The growing popularity of nutraceuticals reflects the public's interest in plant ingredients that protect against the risk of certain disease states. As a result, consumer trends have shifted towards food- which not only meets the basic nutritional requirements, but also contains beneficial pro-health compounds that may contribute to lower the risk of developing civilization diseases. Undoubtedly, this group includes onion vegetables, and above all, onion. Onion (*Allium cepa* L.) is a popular and highly valued vegetable in the country and in the world, not only for its organoleptic qualities, but above all for its valuable pro-health compounds, such as vitamins, minerals, sulfur compounds and polyphenols. The bioactive ingredients in onions are unstable, their amount varies and depends on many factors: variety, storage method, agrotechnical and climatic conditions or location in the tuber. Many health benefits of eating onions have been proven, including anti-cancer, anti-allergic, anti-viral, anti-inflammatory, anti-parasitic, anti-bacterial, anti-fungal, anti-cardiovascular and other chronic diseases.

Many scholars conduct research on the search for ways to preserve food with the least loss of health-promoting ingredients. One of the methods of fixing plant tissue is osmoconcentration, i.e. dehydration in aqueous concentrated solutions, e.g. of sugars and / or salts, accompanied by weight changes in the material to be dehydrated. This process enables the maintenance of the desired initial characteristics of the raw material to a large extent and improves the quality of the final product. Literature data on changes occurring during dewatering relate primarily to mass transport - water loss, increase in soluble dry matter, moisture content. It should be emphasized that there is little information in the available literature on changes in the group of polyphenols in onion after osmoconcentration. Another popular process is lactic acid fermentation. This process gives the desired organoleptic characteristics to the raw material and also favorably changes its composition. Fermenting vegetables with probiotics can alter the composition of bioactive compounds such as antioxidants, vitamins and dietary fiber, and generate improved biological activity in fermented foods. Onions are also fermented. However, the mechanism of the mutual relationship between osmoconcentration and lactic acid fermentation is not known. The authors of the project intend to investigate the effect of osmoconcentration on the modification of the chemical composition of new onion varieties. The next step will be to determine the effect of osmotic dehydration on the growth and biological activity of LAB. There is little information in the literature on the chemical composition of fermented onions in terms of the molecular characteristics of the components responsible for pro-health and antimicrobial effects. The authors of the project intend to determine the effect of probiotic strains and dewatering on the production of metabolites. It is important to know the retention of polyphenols and the factors responsible for the antioxidant properties of the fermented material. Due to the fact that the presence of various polyphenolic substances may have a synergistic effect, it is also important to understand the influence of individual compounds on shaping health-promoting properties. Therefore, the aim is also to understand the course of lactic acid fermentation and the properties of post-fermentation media in model solutions. The authors of the project also intend to conduct an *in-vivo* study to assess the impact of dietary fermented onion products on physiological reactions in the intestines and the regulation of the metabolic effect of the resulting compounds in the body.

The solution to the research problems posed will bring a lot of new information to world science in the field of explaining the factors responsible for preserving food in a natural way, ensuring its beneficial natural properties resulting from the content of bioactive ingredients. The obtained results will bring new elements to the current knowledge in the field of nutrition and food sciences on the impact of osmoconcentration and lactic fermentation on the quality of plant products and their metabolic effect.