Summary

Changes in the standard of living, eating habits and the growing awareness of consumers about the impact of nutrition on health have made more and more consumers pay attention to the nutritional value of food products. Consumers are increasingly convinced that food contributes to life extension and well-being, and that it can counteract chronic non-communicable diseases. Despite this, stress, rush and lack of time are conducive to reaching for various types of snacks, often highly processed, such as crisps, breakfast cereals, muesli or biscuits. Products of this type contain a relatively large amount of acrylamide, which can have a significant negative impact on human health, and in particular children, whose diet is characterized by a large amount of acrylamide ingested with food in relation to their body weight.

Acrylamide is formed during the thermal processing of food (at a temperature of 120°C or higher), mainly by the Maillard reaction between reducing sugars and asparagine, but also in the acrolein pathway or during thermal degradation of gluten. It may also be of endogenous origin – under appropriate conditions it is formed from asparagine under the influence of reactive oxygen species. There are several options for reducing the acrylamide content in the final product. Some literature data indicate that, depending on the raw material, one can try to reduce the formation of acrylamide by selecting the appropriate soil or cultivated varieties of plants poor in AA precursors, i.e. reducing sugars and asparagine. Additionally, the temperature and storage time of raw materials can be lowered to prevent the activity of enzymes responsible for acrylamide synthesis. During thermal processing, the process should be carried out under optimal conditions of time and temperature, use appropriate frying media, as well as use antioxidant preparations, it is also possible to use the process of lactic fermentation of some products (e.g. potatoes) before frying.

In this study, it was decided to approach the problem of harmful acrylamide in a different way, i.e. to investigate whether lactic acid bacteria and yeast, naturally occurring in fermented milk products, can degrade acrylamide already present in food.

The results of the research showed that some strains of lactic acid bacteria found in the gastrointestinal tract or in fermented milk drinks, i.e.: *Lactobacillus plantarum, Lactobacillus brevis, Lactobacillus lactis* subsp. *lactis, Lactobacillus acidophilus* LA-5, *Lactobacillus casei* show tolerance to high concentrations of acrylamide (up to 1 g / ml). Moreover, the growth of some of the tested species was more intense in the medium with the addition of acrylamide than without, which suggests the ability to use acrylamide as a nitrogen and carbon source in the case of a lack of other easily digestible sources of these compounds. It has also been proven that the probiotic *Lactobacillus acidophilus* LA-5 bacteria can use acrylamide to survive unfavourable conditions (model solutions

poor in carbon and nitrogen compounds) by decomposing its molecule with the release of ammonia, which indicates the participation of amidase enzymes in this process. However, research conducted under real conditions has shown that acrylamide degradation does not occur when easier digestible sources of carbon and nitrogen are available. However, acrylamide acts as a stress factor that modulates the metabolism of *Lactobacillus acidophilus* LA-5, which leads to changes in the sensory profile of fermented milk products.

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