

ANALYSIS OF THE DECLARED COMPOSITION OF SAUSAGES AVAILABLE ON THE POLISH MARKET

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Abstract

Due to the increasing pace of people's lives, the demand for convenient food is increasing. An example of such food are sausages. Sausages are a meat product, so in their composition the vast majority should be high-quality meat. Another characteristic of sausages is their homogenization and soft texture. In addition, it is a product that has been designed with the desired sensory qualities both hot and cold. For these reasons, among others, sausages are a frequent choice of consumers in the meat products segment. Unfortunately, not all of these products are considered wholesome meat products. This, however, shows that these are not always products that should be consumed in the daily diet, e.g. by children and sensitive consumers. The aim of this article was to analyze the composition of sausages of various brands (both discounters' own brands and those enjoying great popularity) and to classify them in terms of quality.

Key words: *purslane, photosynthesis, transpiration, stomatal conductance*

INTRODUCTION

There are many food additives in food, 5 main groups can be distinguished¹ namely: 1) dyes, 2) preservatives and acidity regulators, 3) antioxidants and synergists, 4) stabilizing, thickening and emulsifying substances, applied to the surface of products, fillers, 5) other substances.

General definition of food additives² states that it is any substance that is not normally consumed as food or used as a characterizing food ingredient, regardless of its possible nutritional value, which is deliberately added, for technological reasons, to food during its the production, processing, preparation, handling, packaging, transport or storage causes, or may reasonably be expected to, cause the substance or its products to become, directly or indirectly, an ingredient of the food. Hence, it can be assumed that it is supposed to improve the taste and aesthetic qualities or extend the shelf life of

the product and give the product the features expected by the consumer.

An ADI (Acceptable Daily Intake) has been set for food additives. It is an acceptable daily intake of additional substances, the consumption of which during the day while complying with the standards is not harmful to health, even if you consume the substance on a daily basis.

Currently, many manufacturers use food improvers and additives in order to correctly taste, structure and consistency of the finished product while reducing the price. One such example is sodium nitrite (E 250) ADI for nitrate ions is 0.07 mg / kg bw / day (0.1 mg NaNO₂ / kg bw / day)³. Nitrites can build up in the body and pose a great risk to health. "Nitrites react with secondary and tertiary amines in meat to form nitrosamines. Nitrosamines are carcinogenic, (...). It is estimated that at a dose of 5 µg / g they induce tumor development in experimental animals."⁴

The use of food additives is not necessary in the production of sausages, but it makes it easier production and reduces producer costs. The basic ingredients of sausages should be meat, spices, fat and water. However, in order to reduce production costs, increase product efficiency and intensify the taste, manufacturers use flavor enhancers (such as monosodium glutamate, yeast extract), preservatives such as nitrite. In order to increase efficiency and reduce production costs, manufacturers add hydrocolloids, i.e. thickeners and gelling agents, such as starch, vegetable proteins and others. Thickening agents are also added to prevent water syneresis, it is most often starch. Producers also reach for antioxidants, dyes and aromas, which are not needed in a "real", non-adulterated product. For the purposes of this article, a "real" product means sausages, A sausage is a homogenized sausage, classified as ready-to-eat food. It belongs to the group of products that are convenient and quick to prepare. Particularly liked by parents and people who live in constant rush, because it does not require special attention in preparation. In addition, it is a product suitable for consumption both hot and cold. In the cold version, it is undoubtedly a quick snack. However, the consumption of hot dogs requires their preparation, starting from heating in water or in a pan, ending with hot dogs or sausages baked in puff pastry. The purpose of this article is to indicate which food additives are used in the production of sausages based on the analysis of 11 products available on the Polish market. Moreover, the legitimacy of their application will be analyzed.

MATERIALS AND METHODS

This paper presents a detailed description of the hot dogs available at the Lidl discount store. The research material was collected in July 2021, it was purchased in Poland in the Małopolskie Voivodeship. The analysis covered 11 types of sausages, 2

types of sausages dedicated to children, 6 types of discount private label, 2 types of flagship sausage producers in Poland and 1 cheap poultry sausages. The tested products were:

- PRODUCT 1 - sausages with turkey fillet,
- PRODUCT 2 - sausages with ham fillet,
- PRODUCT 3 - sausages with chicken breast meat,
- PRODUCT 4 - poultry sausages,
- PRODUCT 5 - ham sausages,
- PRODUCT 6 - classic,
- PRODUCT 7 - premium chicken fillet sausages,
- PRODUCT 8 - premium pork ham sausages,
- PRODUCT 9 - pork sausages,
- PRODUCT 10 - sausages with turkey fillet,
- PRODUCT 11 - sausages with ham fillet.

Detailed information on the batch number is available from the author of the article.

The first research method used was the analysis of the composition of each type of sausages. Each component has been analyzed in terms of the purposefulness of its use, and therefore what is its technological suitability.

Another element of the work was to indicate which of the analyzed products are characterized by very good nutritional value, average nutritional value and low nutritional value. The maximum number of points obtained by the product was 11, and the nutritional value, depending on the sum of points, was characterized as follows: 0-5 low nutritional value, 6-8 average, 9-11 very good. This classification took into account the number of ingredients that make up the product, with 3 points for products with up to 6 ingredients, 2 points for 8 ingredients and 1 point for 9-10 ingredients and more than 10. ingredients 0 points. In addition to the amount of

ingredients, the use of various food additives in the production was assessed. 8 categories were taken into account: thickeners, flavor enhancers, added sugars, sodium nitrite, stabilizers, emulsifiers, artificial flavors, proteins of non-animal origin. In the case of non-use of the above-mentioned additives in the product, 1 point was awarded in individual categories, however, if a given substance was present in the composition, 0 points were awarded.

The choice of the category and method of awarding points is subjective, while the information contained in the final evaluation of the products is objective, resulting from the manufacturer's declaration. The analyzed products could be assessed through the prism of other categories or points could be awarded in a different way, however, for the purposes of this article, the author made such a choice.

RESULTS AND DISCUSSIONS

Table 1 shows the composition of the PRODUCT 1 brand sausages - turkey sausages. It was found that the composition of the analyzed product in terms of non-meat additives is short. It should be noted that the product uses spices, but also spice extracts, i.e. oleoresins and essential oils. Spice extracts, when applied to carriers, give an effect analogous to natural spices, but at a much lower dosage and lower production cost⁵. Undoubtedly, the aromas and glucose added to the production of the analyzed sausages could be omitted. However, their use allows, for example: to hide the defects of the raw material used for production, reduce production costs by replacing spices with aromas or glucose. This is undoubtedly a procedure beneficial in terms of production technology, but not necessarily in the interest of the consumer.

Tab. 1. PRODUCT 1 - sausages with turkey fillet

Component	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Water	It is added to make the mass uniform and as a filler. By adding water, the weight of the product can be increased.	The substance is needed in a small amount, it facilitates the process of homogenizing the mass.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.

Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.

Table 2 presents the analysis of non-meat additives declared as used in the production of the brand's sausages PRODUCT 3 - sausages with chicken breast meat. The undoubted disadvantage of these sausages is the addition of chicken skins for production. Chicken skins are primarily a source of fat, while the consumer, when buying a poultry product, expects a low-fat meal. Besides, the name of the sausages may be somewhat misleading, because they are sausages "with chicken breast meat", while apart from breast meat, there are also other elements of chicken, which the consumer may not be aware of. The name of the product in accordance with the

regulation must not be misleading and must, like all information on the packaging, "(...) serve a high level of protection of health and consumer interests by providing end consumers with grounds for making informed choices and safe use of food,⁶. However, in the subjective opinion of the author, it is not a precise name and leaves room for interpretation. It is also worth mentioning that the addition of glucose to this product is not necessary. Currently, Poles consume far too much sugar, which is causing the obesity epidemic⁷. Therefore, sausages as a meat product, i.e. dry in principle, should not contain sugar additives.

Tab. 2. PRODUCT 3 - sausages with chicken breast meat

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Chicken skins	When used as a filler, they are cheaper than meat, and at the same time the manufacturer can say that he does not use chemical thickeners.	The substance is not necessary for the production of sausages, it contains a large amount of fat, which increases their calorific value despite being used for the production of chicken meat with theoretically low fat content.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Chicken protein	The aim is to thicken the product and increase the amount of protein, which increases the nutritional value of the product.	For the production of sausages it is not necessary to add chicken protein. There is enough protein in good quality meat.
Vinegar	It is added to acidify the product, extend its shelf life and as a flavor enhancer. Small amounts of spirit vinegar in food stimulate the appetite and	It is not required for production, but it is a natural means of extending the life of the product. In addition, adding vinegar allows you to partially cover up any defects in the raw material.

	facilitate the digestive process, which is beneficial for the consumer.	
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Natural flavors	Used as flavor enhancers. Their use may be to hide the defects of the raw material.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.

Table 3 shows the declared composition of PRODUCT 3 poultry sausages. They contain only 55% meat, in addition, it is mechanically separated meat (MSM). This is inappropriate from the consumer's point of view, as the end product of sausages is by definition a meat product. However, the content of only 55% of MSM, which is not the best quality meat raw material, indicates that 45% of the ingredients are fillers, due to the fact that flavor enhancers and spices always make a small contribution to the production process. Chicken skins fill the product with fatness, but it is not a raw meat, but waste after cutting up poultry. The disadvantage of this product is also undoubtedly the presence of semolina and starch, because it is a typical example of fillers aimed primarily at food adulteration in terms of quality. In turn, the use of soy protein and sunflower protein hydrolyzate is intended to hide the lack of wholesome meat in the product and use mechanically separated meat instead. Antioxidants, emulsifiers, flavors, stabilizers and flavor enhancers are products that, according to the provisions of the Act, can be used in food production, however, if the food product is characterized by high-quality ingredients

and the technological production process is carried out at the highest possible level, it is not necessary to use them. or at least not all of them at the same time. In turn, the use of soy protein and sunflower protein hydrolyzate is intended to hide the lack of wholesome meat in the product and use mechanically separated meat instead. Antioxidants, emulsifiers, flavors, stabilizers and flavor enhancers are products that, according to the provisions of the Act, can be used in food production, however, if the food product is characterized by high-quality ingredients and the technological production process is carried out at the highest possible level, it is not necessary to use them. or at least not all of them at the same time. In turn, the use of soy protein and sunflower protein hydrolyzate is intended to hide the lack of wholesome meat in the product and use mechanically separated meat instead. Antioxidants, emulsifiers, flavors, stabilizers and flavor enhancers are products that, according to the provisions of the Act, can be used in food production, however, if the food product is characterized by high-quality ingredients and the technological production process is carried out at the highest possible level, it is

not necessary to use them. or at least not all of them at the same time.

Tab. 3 PRODUCT 4 - poultry sausages

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Chicken skins	When used as a filler, they are cheaper than meat, and at the same time the manufacturer can say that he does not use chemical thickeners.	The substance is not necessary for the production of sausages, it contains a large amount of fat, which increases their calorific value despite being used for the production of chicken meat with theoretically low fat content.
Water	It is added to make the mass uniform and as a filler. By adding water, the weight of the product can be increased.	The substance is needed in a small amount, it facilitates the process of homogenizing the mass.
Starch	Used as a filler, thickener, especially with large amounts of water, it prevents syneresis.	Starch is not necessary, but when added, there is no loss of product during the manufacturing, heating or storage process. This is economically advantageous for the producer, but not in the consumer's interest.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Soy protein	Used in low-quality products to supplement protein, it is also a cheap source of protein.	For the production of sausages that use good quality meat, it is not necessary to add protein, especially vegetable protein. It is a procedure aimed at reducing production costs.
Semolina (from wheat)	Used as a filler, thickener.	It should not be used in a good quality product.
Stabilizers (triphosphates, sodium acetates, sodium citrates)	Added to maintain the physical and chemical properties of products, e.g. consistency or to extend their durability. They can also act as protection against the formation of free radicals during storage.	These are not substances necessary for the production of sausages, they are typical chemical additives that allow you to hide the quality defects of the raw material used in production and generally give the product features that should have full-fledged sausages.
Flavor enhancers (monosodium glutamate, disodium 5'-ribonucleides)	Added for purely economic purposes as the flavor enhancer gives it a distinctive flavor.	These are not substances needed for the production of sausages. It is an added substance to reduce production costs, because the addition of spices can be limited.
Sugar	Used as a flavor improver	It is not necessary to produce sausages.
Antioxidant (ascorbic acid)	Added to reduce the oxidation of the product and the formation of free radicals. In the case of ascorbic acid, the manufacturer may inform about the high content of vitamin C, i.e. about the health properties of the product.	It is not necessary for production, but in case of low quality of the product, where oxidation of e.g. low-quality fats may take place, it is advisable to add antioxidants in order to maintain the stability of the product.
Emulsifiers (mono- and diglycerides of	Added to give a silky and thick consistency, making it more attractive to the consumer, while shortening the	They do not have to be used in the production of sausages, if good quality raw materials are used in the production and the technological process is

fatty acids / esterified with citric acid)	technological process.	carried out carefully.
Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Smoke flavor	It gives color and replaces the natural aroma that arises in the process of traditional meat smoking. It allows you to falsify the quality of the product, hide the wrong smell and color of the product, especially in the case of not fresh products.	It is not needed in the production of sausages, because it is added only for economic purposes and because of the desire to hide the poor quality of the product.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Onion	Used as a spice to enhance the flavor.	It can be used as a natural flavor enhancer and flavor enhancer. It is a kind of spice.
Sunflower protein hydrolyzate	Added to replace meat protein with a cheaper alternative, it also allows you to hide low-quality meat used.	It should not be used in good-quality meat products, because good-quality raw meat has the right amount of protein.
Preservative (sodium nitrite)	In order to extend the shelf life.	It is not necessary, however it is added to reduce production costs and extend the life of the product, especially when using low-quality raw materials.

Table 4 shows the composition of PRODUCT 7- brand sausages made of premium chicken fillet. Although they include the words chicken fillet or premium in the name, this is inappropriate as it suggests a high quality product to the consumer, and in fact the consumer receives not the best quality sausages. It is worth noting that the main disadvantage is the presence of glucose, which reappeared in a dry product such as sausages. In

addition, the meat product contains milk proteins, which is certainly a feature that excludes this product from the "premium" class. This is due to the fact that the meat product should not contain any milk ingredients, mainly because they are strong allergens, and the consumer, when buying a "premium" meat product, does not expect milk in it. Preservatives such as sodium nitrite can be used to⁸

Tab. 4 PRODUCT 7– premium chicken fillet sausages

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Milk protein	Added to replace meat protein with a	It is a filler that allows you to supplement protein

	cheaper alternative, thus concealing the use of low-quality meat.	deficiencies in the product, which result, for example, from the use of low-quality meat in production. However, sausages should not contain any milk ingredients, because they are primarily a strong allergen, and the consumer does not expect milk ingredients in the meat product.
Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Antioxidant (ascorbic acid)	Added to reduce the oxidation of the product and the formation of free radicals. In the case of ascorbic acid, the manufacturer may inform about the high content of vitamin C, i.e. about the health properties of the product.	It is not necessary for production, but in case of low quality of the product, where oxidation of e.g. low-quality fats may take place, it is advisable to add antioxidants in order to maintain the stability of the product.
Citrus fiber	Used as a thickener and to absorb excess water and prevent syneresis.	It is undoubtedly a better solution than the use of starch, as it allows you to supplement the fiber deficiency in the diet. However, due to the fact that sausages are a meat product, it is inadvisable to add carbohydrate raw materials, especially since their technological role is to be a thickener and a hydrocolloid.
White pepper	Used as a spice to enhance the flavor.	Its use is advisable so that the product has more desirable sensory characteristics.
Smoke flavor	It gives color and replaces the natural aroma that arises in the process of traditional meat smoking. It allows you to falsify the quality of the product, hide the wrong smell and color of the product, especially in the case of not fresh products.	It is not needed in the production of sausages, because it is added only for economic purposes and because of the desire to hide the poor quality of the product.
Preservative (sodium nitrite)	In order to extend the shelf life.	It is not necessary, however it is added to reduce production costs and extend the life of the product, especially when using low-quality raw materials.

Table 5 presents sausages dedicated to children. PRODUCT 10 - sausages with turkey fillet. It is a product that has a very desirable composition for this category of products, because it contains only 6 ingredients (except meat), and these ingredients are water and spices. The only

drawback that could be indicated is the presence of glucose, which is not necessary for the production of meat products, but it is a source of simple sugars, and therefore may contribute to the formation of obesity⁹.

Tab. 5 PRODUCT 10 – sausages with turkey fillet

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Water	It is added to make the mass uniform and as a filler. By adding water, the weight of the product can be increased.	The substance is needed in a small amount, it facilitates the process of homogenizing the mass.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.

The second of the analyzed product categories are pork sausages. In this case, the products analogous to those used in poultry sausages were analyzed, however, apart from the discount's private labels, the two most popular and widely available brands were also taken into account. Table 6 presents the PRODUCT 2 sausages - sausages with ham fillet. These

are sausages with ham fillet. These are sausages with an exceptionally good composition, because the biggest disadvantage that can be found in them is glucose, which contributes to the increase in obesity and overweight in our country. It is a substance that is found more and more often in products, not only sweet products, but also dry products such as cold cuts or sausages¹⁰.

Tab. 6. PRODUCT 2 - sausages with ham fillet

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.

Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Collagen pork protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product is a great way to supplement protein, it is also cheap	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.

Table 7 shows the composition of PRODUCT 5 sausages. They are ham sausages. They contain starch which is a cheap thickener¹¹. This is inappropriate as

it is not compatible with the concept of the sausage product. The disadvantage is also the presence of sugar, which promotes the emergence of civilization diseases such as overweight and obesity¹².

Tab. 7. PRODUCT 5 - ham sausages

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Starch	Used as a filler, thickener, especially with large amounts of water, it prevents syneresis.	Starch is not necessary, but when added, there is no loss of product during the manufacturing, heating or storage process. This is economically advantageous for the producer, but not in the consumer's interest.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Sugar	Used as a flavor improver	It is not necessary to produce sausages.
Pork protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product, it is a great way to supplement protein, and at the same time it is cheap	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.
Antioxidant (ascorbic acid)	Added to reduce the oxidation of the product and the formation of free radicals. In the case of ascorbic acid,	It is not necessary for production, but in case of low quality of the product, where oxidation of e.g. low-quality fats may take place, it is advisable to add

	the manufacturer may inform about the high content of vitamin C, i.e. about the health properties of the product.	antioxidants in order to maintain the stability of the product.
Preservative (sodium nitrite)	In order to extend the shelf life.	It is not necessary, however it is added to reduce production costs and extend the life of the product, especially when using low-quality raw materials.

Table 8 shows the composition of PRODUCT 8 sausages. These are premium pork ham sausages. In this case, the biggest disadvantage of hot dogs is the presence of preservatives and glucose. This is inappropriate because foods that

can be eaten daily contain a very large amount of sugar which promotes obesity¹³, and the presence of preservatives is to extend the shelf life of the product, which on the one hand is good for convenience foods, but not necessarily from the health point of view¹⁴.

Tab. 8 PRODUCT 8 - premium pork ham sausages

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Water	It is added to make the mass uniform and as a filler. By adding water, the weight of the product can be increased.	The substance is needed in a small amount, it facilitates the process of homogenizing the mass.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Aromas	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Acidity regulators (sodium citrates)	The pH is lowered, which results in the extraction and improvement of taste and the extension of shelf life. In addition, it protects against color change.	This is not a necessary additive, but in the case of food that we want to store longer, it makes it easier
Antioxidant (ascorbic acid)	Added to reduce the oxidation of the product and the formation of free radicals. In the case of ascorbic acid, the manufacturer may inform about the high content of vitamin C, i.e. about the health properties of the product.	It is not necessary for production, but in case of low quality of the product, where oxidation of e.g. low-quality fats may take place, it is advisable to add antioxidants in order to maintain the stability of the product.
Preservative	In order to extend the shelf life.	It is not necessary, however it is added to reduce

(sodium nitrite)		production costs and extend the life of the product, especially when using low-quality raw materials.
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Table 9 shows the composition of PRODUCT 9 - pork sausages. These are sausages with not the best composition, because they contain soy protein and modified starch, which are a filler, sausages are a meat product that does not

contain fillers¹⁵. Another disadvantage is the presence of stabilizers and flavor enhancers¹⁶ that may have a negative impact on the human body, especially children.

Tab. 9 PRODUCT 9 - pork sausages

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Water	It is added to make the mass uniform and as a filler. By adding water, the weight of the product can be increased.	The substance is needed in a small amount, it facilitates the process of homogenizing the mass.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Soy protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product, it is a great way to supplement protein, and at the same time it is cheap	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.
Modified starch	Used as a filler, thickener, especially with large amounts of water, it prevents syneresis.	Starch is not necessary, but when added, there is no loss of product during the manufacturing, heating or storage process. This is economically advantageous for the producer, but not in the consumer's interest.
Collagen pork protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product, it is a great way to supplement protein, and at the same time it is cheap	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Stabilizers (diphosphates, triphosphates)	Added to maintain the physical and chemical properties of products, e.g. consistency or durability They may also have a function that prevents the formation of free radicals during oxidation	These are not substances needed for the production of sausages. At the same time, they greatly facilitate the production of low-quality products.
Flavor	They are added for purely	However, it is not necessary, it is added in

enhancer (monosodium glutamate)	economic purposes, as the flavor enhancer gives the desired flavor with less use of more expensive ingredients	order to lower the production costs and hide the poorer quality of the product
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Antioxidant (sodium ascorbate)	Added to reduce the oxidation of the product and the formation of free radicals. In the case of ascorbic acid, the manufacturer may inform about the high content of vitamin C, i.e. about the health properties of the product.	It is not necessary for production, but in case of low quality of the product, where oxidation of e.g. low-quality fats may take place, it is advisable to add antioxidants in order to maintain the stability of the product.
Preservative (sodium nitrite)	In order to extend the shelf life.	It is not necessary, however it is added to reduce production costs and extend the life of the product, especially when using low-quality raw materials.

Table 10 shows the composition of PRODUCT 11 sausages - sausages with ham fillet. These are sausages aimed mainly at children. It has a decent composition for this product category. It only contains 6 ingredients (except meat)

and these ingredients are water and spices. The biggest and at the same time the only disadvantage of these frankfurters is the presence of glucose, which has an impact on obesity and overweight, which are more and more common in children.¹⁷

Tab. 10 PRODUCT 11 - sausages with ham fillet

Composition	The manufacturer's stated purpose for adding the substance and any hidden purpose for adding the substance	Whether the substance is necessary for production
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Natural flavors	Used as flavor enhancers, improving the taste and aroma of the product. Their use may be to hide product defects.	Aromas are not needed to produce frankfurters, because good frankfurters have a natural, pleasant aroma, and the taste of high-quality meat, enhanced with appropriate spices.

Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Collagen pork protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product, it is a great way to supplement protein, and at the same time it is cheap	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.

Table 11 shows the composition of popular and widely available sausages. PRODUCT 6. They contain, among others, fillers such as soy protein or modified starch. This is inappropriate because the consumer buys a meat product and gets a meat product

with non-meat additives not required for production. The disadvantage is also the presence of preservatives and glucose, which are nowadays added to many products, have a negative effect on the body, especially when consumed high.¹⁸

Tab. 11 PRODUCT 6– classic

Composition	Purpose of adding the substance as stated by the manufacturer Possible hidden purpose of adding the substance by the manufacturer	Whether the substance is necessary for production
Water	It is added to make the mass uniform and as a filler. By adding water, the weight of the product can be increased.	The substance is needed in a small amount, it facilitates the process of homogenizing the mass.
Salt	Used as a spice, flavor enhancer, preservative extending the shelf life of the product.	A small amount of salt is advisable and even necessary. Because it consists of elements such as sodium and iodine needed for the proper functioning of the body. In addition, salt imparts sensory features that are beneficial and desired by the consumer.
Soy protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product is a great way to supplement protein, it is also cheap	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.
Modified starch	Used as a filler, thickener, especially with large amounts of water, it prevents syneresis.	Starch is not necessary, but when added, there is no loss of product during the manufacturing, heating or storage process. This is economically advantageous for the producer, but not in the consumer's interest.
Collagen pork protein	It increases the feeling of satiety, which results in a reduction in the portion that the consumer will eat in a poor-quality product	It is not necessary to add any protein for the production of sausages. There is enough protein in good quality meat.

	is a great way to supplement protein, it is also cheap	
Glucose	Used as a flavor improver.	It is not necessary to produce sausages.
Stabilizers (diphosphates, triphosphates)	Added to maintain the physical and chemical properties of products, e.g. consistency or durability They may also have a function that prevents the formation of free radicals during oxidation	These are not substances needed for the production of sausages. At the same time, they greatly facilitate the production of low-quality products.
Flavor enhancer (monosodium glutamate)	They are added for purely economic purposes, as the flavor enhancer gives the desired flavor with less use of more expensive ingredients	However, it is not necessary, it is added in order to lower the production costs and hide the poorer quality of the product
Spices	In order to enhance the flavor of the product, however, they may be used to conceal product defects.	They provide sensory features that are beneficial and desired by the consumer, therefore they are needed in the production process. They allow partial replacement of salt, which is harmful in excess.
Spice extracts	Used as flavor enhancers, substitutes for natural spices, most often used for economic reasons.	Spice extracts are not strictly necessary for production, but are a cheaper version of spices.
Antioxidant (sodium ascorbate)	Added to reduce the oxidation of the product and the formation of free radicals. In the case of ascorbic acid, the manufacturer may inform about the high content of vitamin C, i.e. about the health properties of the product.	It is not necessary for production, but in case of low quality of the product, where oxidation of e.g. low-quality fats may take place, it is advisable to add antioxidants in order to maintain the stability of the product.
Preservative (sodium nitrite)	In order to extend the shelf life.	It is not necessary, however it is added to reduce production costs and extend the life of the product, especially when using low-quality raw materials.

Product	Number of ingredients 1	Thickening agents 2	Flavor enhancers 2	Added sugars 2	Sodium nitrite 2	stabilizers 2	emulsifiers 2	Artificial flavors 2	Protein of non-meat origin 2	sum
PRODUCT 1 - sausages with turkey fillet	3	1	1	0	1	1	1	1	1	10
PRODUCT 10 - sausages with turkey fillet	3	1	1	0	1	1	1	1	1	10
PRODUCT 11 - sausages with ham fillet	3	1	1	0	1	1	1	1	0	9
PRODUCT 2 - sausages with ham fillet	3	1	1	0	1	1	1	1	0	9
PRODUCT 3 - sausages with chicken breast meat	2	0	1	0	0	1	1	1	1	7
PRODUCT 8 - premium pork ham sausages	1	1	1	0	0	1	1	1	1	7
PRODUCT 5 - ham sausages	1	0	1	0	0	1	1	1	1	6
PRODUCT 7 - premium chicken fillet sausages	1	1	1	0	0	1	1	0	0	5
PRODUCT 9 - pork sausages	0	0	0	0	0	1	1	1	0	3
PRODUCT 6 - classic	0	0	0	0	0	0	1	1	0	2
PRODUCT 4 - poultry sausages	0	0	0	0	0	0	0	0	0	0

Awarding of points based on the amount of ingredients:

- up to 6 ingredients 3 points
- up to 8 ingredients 2 points
- up to 10 ingredients 1 point
- over 10 ingredients 0 point

Awarding points for the presence of the analyzed ingredient:

- the presence of the ingredient in question - 0 points
- no presence 1 point

Unfortunately, none of the tested products received the maximum number of points, and one product did not receive any point. The four evaluated products received a very high score in the form of 9 and 10 points. Products rated 10 are PRODUCT 1 - turkey sausages and PRODUCT 10 - turkey sausages. Products rated 9 points came from the same brands, but their basic ingredient was pork. Products with a score of 10 points did not receive the maximum score due to the presence of added sugars, which are not necessary for

their production but only improve their taste. In the case of sausages, which received 9 points, according to the author, their disadvantage was the presence of added sugars and proteins of non-animal origin. Subsequently, the classification also includes the discount brand sausages, PRODUCT 3 - sausages with chicken breast meat and PRODUCT 8 - premium pork ham sausages, which received 7 points each. In the case of these sausages, the score was reduced due to

the presence of added sugars and sodium nitrite

PRODUCT 5 sausages - ham sausages were slightly weaker, as they were awarded 6 points. In this case, thickeners, sugars and sodium nitrogen were added to the steamers, which resulted in a reduction in the score.

In the lower part of the classification there are sausages: PRODUCT 7 - premium chicken fillet (5 points), PRODUCT 9 - pork sausages (3 points), PRODUCT 6 (2 points). The lower scores in the case of PRODUCT 7 premium sausages are indicated by the presence of artificial flavors, proteins of non-animal origin, added sugars and sodium nitrite. PRODUCT 9 pork sausages unfortunately contained proteins of non-animal origin, added sugars and sodium nitrite, flavor enhancers and thickeners, which resulted in a lower rating of the product. The reduction in the score in PRODUCT 6 was influenced by the presence of non-animal protein, stabilizers, added sugars and sodium nitrite, flavor enhancers and thickeners.

The classification is closed by sausages PRODUCT 3 - poultry sausages which did not receive any point. Unfortunately, these sausages contained all the substances that were taken into account in the classification, so they could not receive points.

None of the analyzed sausages received points for the lack of added sugars, which means that either consumers expect this supplement from producers, or producers make consumers dependent on added sugar in this way.

As many as 7 out of 11 had sodium nitrite, including premium brands.

The tested products were of all quality classes (premium brands and discounters'

own brands and the cheapest products available on the market). Therefore, the results may vary. An interesting example is the 7 chicken PRODUCT, which received 5 points and was marked as a premium brand

CONCLUSIONS

Based on the conducted research, it can be concluded that there is a need to educate consumers about food additives and their safety, and how to choose the most valuable products. The fact that products such as PRODUCT 4 sausages are available on the market indicates that there is a demand for them.

At the same time, none of the products met all the criteria set by the author, while all analyzed products contained added sugars. From a dietary point of view, this has very large dietary implications, and there are more and more people in society today who are overweight or obese, especially for children who should not eat too much sugar.

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