THE THERAPEUTIC USE OF DIFFERENT TEA, *CAMELLIA SINENSIS L.* VARIETIES BY POPULATION

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Abstract

Camellia sinensis L., tea tree, is a perennial plant cultivated for over of 2500 years. In this paper we have studied the different varieties of tea obtained from that, the amount of flavonoids and consumption pattern. We measured the amount of flavonoids, substances with antioxidant properties of different tea varieties, which are commercially available in Romania. Our results show that all the studied tea types have antioxidant effect. White tea has the strongest antioxidant effect. Out of the European countries, Romania consumes the lowest quantities of tea, this is due to the fact that Romania is not a country where tea consumption is a tradition. There should be more information available to consumers. The role of the pharmacists, is to inform the patient about the correct way of preparing different tea types, in order to obtain a pleasant taste and the effective use of active principles in the body.

***Key words**: Camellia sinensis L.,* flavonoids, consumption pattern

INTRODUCTION

Camellia sinensis L. sin Thea sinensis Kuntze, the tea tree is native in China and Indochina, it is a perennial plant cultivated for over of 2500 years. Nowadays it is cultivated in all warm regions of Asia, Japan, South America, Russia, Sri Lanka, and Georgia (Tamas J., 2003).

It is assumed that tea was first used for cooking and preparing drinks by the inhabitants of South-East Asia, but more specifically in Yunnan province (China), in Northern Burma (Myanmar) and in the North-East of India (Sealy, 1958; Tamas J., 2003).

Camellia sinensis L. Theaceae Family, Theales, Guttiferales Order, it is a shrub of 5-6 m tall, and its crown has a spherical shape. The young leaves are hairy, becoming then hairless, coriaceous, with toothed edges, with many sclereids in mesophyll (Pallag, 2013). The flowers are white with a pleasant smell. The fruit is a capsule with three edges. *Theae folium* represents the young leaves (Ravichandran & Parthiban, 1997, Ravichandran & Parthiban, 1998, Pallag, 2015).

After processing the leaves, many tea varieties are obtained. The best quality of leaves is obtained from crops situated at altitudes higher than 1500 m, because the plant grows slowly and acquires a better flavor.

The types of tea can be distinguished by the type of processing, all of them coming from the same species of plant (Gardner et al, 2007, Obandaa et al, 2001).

Shortly after they are harvested, the leaves of *Camellia sinensis L.* start to fade and to oxidize.

The chlorophyll breaks down and tannins are released, the leaves progressively becoming black. This enzymatic oxidation process is called "fermentation" in tea industry, although it is not really a phenomenon of fermentation, being not caused by microorganism (Schuh et al, 2006, Pripdeevech et al, 2011, Song et al, 2008).

Green tea is obtained by stopping the oxidation of tea leaves by drying them immediately after harvesting (Revesz et al, 2007, Kim et al , 2000).

Black tea is obtained by leaving the tea leaves to oxidize completely naturally before being dried (Davies et al, 2003, Liang et al , 2003, Gardner et al, 2007).

Oolong tea (*Black Dragon's Tea*) it is a traditional Chinese tea, semi- oxidized (Morre et al, 2003, Bhattacharya et al, 2011).

White tea comes from harvesting the buds and very young leaves that still have the white fluff (Kim et al, 2007, Morre et al, 2003, Bhattacharya et al, 2011).

Yellow tea refers, usually, to a special tea processed similarly to green tea, but where the drying phase is more slow, and the tea leaves may become yellow too (Davies et al, 2003, Bhattacharya et al, 2011, Pallag 2015).

Tea has, usually, a yellow- green appearance and a different odor than both white tea and green tea. Its odor is sometimes confused with that of black tea's.

From a chemical point of view, tea leaves contain purine alkaloids 2-4%, the most important being *caffeine, theophylline and theobromine*, chained tannins 10-30%, volatile oil which is converted during oxidation, carbohydrates and flavones.

The product has incentive-, astringent-, diuretic- and hypotensive properties. It is an intellectual-, muscular-, peripheral vasodilator- and cardiopulmonary stimulant (Kim et al, 2007, Morre et al, 2003, Bhattacharya et al, 2011). The widest use is for nutritional purpose.

In this work we wanted to demonstrate the importance of consuming tea, the beneficial effects of it on the body, we were looking for the reasons why do we consume tea in smaller amounts than other European countries, and ways trough which we can determine population to consume larger quantities of plant infusion, having multiple beneficial effects on the body.

We studied the amounts of flavonoids, substances with antioxidant properties of different tea varieties, which are available in Romania.

We made a study too, about the population's habits related to drinking tea, making use of some questionnaires, distributed in pharmacies and drugstores in the period of 2014-2015.

MATERIAL AND METHODS

The quantitative determination of flavonoids was performed using the technique indicated in F.R.X, the monograph to *Cynarae folium*, based on the property of flavones to form chelates with aluminum chloride of an intense yellow color (FR X, 2008).

As vegetal material, it was used black tea, green tea, white tea, Oolong tea pu-erh tea, in the form of sachets, bought from commerce.

The alcoholic extracts of tea we've obtained by using methanol as solvent. The aqueous extract of tea we've obtained by infusing 1 g of tea in 100 ml water. The result is expressed in g of flavones expressed in rutozide/ 100 vegetal product.

Preparation of samples: 1 g of vegetal product (crushed to a degree of fineness by spraying, sieve VI), is extracted in a water bath at 60ºC with 100 ml ethanol 50º, to reflux, in flask with descending cooler for 30 minutes and filtered hot, than it is added ethanol 50º in volumetric flask of 100 ml.

The flavonoid concentration of the sample to be analyzed is calculated using a sample curve, established in parallel and in the same conditions as the sample solution according FR X.

Extinction is read in 1 cm cuvettes at wavelength of 430 nm (Bungau et al, 2004, Schuh et al, 2006, Bungau et al, 2011). To calculate the concentration of flavones it was used a calibration curve in rutozide. Tea consumption in Romania, around 3 liters per year, is very low compared to other countries. According to some studies, in the last years Romanians have bought less black tea, but the sales of green tea increased.

In our study were interviewed a total number of 134 persons (73 women and 61 men) in the period between 2014-2015. They fill in a questionnaire in which we formulated several questions related to the habits and preferences of tea consumption.

RESULTS AND DISCUSSIONS

The results regarding the amount of flavonoids are presented in figure 1.

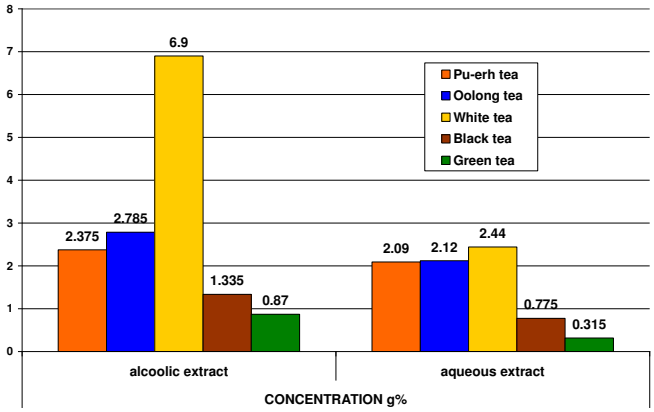

Fig.1. The percentage concentration of flavonoids in aqueous and alcoholic extracts

It was observed that in alcoholic extracts the flavonoid concentrations are higher. Out of the analyzed tea types, white tea contains the largest amounts of flavonoids, followed by oolong tea, pu-erh tea, black tea and green tea. The answers to the questionnaire are shown in figures 2, 3, 4.

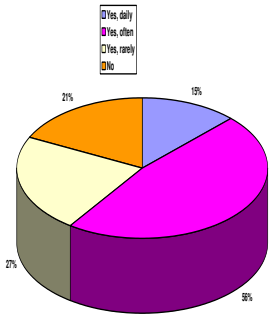

Fig. 2. The percentage distribution of the habit of drinking tea

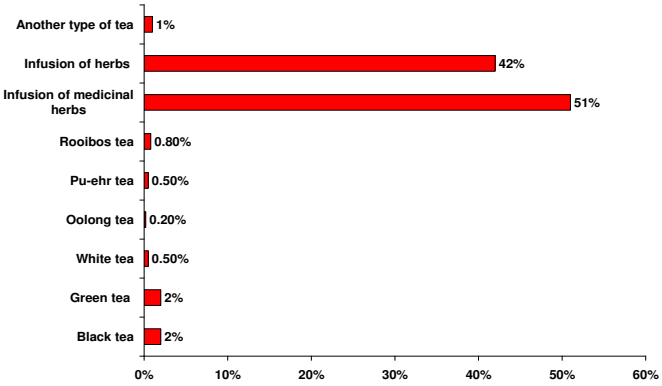

Fig. 3. The percentage distribution of answering the question: "What kind of tea do you drink usually?"

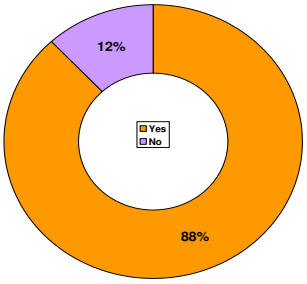

Fig. 4. The percentage distribution of answering the question: "If you received more information about the beneficial effects of black tea, green tea, or white tea on the body, would you drink more of these types of tea?"

Out of the given answers we found out that for the majority of the respondents there is no difference between the tea infusion prepared from *Camellia sinensis L.* leaves and infusions prepared from other various herbs or aromatic plants.

The majority of the respondents do not drink tea, the sorts of white tea, oolong tea or pu-erh tea being very little known.

The great majority of respondents has no knowledge about the beneficial effects of tea on the body, but they are willing to drink more if they'd received more – and clear information about these effects.

CONCLUSIONS

In this paper we have studied the different varieties of tea obtained from *Camellia sinensis*, the amount of flavonoids and consumption pattern.

We measured the amount of flavonoids, substances with antioxidant properties of different tea varieties, which are commercially available in Romania. Our results show that all the studied tea types have antioxidant effect. The alcoholic extracts are richer in flavonoid substances than those of aqueous. White tea has the strongest antioxidant effect.

Out of the European countries, Romania consumes the lowest quantities of tea, this is due to the fact that Romania is not a country where tea consumption is a tradition.

There should be more information available to consumers.

The role is that of the pharmacist too, to inform the patient about the correct way of preparing different tea types, in order to obtain a pleasant taste and the effective use of active principles in the body. They must learn better the chemical composition of different sorts of tea, the differences between them and the beneficial effects on the body.

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