

POPULAR SCIENCE SUMMARY

Iodine is an element necessary for the proper functioning of the human body, and its deficiency is manifested by hypothyroidism, reduced mental functions, or congenital defects. The problem of iodine deficiency occurs in 118 countries in the world, including Poland. People following plant-based diets are particularly vulnerable due to low iodine intake in the diet, as the main sources of this element are fish, seafood, and dairy products. Sea algae are also characterized by high iodine content, but they are not a good source of iodine in European countries due to low consumption. In addition, algae are not used for the fortification of food due to EU legislative restrictions related to the introduction of novel food on the market. A group in which an adequate level of iodine nutrition is of key importance are pregnant women due to the effects of deficiency, e.g. mental retardation of the fetus or stillbirth. One of the most common strategies for preventing iodine deficiency, also used in Poland, is the iodization of table salt. The obligatory salt iodization program brought very good results and allowed Poland to be classified by the WHO as a country with a sufficient supply of iodine at the population level. However, in 2006 WHO introduced a recommendation to limit salt intake to 5g/d, as it is a risk factor for atherosclerosis and hypertension. This level is more than double lower than the current salt intake in most of Europe. This raises legitimate concerns about the effectiveness of the currently used iodine carrier, i.e. table salt. Both in Poland and in the world, research is being carried out to find an iodine carrier as common and effective as sodium chloride, but with fewer side effects for the human body, and at the same time possible to be used by people with special nutritional requirements.

This project is part of this trend, as it aims to investigate the possibility of using commonly consumed vegetables, such as pumpkin, cauliflower, broccoli, and carrot as iodine carriers for food enrichment - to determine the limitations of selected matrices related to the durability of the designed droughts during storage and the effectiveness of iodine fortification of food products. Potassium iodide and iodate were used as iodine carriers, which are obligatory in the iodization of table salt in Poland. The base product is dried vegetables fortified with iodine and will be used to carry out all planned experiments. An assessment of the impact of changing storage conditions of the preparations on the stability of the iodine applied to them will be carried out. This stage will take into account variable humidity, temperature, type of packaging, and unlimited and limited access to light. The total storage time will be 180 days. In addition, the determination of phenolic compounds at the beginning and end of the storage period will be carried out. This will allow us to determine the correlation between their content and iodine stability. The obtained results are planned to be subjected to statistical analysis determining the dynamics of changes in the content of iodine deposited on the indicated preparations. This will allow us to know the model of iodine transformations introduced into new carriers and to choose the one with the highest iodine stability, and at the same time indicate the most optimal storage conditions.

At the same time, a product such as Gnocchi dumplings enriched with iodine-fortified vegetables will be designed. It is planned to store the product uncooked and cooked in vacuum bags at -21°C for 120 days to determine the iodine content. Dietary fiber and phenolic compounds in the product will also be determined at the beginning and end of the storage period to determine the correlation between their content and the stability of iodine in the product.

At the same time, a sensory analysis of the designed Gnocchi type product will be carried out. The analysis assumes a consumer assessment among the target group and an analysis of sensory profiling with the participation of a trained sensory team. The Gnocchi type product will be a source of iodine and dietary fiber, which can be a nutritional and sensory variety of flour products. In addition, it will be suitable for people who follow a plant-based diet.

It is planned to indicate guidelines regarding the storage conditions of fortified droughts, which could be included on the packaging and intended for producers and consumers. In addition, it is planned to place nutrition claims related to the content of iodine and dietary fiber on the packaging of products with the addition of iodine-fortified dried vegetables.

The expected effects are the recognition of the usefulness of the tested dried vegetables as stable iodine carriers, possible to be used in meat-free products, and suitable for people with special nutritional requirements.