

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Undoubtedly, the continuous technological progress is a source of the improvement of quality of life. In addition, the adverse effects of the environmental pollution may also affect the increase in the incidence of lifestyle diseases. Lipoic acid (LA) has antioxidant properties. It is scavenger of reactive oxygen species and therefore protects the body against oxidative stress, which is the cause of the occurrence of civilization diseases. This antioxidant is widely used in the prophylaxis and treatment of diseases such as cancer, diabetes, cardiovascular diseases, autoimmune diseases and neurodegenerative disorders. The pathogenesis of these diseases closely correlates with the occurrence of oxidative stress. The continuous development of new technologies, the trend towards processing of foodstuffs as well as the urge to provide longer shelf-life of many foodstuffs enhance the number of food additives used in food processing. Certainly, these steps increase the attractiveness of the product on the market however it also has negative effect on bioavailability and activity of compounds such as LA and lipoyllysine, which naturally occur in food.

For several years, scientists from all over the world are interested in the properties of lipoic acid and its effects on the human body. However, consumer awareness of the influence of food ingredients on health is growing. This causes, that pharmaceutical market introduces a new drugs and dietary supplements containing health-promoting ingredients. The studies on the antioxidant properties of lipoyllysine may pave the way for a new generation of pharmaceuticals and reduce the increasing burden of civilization diseases.

Lipoic acid and lipoyllysine are widely distributed in foods of plant and animal origin. However, literature does not contain the exact information about the contents of these compounds in foods. Due to this fact and the desire to draw people attention on the influence of diet on the functioning of the body, our project will focus on the following objectives: (a) the adaptation of existing methods for the determination of lipoic acid and lipoyllysine in fruits, vegetables and products of animal origin, (b) to examine the influence of food processing (e.g. cooking, steaming, cooking in a microwave oven, baking, frying) on the content of LA and lipoyllysine in selected foods and (c) the effect of food additives (such as preservatives, antioxidants, flavour and odour enhancers) on concentration of the above-mentioned compounds in tested food, as well as (d) to examine antioxidant properties of lipoyllysine.

Previously developed by our team the chromatographic conditions have been modified, improved and then applied for determination of LA and lipoyllysine. The procedures used in the experiment will be characterized by a simplification sample preparation and the relatively short time of analysis. During the studies, the number of sample preparation steps will be reduced to a minimum, which will have a positive impact on depletion analytes losses. The short time of analysis enable to examine more samples.

The culmination of our studies will set to evaluate antioxidant activity of lipoyllysine both in the standard compound and in vegetable and fruit homogenates. For this purpose, the in vitro method will be used. It is based on the ability of the antioxidant to scavenge the free radical 2,2-diphenyl-1-picrylhydrazyl. Antioxidant activity of lipoyllysine will be then analyzed by spectrophotometric method.

In conclusion, the proposed project includes the interdisciplinary studies, which cover issues of many fields of science such as analytical chemistry, medicine and food chemistry. There studies are intended to draw people attention to the correct way of food preparation and would prevent negative consequences of improper processing. The obtained results of project would be easily used in the food industry. Furthermore they can be applied in clinical trials to prevent obesity and many other diseases occurring in people all over the world. Our innovative research can become motivation for exploring the new properties of lipoyllysine.