

DESCRIPTION FOR THE GENERAL PUBLIC

Fats together with carbohydrates and proteins are the main nutrients present in our daily foods. In public opinion, a diet rich in fats is not associated with healthy life style, which is a result of their high caloric value and, in the case of saturated fats, due to their proven role in the development of cardiovascular disease. It is worth emphasising, however, that aside from saturated fatty acids present in relatively high quantities in animal foodstuffs, there are also unsaturated fatty acids usually beneficial and some of them even essential to our health. A rich source of unsaturated fatty acids rather rarely seen in foods are seeds of plants being the subject of this research, that is industrial hemp, opium poppy, milk thistle, pot marigold, common flax and camelina, from which they can be obtained in the form of oils. These seeds, aside from unsaturated fats, contain also other important components, such as proteins that are a basic building material for our organism, fibre that regulates intestinal functions, among others, or phenolic compounds that can cover cells against a harmful effects of free radicals. Moreover, studies suggest that the majority of the aforementioned components, including unsaturated fatty acids, can prevent the so-called diet-related diseases, such as obesity or atherosclerosis.

The aim of this project is to verify whether the aforementioned seeds can be used for creating diets with an adequate nutritional value, which can prevent diet-related diseases or attenuate disorders that are seen in these medical conditions. A key outcome of this project will be the answer to the following question: to what extent the oil fractions of the tested seeds rich in unsaturated fatty acids can be responsible for the health promoting properties of a diet? The design of the studies is consisted of few stages. In the first stage, the seeds will be ground in order to facilitate their chemical analysis and to increase the ingestion of their components by the organism. Then, the seeds, oils obtained from them by cold-pressing and the defatted seeds will be chemically analysed to determine their nutritional value and the content of components that supposed to have health promoting effects, including especially the content of unsaturated fatty acids. In further stages, experiments on laboratory rats will be conducted, in which these animals will be fed with diets containing the tested seeds or oils. These experiments will allow, among others, to assess nutritional properties of the tested seeds, including the degree to which proteins from individual seeds can be digested, absorbed and used for building purposes by the organism. In order to study a possibility to use the seeds and oils for shaping health promoting properties of a diet, disorders specific to diet-related diseases, such as increased body fat content, increased blood cholesterol and triglyceride levels or fatty liver, will be induced in rats. In the experiments, the effect of the removal of oil from individual seeds on the development of the aforementioned disorders will be investigated as well the extent to what their development can be reduced by oils from selected seeds being the main dietary source of fat. In the final experiment, health promoting effects of diets supplemented with selected seeds will be compared with those of diets supplemented with respective oils, which allows, among others, to determine the role of individual oil fractions in these effects.