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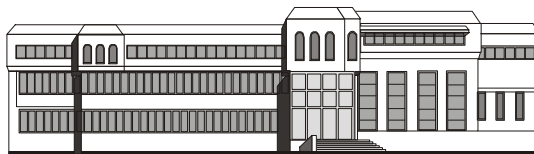
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## CONFERENCE OF AGRONOMY STUDENTS

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## Use of food additives in dairy products

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**Abstract:** The usage of additives is regulated with a special rulebook. In general, additives are not used in raw milk, butter and whey. Additives are used more in cheese, fruit yogurt, chocolate milk and similar products. The purpose of this study is to analyze the presence of additives in dairy products. The information for the used additives was obtained from the declarations of the products. According obtained results 29 different additives were noted in analyzed samples of dairy products, most of which were colors, stabilizers, emulsifiers. Most of used additives are safe for human health.

**Key words:** additives, milk products, health , effect on humans

### Introduction

In the late 1970s and early 1980s, consumers of food products very quickly became convinced that additives were dangerous and should be avoided. By the mid-1990s, interest in organic and natural foods had begun to rise and consumers also started becoming more aware of some of the potential benefits of additives. However, although consumers were aware that the additives could deliver benefits, the automatic assumption that additives were ‘bad’ remained and consumers felt that additives should be reduced in our foods (Brockman, 2011).

Nowadays, preservation techniques have considerable role in food industry. Generally, they are used for improving the quality with boosting durability of products and thus enhancing food shelf life. The rate of food spoilage can be controlled by many procedures such as suitable packaging for preventing available oxygen, sterilization, pasteurization, dehydration (drying), smoking, freezing, and food additive (Msagati, 2012).

The requirement of consumers to reduce additives in food products has led to the removal of artificial colors, flavors, and preservatives in many food categories so as to obtain clean-label products. Looking specifically at the dairy industry, much of the innovative new product development has been carried out in the 'health and wellness' area. Besides the introduction of more natural dairy products with fewer additives, this has also included development of dairy products with less fat and less calories (Brockman, 2011).

A wide range of additives are present in the food supply. While different types have different technological functions, such as imparting color, emulsifying, or stabilizing properties, preservatives, it is incumbent on food regulators to ensure that they are safe for human consumption. Chemical preservatives have been used in the preservation of some milk products for a very long time, but there has not been much use of them in fresh milk. The general attitude in most countries has been that fresh milk is a basic food and that its preservation should be secured through improved methods of production, processing, and distribution, rather than through addition of preservatives (Collins, 2012).

The safety of food additives is assessed by a risk assessment. The risk assessment process comprises four stages: hazard identification, hazard characterization, exposure assessment, and risk characterization. Animal-based toxicology studies and food additive exposure assessments are integral parts of a food additive risk assessment.

Dairy products as an important nutritional recommended consuming in daily and appropriate amounts. The safety of dairy products should be considered in the presence of preservatives. The acceptable daily intake (ADI) represents amount of daily consumption of substance without any risk even for a lifetime. According to ADI, the maximum permitted limit for food additives is based on mg/kg of body weight. The most commonly used preservatives in dairy products such as cheese and yogurt are benzoate, sorbate, and natamycin (WHO, 2011).

These compounds are generally used to inhibit various types of microorganisms (e.g., bacteria, yeasts, and molds). Sodium benzoate (E211) is known as the first chemical preservative approved in food products by the US Food and Drug Administration (FDA). Its solubility is more than other salt of benzoate like potassium and calcium. (Sieber, 1995).

The data derived from toxicology studies are used to derive an acceptable daily intake (ADI) of a food additive by employing a large safety (uncertainty) factor. The primary purpose of exposure assessments is to assess whether (intake) exposure to an additive is below its ADI for the ultimate protection of the consumer. Several methods of exposure assessment exist, ranging from crude screens to more refined techniques such as probabilistic modeling (Gilsenan, 2011).

Milk is a biological liquid with a very complex composition, a yellow white color, and a characteristic smell and taste that secretes the mammary gland of females in mammals or women, a certain time after delivery. Under the term "milk" it is always understood "cow milk" and other types of milk must always be emphasized by which species of animal originates. All types of milk contain the same ingredients, but the presence and the interaction of the components as well as their structure can be very different. Therefore, all types of milk vary according to food, physical chemistry and technological procedures. Simply, the milk can be considered as an emulsion or as a suspension of milk fats dissolved in an aqueous phase, in which phase other solutes are dissolved, but they are colloidal. The materials that are deliberately added to the milk and dairy products are so called additives. Milk additives do not include substances that managed to get through the animal food, sharply curing, through the dishes, the air, and contamination (Presilski, 2005).

Additives in dairy products are added for several reasons: to continue the correctness of the milk and dairy products, ie to prevent the development of an undesirable microflora. This group includes: sugar, salt, preservatives (sorbic and benzoic acid and their salts), antioxidants.

Because food additives have become essential in the food industry, the European Economic Community (EEC) in 1988 introduced the regulation of labeling and numbering of food additives, such as food colorings, flavors, taste enhancers and preservatives, to promote a free and fair market of safe food products within the European Community (Haen , 2014).

## **Material and methods**

In this research work were included 35 samples of dairy products present on the local markets. Data on additives used for the production of dairy products were obtained from the declarations of products. The products were grouped into 9 groups: melted cheeses (6 products), dairy preparations for cooking (4 products), fruit and sweet dairy products (5 products), chocolate milk (4 products), White cheese (6 products), cheese (5 products), sour cream and sour cream with vegetables and herbs (4 products), milk powder (2 products), topping (1 product).

## **Results and discussion**

In the positive list of additives from the Official Gazette No: 118/2005, the additives added in dairy products include all off the additives used in diary products. The effects of additives are presented in the Table 1.

Table. 1. Additives in dairy products, purpose and health risk

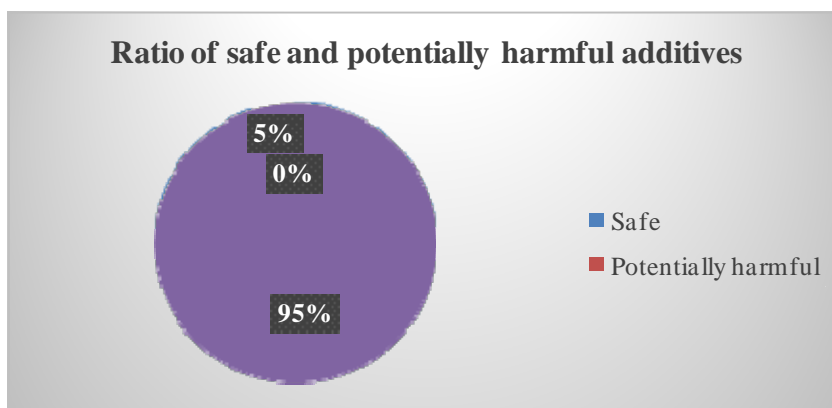
E - number		Name	Purpose	Health risk
1.	E150d	Caramel sulfid/ammonia	Coloring	Carcinogen
2.	E160	Carotenes	Coloring	Safe
3.	E202	Potassium Sorbate	Preservative	Safe
4.	E224	Potassium metabisulphite	Preservative , antioxidant	Toxic, causing an asymptomatic attack in asparticides, destroys B1 vitamin.
5.	E234	Nisin	Preservative , antioxidant	Safe
6.	E252	Potassium nitrate	Preservative , antioxidant	Avoid, potential carcinogen
7.	E322	Lecithin	Emulsifier, stabilizer	Safe
8.	E331	Sodium citrate	Acid regulator, emulsifier, stabilizer, antioxidant	Safe
9.	E332	Potassium citrate	Acid regulator, emulsifier, stabilizer, antioxidant	Safe
10.	E339	Sodium phosphate	Acid regulator, emulsifier, stabilizer, precipitation agent	High amounts may impair potassium / sodium Balance
11.	E340	Potassium phosphate	Acid regulator, emulsifier, stabilizer, antioxidant	High amounts may impair Potassium / Sodium Balance
12.	E341	Calcium phosphate	Acid regulation, anti-baking agent, hardening agent, molding agent	Safe
13.	E407	Carrageenan	Stabilizer, alteration of consistency	Carcinogen, to be avoided
14.	E410	Carruba rubber	Stabilizer, changing consistency	Can reduce cholesterol
15.	E412	Guar rubber	Stabilizer, changing consistency	Cause vomiting
16.	E417	Tara rubber	Stabilizer, changing consistency	Safe
17.	E415	Xanthan rubber	Thickening agent, stabilizer for preventing the separation of ingredients	Intestinal gas (flatulence). People who are exposed to a xanthan gum powder may have flu symptoms, nose irritation, and lung problems
18.	E420ii	Sorbitol	Sweetener, moisture retainer, emulsifier	Gassart disorders, should not be used for children

19.	E432	Polyoxyethylene sorbitan monolaurate	Emulsifier	Safe
20.	E450	Disodium diphosphate	Acidic acid regulator, stabilizer, emulsifier salt, precipitation agent, molding agent.	High amounts can cause disturbance in calcium / phosphorus balance
21.	E452	Sodium polyphosphate	Emulsifier, growth agent, stabilizer	Safe
22.	E466	Sodium carboxymethyl cellulose	Change of consistency, emulsifier, stabilizer	Safe
23.	E471	Mono and diglyceride of fatty acids	Emulsifier, growth agent, stabilizer	Safe
24.	E472a	Ester acetic acid mono and diglyceride fatty acids	Emulsifier, sequestrant, growth agent, stabilizer	Safe
25.	E472b	Lactic acid ester mono and diglyceride fatty acids	Emulsifier, anti-foaming agent, stabilizer	Safe
26.	E472e	Tartaric acid mono and diglyceride fatty acids	Emulsifier, anti-foaming agent, stabilizer	Safe
27.	E509	Calcium chloride	An agent for hardening, for retaining consistency	Safe
28.	E575	Glucot Delta-Lactone	Acid Regulator	Safe
29.	E1442	Hydroxy propyl dibromophosphate	Volume enhancer, stabilizer, emulsifier, hardening agent	Safe

According to obtained results in analyzed samples of dairy products, some of dairy products contained additives, which in higher dose could have potential harmful effect on human health.

According to information of the ratio between safe and potentially harmful additives, the results have shown that most of the additives are safe.





**Figure.1** Ratio of safe and potentially harmful additives

## Conclusion

According to these studies, additives that are added to dairy products are generally safe. Exceptions are some of the colors and flavor enhancers most commonly added to fruit yogurts and chocolate milk such as caramel color (E150d), Preservative calcium metabisulphite (E224), carrageenan stabilizer (E407).

Also, it is good to avoid children and pregnant women, and for healthy people to be used in very small quantities sorbitol (E420i), potassium phosphate (E339), sodium phosphate (E340), potassium nitrate (E252).

Despite these additives which in higher doses could not have positive effects on human health and because of that they are used in small quantities, others additive used in production of dairy products are safe for use.

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