. rambutan, durian, guava, kumquat, dragon fruit and goldenberry. Four of mentioned fruits, e.g. banana, lemon, tangerine and orange are known and bought by over 70 percent of respondents. Proportion of respondents who reported that they know, but do not purchase the particular fruit varies from 0.1 percent to 59 percent and it mainly concerns papaya, passion fruit, dates, figs, pomegranate and star fruit.

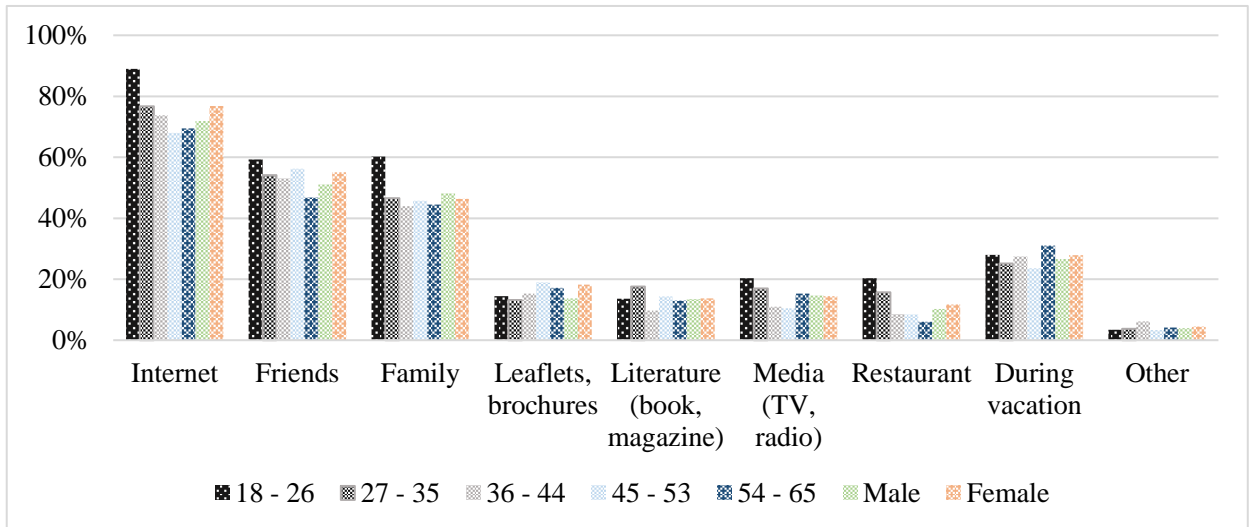
Figure 4: Attitudes of Czech citizens towards tropical fruits



Concerning source of information about fruits, over 65 percent of respondents search the Internet to obtain knowledge, up to 45.8 percent of respondents from each age group and more gain information via friends and family. Representative 31 percent of the eldest group (54-65 years) gains experiences with tropical fruit during vacation and search in other sources such as leaflets, brochures, literature, media, restaurant, however other types of sources were represented by less than 20 percent of respondents (Figure 8). Over 20 percent of all respondents stated that they gained information from their job, directly from shop or market or they do not search for information at all. Over 15 percent of respondents reported their consumption of tropical fruits consist of daily intake, furthermore, more than 50 percent of respondents stated they consume tropical fruit on

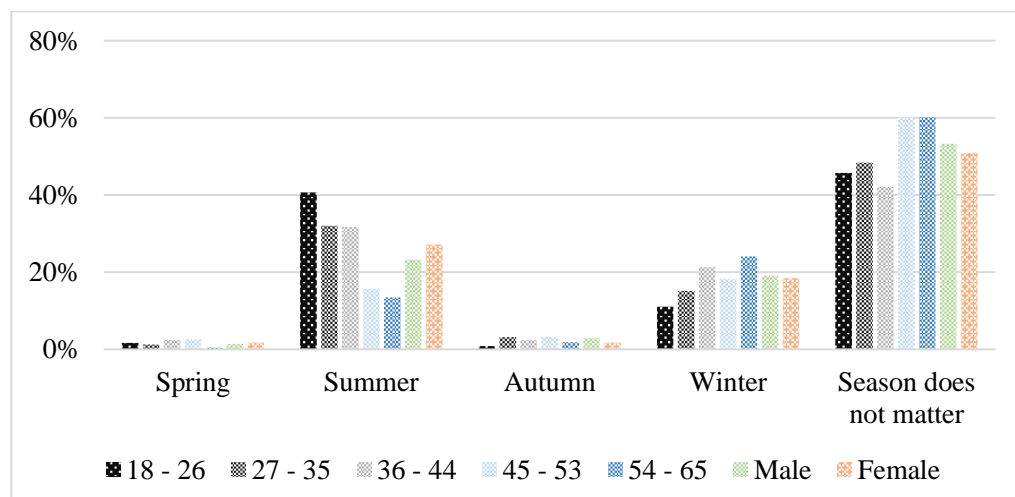
weekly basis. Respondents consuming mentioned fruits exceptionally fluctuates below 10 percent.

Figure 5: The most important source of information on tropical fruits



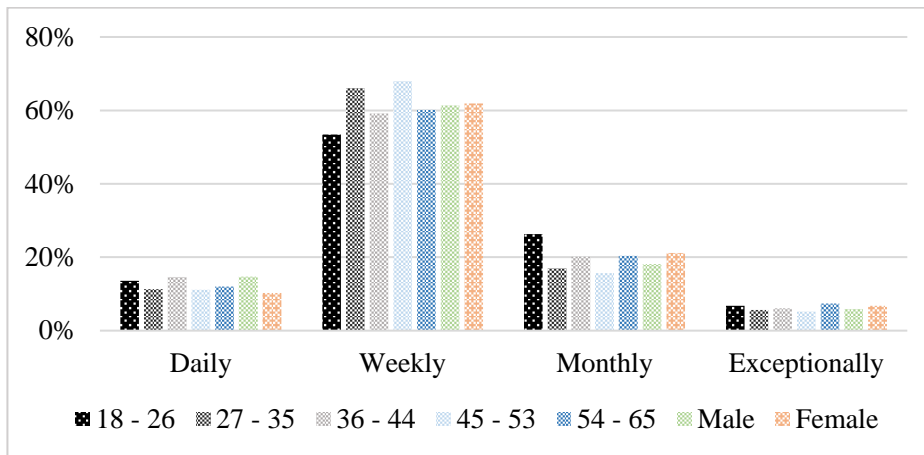
With respect to the seasonality for over 40 percent of respondents it plays no significant role what season it is, however respondents in years between 18 to 44 prefer consumption of tropical fruits in summer, whereas (approximately 40 percent) and nearly around 20 percent of respondents prefer wintertime, usually before Christmas time. Younger generation favours consumption of tropical fruits during summer more than elder generation, which is in the contrast with winter season where the consumption of tropical fruits reports adverse. Women purchase tropical fruits more during summer than men, men are more likely to not be affected by season (Figure 9).

Figure 6: Seasonable consumption of tropical fruits by Czech consumers



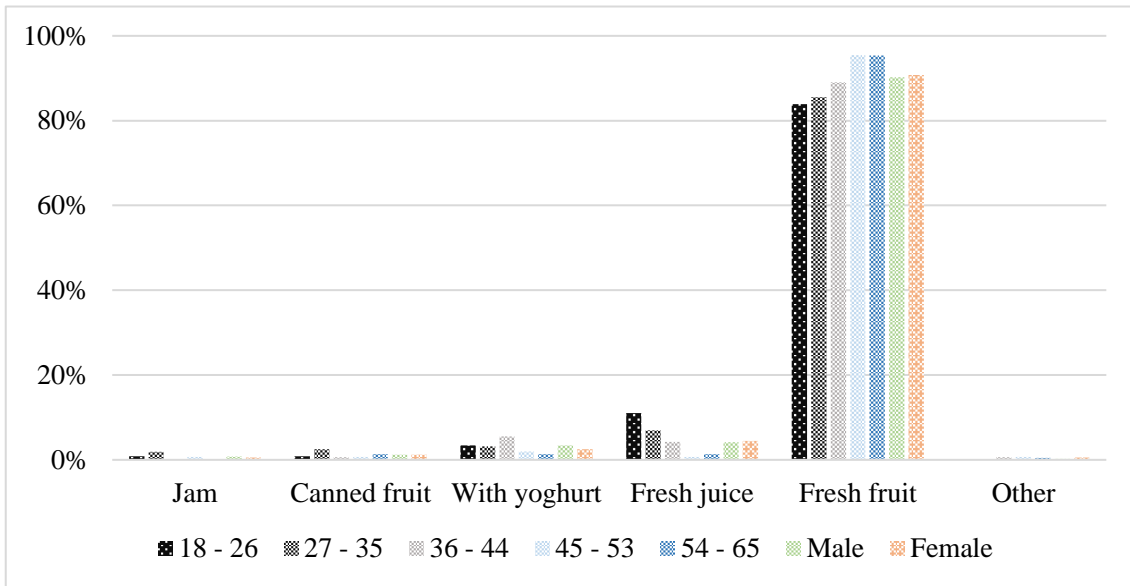
With regards on the consumption frequency most of the Czech consumers reported weekly consumption where the largest representation shown group aged between 45 to 53 years and surprisingly the youngest group (18-26 years) reported the lowest level (Figure 7). This is possibly due to high monthly consumption as compared to other age and gender groups. However, the weekly consumption still reaches over 50 percent. In relation to gender, differences are not very much significant, nonetheless men favour daily consumption more than women.

Figure 7: Consumption intensity of tropical fruits by Czech consumers



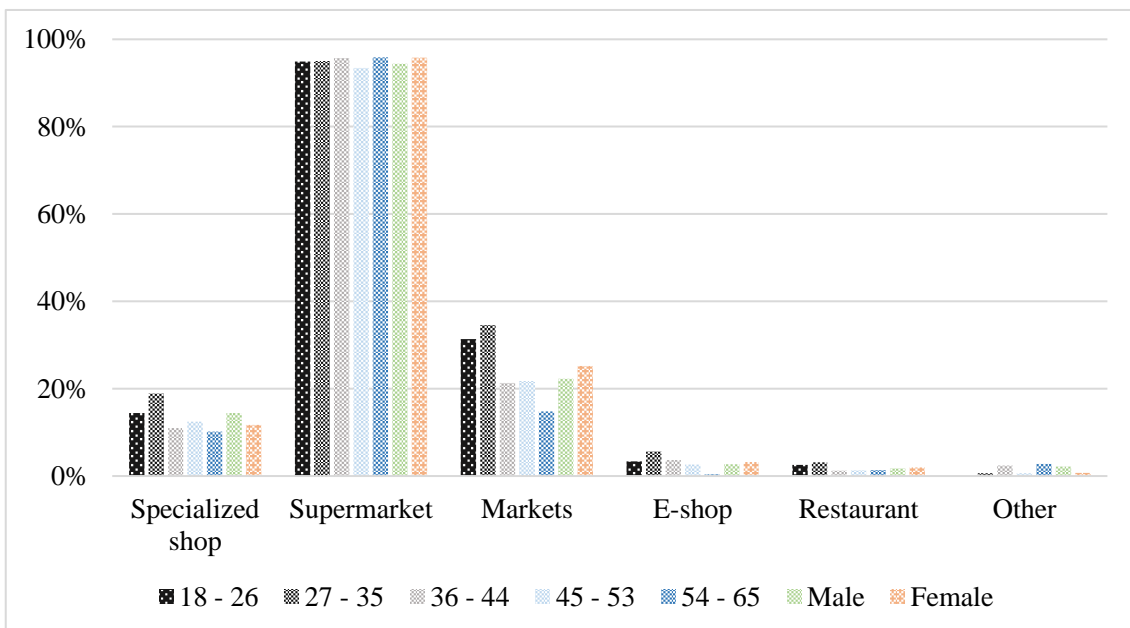
Regarding favourable forms of tropical fruits for consumption, the result is utterly self-evident. The pure form of fruit was the most preferable among the Czech consumers where each age and gender category is represented by above 80 percent, ranging from 83.9 percent to 95.4 percent. Fresh juice is more likeable by youngest group (18-26 years) by 11 percent in the contrast with age group from 45 to 53 years, which is represented by only 0.7 percent. Concerning gender, no significant difference has been reported (Figure 8).

Figure 8: Preferable forms of tropical fruit



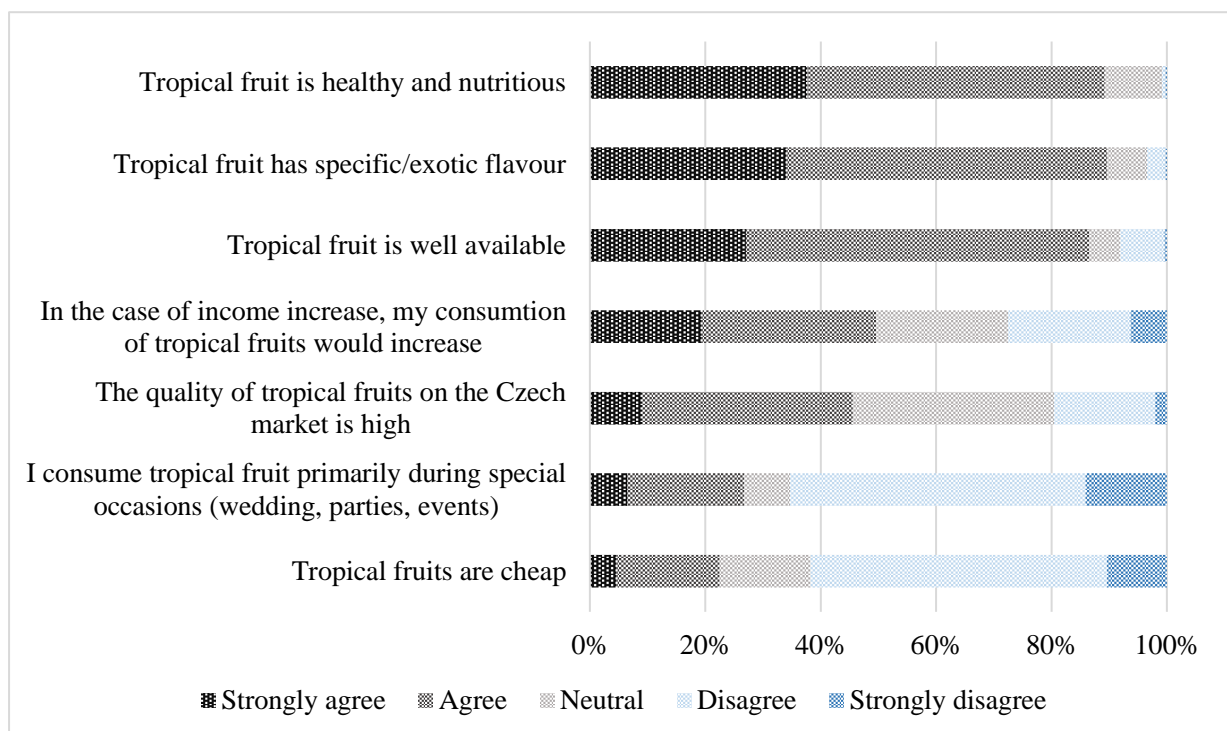
With respect to purchase intentions, majority of respondents buy tropical fruits in the supermarket (93.5 percent and above). Women purchase tropical fruits on markets more than men do (Figure 9). Respondents from age group from 27 to 35 years tend to buy fruits from various locations besides supermarket such as markets and specialized shops. Furthermore, this age category inclines towards e-shops the most among others

Figure 9: Place of purchase of tropical fruits by Czech consumers



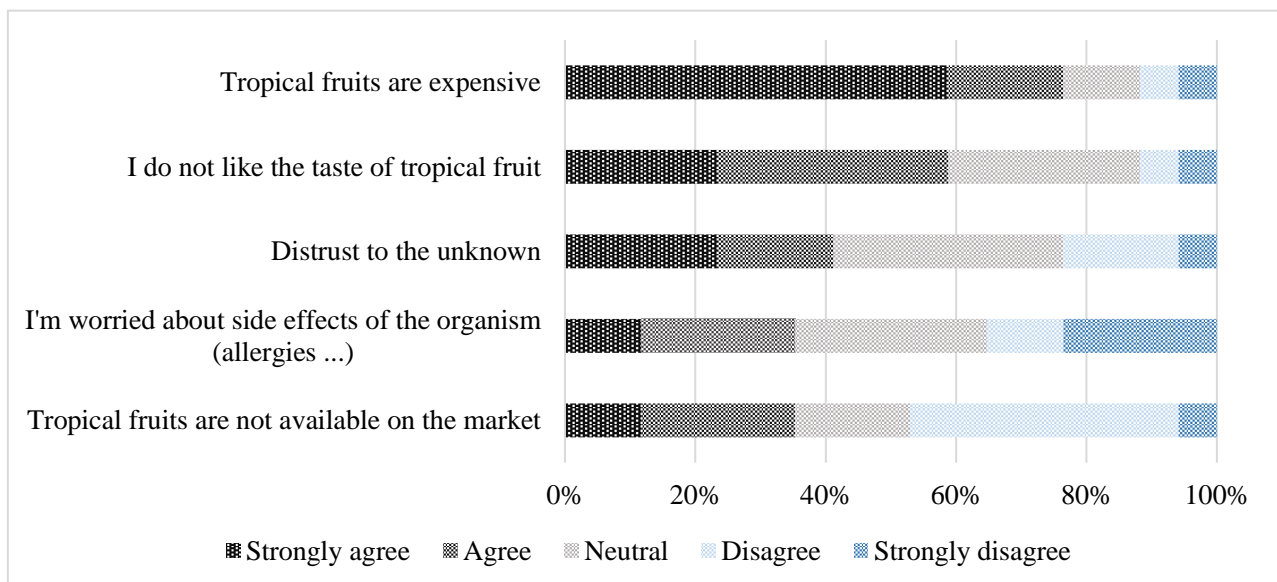
In respect to the set of questions which were to answer regarding the Likert scale (LIKERT 1932), respondents were given two sets. First set of question was given to the respondents who stated that they know tropical fruits and furthermore, they tried some. This set was to reveal what are the reasons they consume tropical fruits. Majority of respondents stated that they purchase tropical fruits mainly because they enjoy the taste of it (Figure 10). They presume tropical fruits are healthy and nutritious for human body and furthermore, 89 percent of respondents agreed that tropical fruits have specific or exotic flavour. Concerning the accessibility, 86 percent of respondents believe that tropical fruits are well available on the Czech market in wide range. Nevertheless, the state of quality of tropical fruits remains undiscovered due to 34 percent of respondents plagued neutral, even though 45 percent believe the quality of tropical fruits is high. However, majority (61 percent) confirmed that tropical fruits are expensive on the Czech market. Overall, 49 percent of respondents agreed that in case their income would increase, they would purchase more tropical fruits, however high number of respondents (22 percent) remained neutral in this question.

Figure 10: The reasons of consumption of tropical fruits by Czech consumers (n=810)



Second set of questions to be answered according to Likert scale (Likert 1932) were regarding only respondents who never tried any tropical fruit in lifetime (Figure 11). The aim was to discover possible reasons not to try a tropical fruit. Majority of respondents (over 75 percent) agreed that their reason of zero consumption of tropical fruits is due to the high price. In addition, 58 percent stated that they do not enjoy the taste of tropical fruits. Many of respondents (35 percent) remained neutral for the question regarding distrust to the unknown and almost 25 percent of respondents disagreed in terms of worrying about tropical fruits side effects. Additionally, over 45 percent of respondents agreed that tropical fruits do not experience poor availability on the market thus it is not the reason of their zero consumption.

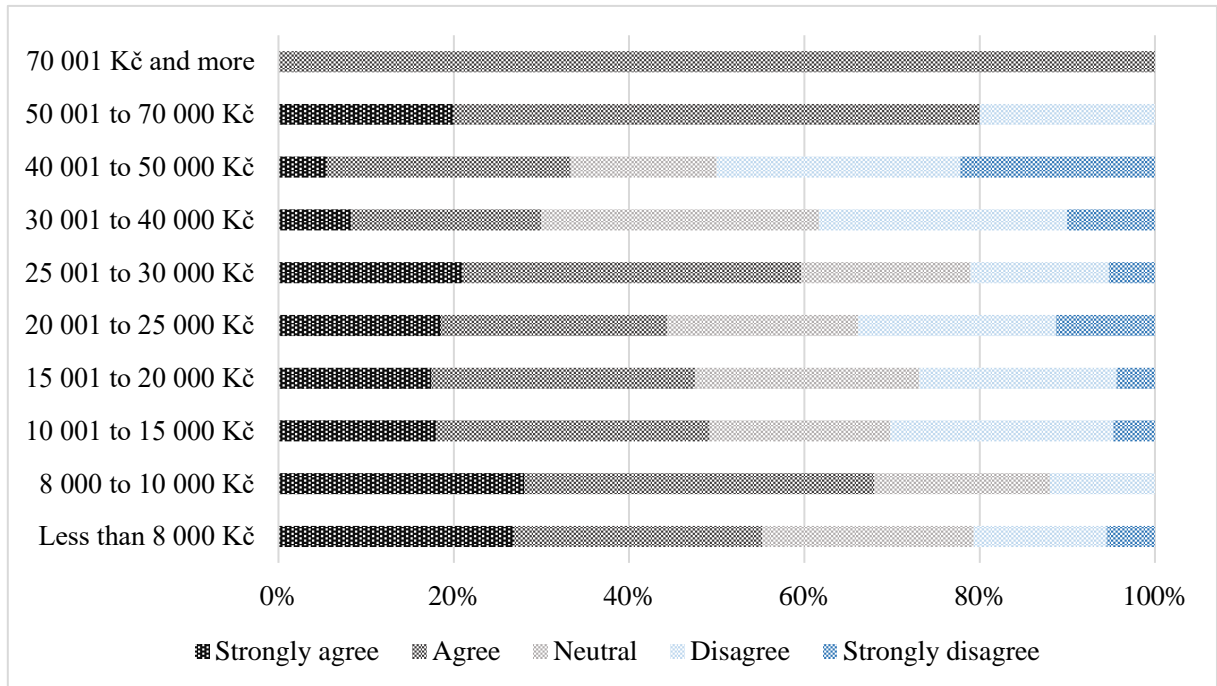
Figure 11: The reasons of zero consumption of tropical fruits by Czech consumers (n=17)



Regarding the relationship between income of the respondents and consumption of tropical fruits, the situation remains unclear. Majority of respondents (over 45 percent) agreed with the fact, that in case of raised income, their consumption of tropical fruits would also increase. However, wide scale of respondents (over 17 percent) plagued neutral in this situation, and less than 23 percent of respondents did not support the thought of buying more tropical fruits in case of being wealthier. However, no significant difference was reported between age and gender in general. Concerning net income of respondents, majority of respondents (57 percent average) agreed on higher level of

purchasing tropical fruits if higher income. Respondents earning between 30,000 to 50,000 CZK are more likely to disagree with such situation.

Figure 12: A correlation between willingness of consumers to spend more money on tropical fruits in case their income increased and the net income



With regards to the impact of age on the consumption of tropical fruits, elder generations show higher consumption of fruits very common in the market in Czech Republic (Table 2). Significant difference has been discovered in the consumption of fruits like tangerine, orange, pineapple, figs, dates and star fruit ($p < 0.05$). On the contrast, more exotic fruits such as passion fruit, pomegranate, dragon fruit and guava are more ($p < 0.05$) recognized and consumed by younger generation (up to 35 years of age). Elder generation (54 years old and more) consume star fruit by almost 20 percent more than people below 35 years of age ($p = 0.008$)

Table 2: The percentage and rating of respondents who consume tropical fruits and the correlation with the age of the respondents

| Age group | 18-26 | | 27-35 | | 36 - 44 | | 45 - 53 | | 54 - 65 | | <i>p</i> -value |
|---------------|-------|------|-------|------|---------|------|---------|------|---------|------|-----------------|
| | % | Rank | % | Rank | % | Rank | % | Rank | % | Rank | |
| Banana | 98.3 | 1 | 98.7 | 3 | 97.6 | 4 | 97.4 | 2 | 100 | 1 | 0.223 |
| Lemon | 94.9 | 2 | 98.1 | 4 | 98.8 | 1 | 97.4 | 2 | 98.6 | 4 | 0.194 |
| Orange | 94.9 | 2 | 99.4 | 1 | 98.8 | 1 | 96.7 | 4 | 99.5 | 2 | 0.015* |
| Tangerine | 94.9 | 2 | 99.4 | 2 | 98.8 | 1 | 98.7 | 1 | 99.5 | 2 | 0.012* |
| Kiwi | 88.1 | 5 | 95.0 | 6 | 92.1 | 6 | 93.5 | 5 | 92.1 | 6 | 0.308 |
| Pineapple | 88.1 | 5 | 95.6 | 5 | 92.1 | 5 | 91.5 | 6 | 97.7 | 5 | 0.006** |
| Lime | 81.4 | 7 | 88.1 | 7 | 88.4 | 7 | 88.2 | 7 | 88.4 | 7 | 0.360 |
| Mango | 76.3 | 8 | 79.9 | 8 | 81.1 | 8 | 78.4 | 8 | 73.6 | 9 | 0.419 |
| Pomegranate | 65.3 | 9 | 65.4 | 9 | 62.2 | 10 | 67.3 | 9 | 52.8 | 12 | 0.024* |
| Avocado | 61.9 | 10 | 62.9 | 10 | 66.5 | 9 | 66.0 | 10 | 68.1 | 11 | 0.773 |
| Lychee | 58.5 | 11 | 59.1 | 11 | 54.3 | 14 | 62.1 | 13 | 51.4 | 13 | 0.289 |
| Persimmon | 54.2 | 12 | 54.7 | 12 | 55.5 | 13 | 57.5 | 14 | 48.6 | 14 | 0.520 |
| Fig | 42.4 | 13 | 54.7 | 13 | 61.6 | 11 | 62.1 | 12 | 77.3 | 8 | 0.000** |
| Date | 41.5 | 14 | 48.4 | 14 | 56.1 | 12 | 64.1 | 11 | 72.7 | 10 | 0.000** |
| Dragon fruit | 27.1 | 15 | 21.4 | 19 | 18.9 | 19 | 17.0 | 20 | 10.2 | 20 | 0.000** |
| Passion fruit | 26.3 | 16 | 44.0 | 15 | 37.8 | 15 | 41.2 | 16 | 26.4 | 16 | 0.001** |
| Papaya | 25.4 | 17 | 42.1 | 16 | 37.8 | 15 | 42.5 | 15 | 31.5 | 15 | 0.011* |
| Goldenberry | 23.7 | 18 | 27.7 | 17 | 23.8 | 17 | 25.5 | 18 | 22.7 | 18 | 0.851 |
| Kumquat | 13.6 | 19 | 14.5 | 21 | 20.1 | 18 | 21.6 | 19 | 15.3 | 19 | 0.239 |
| Star fruit | 11.9 | 20 | 23.9 | 18 | 18.3 | 20 | 28.1 | 17 | 25.9 | 17 | 0.008** |
| Guava | 11.0 | 21 | 16.4 | 20 | 13.4 | 21 | 11.1 | 22 | 4.2 | 23 | 0.003** |
| Rambutan | 6.8 | 22 | 10.1 | 22 | 10.4 | 22 | 11.1 | 21 | 4.6 | 22 | 0.127 |
| Durian | 5.9 | 23 | 6.9 | 23 | 9.8 | 23 | 7.8 | 23 | 5.6 | 21 | 0.583 |

Note: * $p < 0.05$ ** $p < 0.01$

With respect to gender significant association has been reported among persimmon, rambutan and durian ($p < 0.05$), (Table 3). Persimmon ($p = 0.000$) is significantly more favourable tropical fruit among women in the Czech Republic than among men. Male respondents show higher knowledge of specific fruits – rambutan ($p = 0.003$) and durian ($p = 0.000$). As the analysis shows, these fruits are recognized and consumed by less than 12 percent of respondents.

Table 3: Percentage and rating of respondents who consume tropical fruits and the correlation between tropical fruits and the gender of the respondents

| Gender | Male | | Female | | <i>p</i> -value |
|---------------|------|------|--------|------|-----------------|
| | % | Rank | % | Rank | |
| Tangerine | 99 | 1 | 98 | 2 | 0.231 |
| Orange | 98.5 | 2 | 97.76 | 3 | 0.412 |
| Lemon | 98.3 | 3 | 97.26 | 4 | 0.319 |
| Banana | 98 | 4 | 99 | 1 | 0.259 |
| Pineapple | 94.1 | 5 | 93.02 | 5 | 0.518 |
| Kiwi | 93.2 | 6 | 91.52 | 6 | 0.382 |
| Lime | 86.6 | 7 | 88.03 | 7 | 0.528 |
| Mango | 75.6 | 8 | 79.8 | 8 | 0.147 |
| Avocado | 65.8 | 9 | 65.09 | 9 | 0.838 |
| Fig | 64.5 | 10 | 58.85 | 12 | 0.095 |
| Date | 60.6 | 11 | 56.11 | 14 | 0.191 |
| Pomegranate | 58.9 | 12 | 64.59 | 10 | 0.097 |
| Lychee | 55 | 13 | 58.1 | 13 | 0.375 |
| Persimmon | 46.5 | 14 | 61.1 | 11 | 0.000** |
| Papaya | 38.4 | 15 | 33.67 | 15 | 0.162 |
| Passion fruit | 36.2 | 16 | 33.67 | 15 | 0.452 |
| Goldenberry | 22.7 | 17 | 26.43 | 16 | 0.222 |
| Star fruit | 21.3 | 18 | 23.44 | 17 | 0.459 |
| Dragon fruit | 19.3 | 19 | 16.46 | 18 | 0.289 |
| Kumquat | 17.8 | 20 | 16.21 | 19 | 0.535 |
| Guava | 12.5 | 21 | 8.98 | 20 | 0.109 |
| Rambutan | 11.2 | 22 | 5.49 | 21 | 0.003** |
| Durian | 10.5 | 23 | 3.74 | 22 | 0.000** |

Note: ** $p < 0.01$

6. Discussion

The study is focused on the consumer behaviour of the Czech citizens towards tropical fruits. These fruits are not grown in the Czech Republic; thus, they are transported long distance from tropical countries. Out of 23 types of tropical fruits, majority seem to be well known, around 39 percent remain less known and not consumed than others, some were not recognized by many respondents. Seven types of fruits were not consumed, even though they were at least known by over 35 percent of respondents. Study from Belgium (Sabbe et al. 2008) revealed that Belgian citizens are more experienced in certain types of tropical fruits (passion fruit, star fruit, lychee) than the Czech citizens. However, concerning persimmon, our research shows that Czech consumers buy this fruit by around 30 percent more than Belgian consumers. Nevertheless, guava, pineapple and mango showed similar results. Czech consumers strongly prefer consumption of tropical fruits in no modified form and more or less decline other forms except juice.

According to Granner and others (2004), males report a lower preference for vegetables than females. That is since females are more interested in weight gain than males. Prättälä and others (2006) state that man in general incline towards unhealthy habits such as smoking, drinking alcohol (McKee et al. 2000), and additionally are more likely to be overweight than women. Men diet in general is more composed of animal products thus, it has usually higher energy percentage than women diet, and lower number of fruit and vegetable components. On the contrary, McKenzie et al. (2020) discovered that there are no significant differences among sex, though their respondents (both sexes) had very poor fruit and vegetable intake in general. Our research showed that male respondents tend to eat fruits more daily than women, who consume tropical fruits rather monthly.

With regards to age, this research reflects that older generations incline towards more frequent consumption of tropical fruits compared to younger generation which tend to consume tropical fruits on monthly basis. This is supported by study from Nicklett and Kadel (2013) which states that older adults include more healthy products in their diet such as nuts, grains, fruits and vegetables than younger adults do. This is mostly in order to prevent themselves from diseases. Generally, fruits and vegetables are linked to reduced mortality amongst elder generations, they are proven to reduce risk of various

diseases, support health condition, and have positive effects on human appearance (Khaw et al. 2008; Strandhagen et al. 2000; Zhang et al. 2011; Genkinger et al. 2004).

Very high inclination towards pure fresh form of tropical fruits in contrast to other forms has been recorded in this study, which is supported by Godrich and others (2017) who reported that in Western Australia majority of their sample (over 95 percent) consumed fruits and even vegetables in fresh form. However, Sabbe and others (2008) discovered the opposite result amongst Belgian consumers. Nevertheless, a high level of consumers reported positive attitude towards tropical fruits, as they are healthy and nutritious, has exotic flavour they enjoy, which is in accordance with Sabbe and others (2008) as their study discovered same results. Seasonality mostly did not matter among respondents from the Czech Republic, however, higher consumption during summer and winter season has been reported. Locke and others (2009) who studied rural agricultural communities revealed that seasonality does have an impact on fruit consumption where majority of Mexican farmworkers (86 percent) purchase fruit season only in the thinning season, as in other seasons they have their own production.

Many studies (Jappelli & Pistaferri 2010; Emsina & Počs 2010; Dreger & Kosfeld 2003; Alan et al. 2014) reveal that consumers generally spend higher amount of money if their income is higher. Nevertheless, these two situations are not parallel, because e.g. when people's net income is increased by one dollar, the consumption raises by twenty cents (Jappelli & Pistaferri 2010). Stewart and others (2003) reported that people from "poor" households (spending less than 3 dollars on fruits and vegetables) are generally spending lower amount of money than "non-poor" households on fruits and vegetables. However, in case of income increase, a positive effect non-poor household consumption has been recorded. With regards to poor households, willingness to spend more money on fruits and vegetables even if income would increase is much lower, because they perceive other goods to be more desirable with regards to their spending bundle. This study revealed that people from lower income households would more likely purchase more fruits in case their income has increased. Nevertheless, even respondents from higher income households agreed that their consumption of tropical fruits would increase with increased income (Stewart et al. 2003).

Apart from other physiological diseases, fruit intake may play a sensitive part in depression and anxiety disorder. These illnesses may be characterized as a feeling of

worthlessness, appetite oscillations, sad moods etc. (Ji et al. 2019). These disorders are one of the highest causes of years of life lost regarding disabilities (Franklin et al. 2017; Gibson-Smith et al. 2019). The World Health Organization (WHO 2011) revealed that the affected population by these disorders represents over 350 million people worldwide. Castaneda and others (2008) supported this by stating that depression is bonded to unhealthy lifestyle behaviours. Many studies sympathise with the fact that healthy diet may positively affect mentioned disorders (Gibson-Smith et al. 2019; Franklin et al. 2017; Liu and others 2019; Liu and others 2016). According to Sanchez-Villegas and Martínez-González (2013) and Debbia and others (2019), fruits and vegetables may have a positive protective effect against depression thus they work as prevention. Liu and others (2016) stated that fruits are independently connected to depression as this food group may lower the odds of such diagnosis and additionally lower the severity of fears. According to Gibson-Smith and others (2019) and El Ansari and others (2014), lowering the odds of depression may also be achieved by increased consumption of foods like vegetables, fish, olive oil and non-refined grains. On a contrast, Ji and others (2019) discovered that very high consumption of banana (more than 4 bananas/week) is positively associated with depression symptoms.

Additionally, many studies over the years (Abrahams et al. 1993; Granner et al. 2004; Neumark-Sztainer et al. 2002; Singleton et al. 2020; Cullen et al. 2002) revealed that differences in consumption occur among ethnicity of consumers whereas white consumers report higher consumption of fruits and vegetables. Regarding availability, study concerning African Americans (Zenk et al. 2005) revealed, that white neighbourhoods with higher incomes have much better availability of stores and supermarkets. Furthermore, even amongst the store of a same type, African Americans were much more limited in selection of goods. This thesis did not include such field as it was not crucial for our research.

Information about fruit and vegetable consumption and their effects on human health are widely available among scientific articles, however detailed data on tropical fruit category is rather scarce, particularly for the Czech Republic.

6.1. Limitation of the research

This thesis contains a section with import and export levels of tropical fruits worldwide, however data nearest to present available on FAOSTAT reach to the year 2016. Collection of data closer to year 2020 would be more revealing. The survey conducted in this research did not yield statistically significant results. There is a lack of data and consistent measures in the field of tropical fruits, the attitudes and behaviour of Czech citizens.

7. Conclusions

Tropical fruits became crucial commodity among the crop international market due to diet and lifestyle changes, inclination towards exotic commodities, and increased level of traveling around the world. This study unveils that banana is the most recognized tropical fruit in the Czech Republic, whereas rambutan was identified as the least known. With regards to gender, significant difference among tropical fruit consumption has been discovered. Even though rambutan and durian belong among less known fruits in the Czech Republic. Men represent significantly higher awareness and consumption than women and furthermore, men show daily consumption of tropical fruits. On the contrast, female purchase and consume persimmon significantly more than men, however their consumption of tropical fruits is more likely to be less regular. In general, some trends observed in our study appear to be similar to other countries. For example, the consumption of tropical fruits is more likely to increase in the case of income increase. That is also applicable on higher money spending in general. Additionally, our study revealed that the Internet is the main source of information on tropical fruits, and tropical fruits are most preferred in no processed form. Concerning seasonality, season does not matter to majority of Czech respondents, however consumption during spring and autumn is rather low.

On the contrary, majority of Czech respondents consumes tropical fruits due to their good, exotic taste and believe that these fruits are healthy and nutritious. Czech consumers believe that tropical fruits are well available, however the high price of tropical fruits is what mainly repels consumers from buying. To the best of our knowledge, this is the first study in the Czech Republic that focuses on the purchasing behaviour of tropical fruits among Czech citizens. Our findings can contribute to an understanding of general attitudes and preferences regarding tropical fruits in the Czech population, which can help to improve and tailor marketing strategies.

8. References

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Appendices

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Appendix 1: Questionnaire sample (Ipsos 2019)

1. Have you ever tried any tropical fruit?

- 1. Yes
- 2. I do not know what that is
- 3. No

2. Please, fill in following table:

| | I know, consume regularly | I know, consume occasionally | I know, but do not consume | I do not know |
|-----------------|---------------------------------|------------------------------------|----------------------------------|-----------------------|
| 1. Avocado | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Banana | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Date | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Dragon fruit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Durian | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Fig | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Guava | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Star fruit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. Please, fill in following table:

| | I know, consume regularly | I know, consume occasionally | I know, but do not consume | I do not know |
|------------|---------------------------------|------------------------------------|----------------------------------|-----------------------|
| 1. Kiwi | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Kumquat | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Lemon | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

- | | | | | |
|-----------|-----------------------|-----------------------|-----------------------|-----------------------|
| 4. Lime | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Lychee | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Mango | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Orange | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Papaya | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4. Please, fill in following table:

| | I know, consume regularly | I know, consume occasionally | I know, but do not consume | I do not know |
|------------------|---------------------------------|------------------------------------|----------------------------------|-----------------------|
| 1. Passion fruit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Persimmon | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Goldenberry | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Pineapple | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Pomegranate | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Rambutan | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Tangerine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

5. Where do you get information about tropical fruits?

- | | |
|-----------------------------------|-------------------------------------|
| 1. Internet | <input checked="" type="checkbox"/> |
| 2. Friends | <input checked="" type="checkbox"/> |
| 3. Family | <input checked="" type="checkbox"/> |
| 4. Leaflets, brochures | <input checked="" type="checkbox"/> |
| 5. Literature (book, magazine...) | <input checked="" type="checkbox"/> |
| 6. Media (TV, radio) | <input checked="" type="checkbox"/> |
| 7. Restaurant | <input checked="" type="checkbox"/> |

8. During vacation



9. Other



6. How often do you consume tropical fruits?

1. Daily



2. Weekly



3. Monthly



4. Exceptionally



7. In what season do you usually consume tropical fruits?

1. Spring



2. Summer



3. Autumn



4. Winter



5. Season does not matter



8. In what form do you prefer to eat tropical fruit?

1. Jam



2. Canned fruit



3. With yoghurt



4. Fresh juice



5. Fresh fruit



6. Other



9. Where do you buy tropical fruits?

- 1. Specialized shop
- 2. Supermarket
- 3. Markets
- 4. E-shop
- 5. Restaurant
- 6. Other

10. What are the reasons you consume tropical fruits?

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. Tropical fruits are well available | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Tropical fruits are heathy and nutritious | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. The quality of tropical fruits on the Czech market is high | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Tropical fruits are cheap | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Tropical fruit has specific/exotic flavour | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. I like the taste of tropical fruit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. I consume tropical fruit primarily during special occasions (wedding, parties, events) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. In the case of income increase, my consumption of tropical fruits would increase | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

11. What are the reasons you do not consume tropical fruits?

| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. Tropical fruits are expensive | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. I do not like the taste of tropical fruit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Tropical fruits are not available on the market | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. I'm worried about side effects of the organism (allergies ...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Distrust to the unknown | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Appendix 2: Pilot questionnaire sample

1. Do you know the term tropical fruit?
 - a. Yes
 - b. No

2. Please fill in following figure:

| Fruit | I know | I buy regularly | I buy occasionally |
|----------------------|---------------|------------------------|---------------------------|
| Avocado | | | |
| Banana | | | |
| Date | | | |
| Figs | | | |
| Grapefruit | | | |
| Kiwi | | | |
| Lemon | | | |
| Lichee | | | |
| Lime | | | |
| Mango | | | |
| Orange | | | |
| Papaya | | | |
| Passion fruit | | | |
| Persimmon (kaki) | | | |
| Pinneapple | | | |
| Pomegranate | | | |
| Pomelo | | | |
| Tangerine | | | |
| Other fruits: | | | |
| | | | |
| | | | |
| | | | |

3. Where do you usually buy tropical fruits?
 - a. Specialized shops
 - b. Supermarkets
 - c. Market
 - d. E-shop
 - e. Other, please specify: _____

4. How do you like the tropical fruit prepared?
 - a. Jam from tropical fruit
 - b. Canned tropical fruit
 - c. Yogurt with tropical fruit
 - d. Tropical fruit juice
 - e. Just fresh
 - f. Cooked

5. Where do you get information about most of the tropical fruit?

- a. Internet
- b. Friends or colleagues
- c. Family
- d. Promotional materials (leaflets brochures, etc.)
- e. Literature (books, scientific journals)
- f. Media (TV, radio)
- g. Restaurants
- h. During holiday in _____

6. What season do you prefer to consume most of the tropical fruit?

- a. Spring
- b. Summer
- c. Autumn
- d. Winter

7. What is the reason you consume tropical fruits?

| | I totally agree | I partly agree | Neutral | I partly disagree | I totally disagree |
|------------------------------|-----------------|----------------|---------|-------------------|--------------------|
| a. Attractive | | | | | |
| b. Cheap | | | | | |
| c. Healthy | | | | | |
| d. Good tasty | | | | | |
| e. Easily available | | | | | |
| f. Ethical (i.e. fair trade) | | | | | |
| g. Nutritious | | | | | |
| h. Other reason: | | | | | |
| | | | | | |

8. What is the reason you NOT consume more tropical fruits?

| | I totally agree | I partly agree | Neutral | I partly disagree | I totally disagree |
|-------------------|-----------------|----------------|---------|-------------------|--------------------|
| a. High price | | | | | |
| b. Smell | | | | | |
| c. Taste | | | | | |
| d. Conservative | | | | | |
| e. Not accessible | | | | | |
| f. Allergy | | | | | |
| g. Other reason | | | | | |

9. Would you consume tropical fruits more often in case of increased income?

I totally disagree I partly disagree Neutral I partly agree I totally agree

10. Gender

- a. Male
- b. Female

- a. < 9 999
- b. 10 000 – 19 999
- c. 20 000 – 29 999
- d. 30 000 – 39 999
- e. > 40 000

11. Age

- a. < 18
- b. 18 - 29
- c. 30 - 49
- d. 50 - 59
- e. 60 +

18. Place of living

- a. Village
- b. Small city
- c. Big city
- d. Prague

12. Nationality

- a. Czech
- b. Foreigner (< than 1 month stay): country of origin:
- c. Foreigner (> 1 month stay): country of origin:

13. Occupation/status

- a. Full time job
- b. Part time job
- c. Student
- d. Retired
- e. Unemployed
- f. Maternity leave

14. Marital status

- a. Single
- b. Married or living with partner
- c. Widowed
- d. Divorced, separated

15. Household members

- a. 1
- b. 2
- c. 3
- d. 4
- e. > 4

16. Education level

- a. Primary education
- b. Practical training
- c. High school
- d. Higher education

17. Income (per month in CZK, net)

