

Over the last decade, more attention has been paid to the use of the raw materials originating from natural resources. Huge importance is gained by the so-called "Clean" technologies that use materials that do not pollute the environment. Natural polymers derived from renewable sources (starch, cellulose, lignin, chitin, chitosan) are such materials. Among them, starch has a special place, it can be used as a basic raw material for the production of a wide range of valuable materials with a wide range of applications, along with the production of new functional materials for the food industry, including those with typical properties for dietary fibre. Due to the increasing scourge of obesity and the increasing incidence of civilization diseases, changes in dietary habits are necessary, e.g. the reduction in the amount of consumed easily absorbed starch and, at the same time, the increase in the amount of fibre consumed, including resistant starch. It is possible to achieve by designing innovative starch preparations with the desired speed and degree of hydrolysis for their proper digestion in the large intestine, obtained, inter alia, by the application of physical and chemical modification of potato starch.

Therefore, the aim of the project is to investigate the effect of molecular structure of dextrinized potato starch preparations in the presence of organic acids under novel controlled heating conditions in a single-mode microwave reactor, on their resistance to enzymatic digestion in *in vitro* conditions.

It is planned to use different heating variants and lengths to optimize the conditions for the obtaining of the preparations. The study of the obtained preparations will allow to find the relationship between their structure and resistance to enzymatic digestion. For this purpose, physical and chemical characteristics of preparations will be performed with the use of infrared spectroscopy (FTIR), X-ray analysis (XRD) and Scanning Electron Microscopy (SEM), analysis of molecular weight distribution before and after enzymatic removal of branches using high performance size-exclusion chromatography (HPSEC), the determination of the modification of the structure of the preparation by identifying the type and amount of newly formed glycosidic bonds using GC-MS/MS and HPLC-MS/MS chromatography, viscosity characterisation using RVA and thermal analysis using differential scanning calorimetry (DSC), determination of resistance to enzymatic digestion by the enzymatic-gravimetric method in *in vitro* conditions, also solubility studies and determination of dextrose equivalents (DE) of the preparations obtained.

The research proposals of the project meet the expectations of producers and consumers who, due to increasing public awareness, are increasingly demanding for food with low glycaemic index and health benefits, including products with high amount of resistant starch.

The development of a method for obtaining fibre preparations from a readily available, cheap raw material such as potato starch in on the one hand, controlled, less time consuming and low energy microwave heating conditions, and on the other hand the precise identification of molecular changes in preparations responsible for resistance to amylolytic enzymes, will be an important contribution to the development of scientific research on functional foods.