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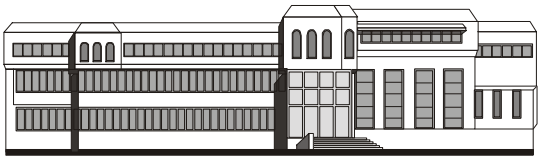

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Food additives in chocolate

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Abstract: Chocolate is among the most famous confectionary food products. Chocolate is usually sweet, brown food, prepared of roasted and ground cacao seeds that is made in the form of a liquid, paste, or in a block, or used as a flavoring ingredient in other foods. Additives are substances that are usually not typical food ingredients and they are added during production, preparation, processing, shaping, packaging, transporting and storage of food. Additives play a very important role, help maintain freshness of food, preserve consistency, improve texture, taste, color and nutritional profile. The purpose of this research was to make an overview of the presence of additives in chocolate. In the study were included 32 samples of chocolates (white, dark and milk chocolate). The information of the additives used for the production of chocolate was obtained from the declarations of the products. The obtained results have shown that in analyzed samples of chocolate are present 8 different additives, most of which were in samples of milk chocolate. Most of used additives in analyzed samples of chocolate are safe for human health.

Key words: additives, chocolate, food safety

Introduction

Chocolate is usually sweet, brown food, prepared of roasted and ground cacao seeds that is made in the form of a liquid, paste, or in a block, or used as a flavoring ingredient in other foods. The production of chocolate consists of cocoa beans, cocoa mass, cocoa butter, sugar, milk powder. Cocoa beans are dry and fermented seeds of cocoa fruits, which make the initial raw material for all cocoa products. The quality of cocoa beans depend of: growth condition of cocoa, a way of manufacture, transport and storing of cocoa beans (Goldoni, 2004). Cocoa beans contain a high amount of fat (up to 61%), tannic substances

of approximately 6% and alkaloids (theobromine and caffeine) up to 2%. The water content in cocoa beans is in the range of 5-7.5%. Cocoa beans contain carbohydrates: starch, cellulose, pentoses, pectin, glucose and fructose. Mineral substances are in the form of salt: carbon, phosphate and sulfate or in the form of oxides. The most common minerals contained in cocoa beans are potassium and phosphorus. From proteins cocoa beans contain albumin, globulin, prolamine and glutenin. Cocoa beans contain vitamins in traces from the complex A, D, E and B. From organic acids they contain: acetic, citric, wine, vanillic and oxalic acid (Goldoni, 2004). The color, smell and taste of the cocoa beans is determined by the content of tannins: catechin, proanthocyanidin, cyanidin and anthocyanin (Goldoni, 2004).

The fruit of the cocoa tree is the pod. It is oval-shaped and measures between 10 and 25 cm long, 15 cm wide and can weigh up to 750 grams. The cocoa pod contains pulp in which the cocoa beans are stored. One cocoa pod contains around forty beans. With fermentation the beans are heaped in piles on the ground or placed in boxes which are covered with banana leaves. Fermentation takes between two and six days. During this time, the cocoa beans are regularly turned over in order to ensure even fermentation. This is how the beans detach themselves from the pulp and get their specific color and flavors. The cocoa beans must be dried before they can be shipped. They are spread out and left to dry in the sun for two weeks. At this stage as well they are regularly turned over. The next stage is selection and cleaning, where the cocoa beans are controlled for quality. After a rigorous selection of the best quality beans, they are submitted to a final verification. Then, the beans are heated to a temperature of between 120 and 130°C for fifteen to thirty-five minutes. During the roasting process, the beans loose about 5 to 15 percent of their initial weight. Roasting enhances the flavor of the beans. Once the beans have been roasted, they are placed in a winnowing machine. This process removes the shells from the beans to leave just the cocoa nibs. Then beans of different origins are blended together in order to obtain the desired flavors. After all these different stages of transformation, the beans are again submitted to quality control checks where after they will be ground to obtain a compact paste. Then beans of different origins are blended together in order to obtain the desired flavors. Chocolate is made by adding cocoa butter to cocoa paste, in addition to that which is naturally contained in the beans. This is what makes chocolate crisp and melt in the mouth, which are the characteristic of good quality chocolate (Choco- Story Brussels).

Chocolate is almost unique as a food in that it is solid at normal room temperatures and it melts easily in the mouth. The reason of this is cocoa butter which solids at temperatures below 25°C. The fat is, however, almost entirely liquid at body temperature, so the chocolate becomes a smooth liquid when it is

heated in the mouth. In chocolate, the fat gives desirable physical characteristics, such as: gloss, creamy texture and rich taste (Afoakwa, 2007 and Beckett 1999). Most common ingredients of chocolate are saccharose and cocoa powder. Saccharose is the common sugar contained in chocolate, is a disaccharide consisting of glucose and fructose and it is derived from sugar beet and sugar cane (Kruger, 2009). Cocoa powder is a product obtained by conversion into powder of cocoa beans which are previously cleaned, peeled and thermally treated, containing at least 20% cocoa butter, calculated on the weight of the dry matter, and with a water content not exceeding 9%. (Rulebook, 2006). Chocolate contains dry matter not less than 35%, of which not less than 18% shall be cocoa butter and not less than 14% fat-free cocoa solids. (Rulebook, 2006). There are three different types of chocolate: dark, white and milk. Dark chocolate contains minimum 45 % cocoa paste, cocoa butter, sugar, soy lecithin and aroma (usually vanilla). Milk chocolate contains: minimum 35 % cocoa paste, cocoa butter, milk, sugar, soy lecithin and aroma (usually vanilla) and white chocolate contains: cocoa butter, milk, sugar, soy lecithin and aroma (usually vanilla).

Food additives are substances intentionally added to food either directly or indirectly with one or more of the following purposes: to maintain or improve nutritional quality, to maintain product quality and freshness, to help in the processing or preparation of food, to make food more appealing. (Inetianbor, 2015). On the other hand, food additives may only be authorized if there is a technological need for their use; they do not mislead the consumer; they present no hazard to the health of the consumer. The use of food additives must always be labeled on the packaging of food products by their category (antioxidant, preservative, color, etc.) with either their name or E number (Inetianbor, 2015).

Material and methods

The aim of this research was to analyze the presence of additives in chocolate samples present in the local markets. In the study were included 32 samples of chocolates (white, dark and milk chocolate). The information of the additives used for the production of chocolate was obtained from the declarations of the products.

Results and discussion

Analyzed samples of chocolate were grouped according their type. In the study were analyzed 32 samples of chocolate, of which 5 dark chocolates, 3 white and 24 milk samples (Figure 1).

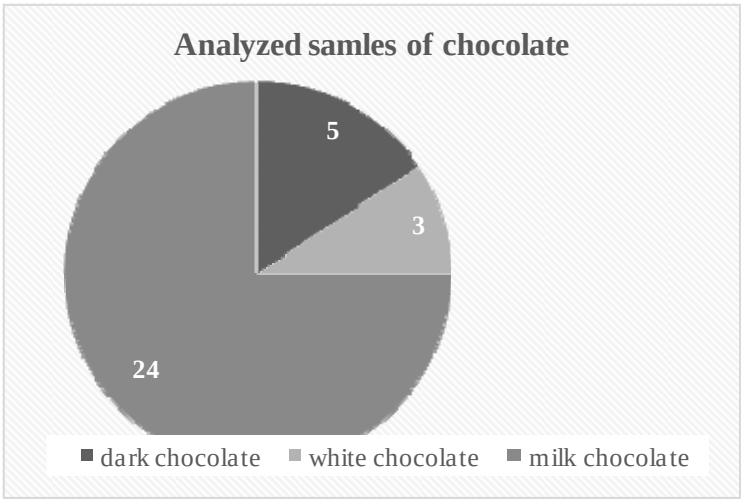

Figure 1. Analyzed samples of chocolate

According information on declaration on analyzed chocolates all samples contained additives (Figures 2).

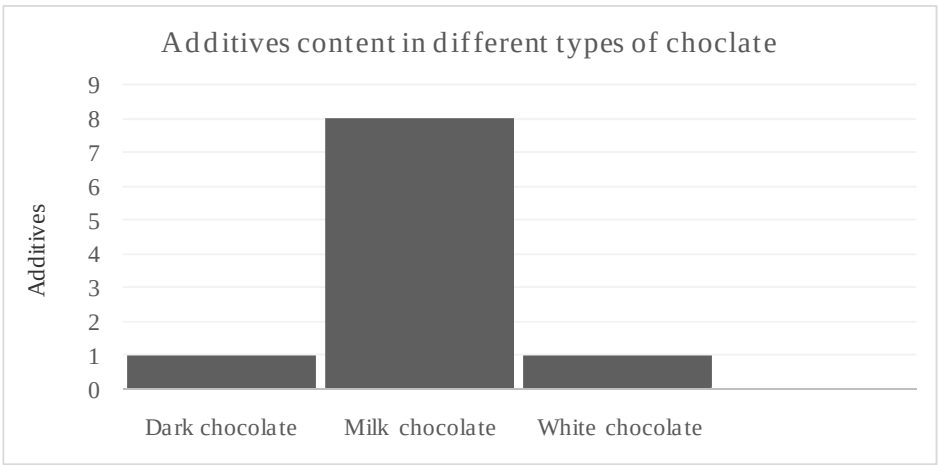

Figure 2. Additives content in different types of chocolate

According obtained results in analyzed samples of dark chocolate was noted presence of 1 additive. In analyzed samples of milk chocolate were noted 8 additives and in analyzed samples of white chocolate was noted 1 additive.

Table 1. Additives present in chocolate

Additives		**Type of chocolate**	**Property**	**Effect**
E -number	**Name of the additive**			
E-330	Lemon acid	milk chocolate (n= 1/24)	Acid regulator	Safe
E-341	Phosphoric acid, di-phosphate	milk chocolate (n=1/24)	Emulsifiers	Safe
E-471	Mono and diglycerides of fatty acids	dark chocolate (n=1/5) milk chocolate (n=1/24)	Stabilizers and esters of fatty acids	Safe
E-476	Polyglycerol	white chocolate (n=3/3) milk chocolate (n=8/24)	Emulsifiers	Safe
E-500	Carbonates	milk chocolate (n=2/24)	Acid regulator	Safe
E-503	Carbonates	milk chocolate (n=1/24)	Acid regulator	Laxative effect
E-530	Magnesium oxide	milk chocolate (n=1/24)	Acid regulator	Safe
E-501	Carbonates	milk chocolate (n=1/24)	Acid regulator	Safe

Conclusion

Food additives play a very important role, they help maintain freshness of food, preserve consistency, and improve texture, taste, color and nutritional value. The obtained results have shown that in analyzed samples of chocolate are present 8 different additives, most of which were in samples of milk chocolate. Most of used additives in analyzed samples of chocolate are safe for human health.

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