

DESCRIPTION FOR THE GENERAL PUBLIC

The aim of the project is to prove the hypothesis that compounds present in cuticular waxes of plants exhibit bioactive properties and can be useful in prevention and therapy of various diseases. To verify this hypothesis, several species of plants that are indigenous for Poland will be selected and examined.

Plant cuticles are lipophilic structures deposited on the outer side of epidermis. Two major components of cuticle are a mixture of lipophilic compounds (long chain hydrocarbons, their derivatives and terpenic compounds) and insoluble polyester called cutin. The most important functions of cuticular waxes are: protection against non-stomatal water loss and UV damage as well as signal transmission between plant and other organisms.

Amongst the constituents of the cuticular waxes the biggest attention is focused on triterpenes due to their health promoting properties. Pharmacological features of triterpenes include ability to inhibit tumor growth and metastasis formation, antimicrobial properties, antioxidative activity, capability to protect internal organs against a chemically-induced damage and potential to intensify anabolic processes in bones and muscles. So far the vast majority of the triterpene research has been carried on the two most abundant of them: ursolic and oleanolic acid. It should be noted, that multiplicity of biochemical processes occurring in tissues leads to creation of a huge array of isomers and derivatives (such as esters) characteristic for various plant species.

The project will include two main tasks covering research on isolation of wax constituents and their properties. In the first stage wax coatings of fruits, leaves and flowers of selected plants will be collected by extraction with organic solvents. Afterwards compounds will be isolated and purified by means of preparative liquid chromatography. The last part of this task will be determination of the structures of acquired molecules using mass spectrometry and ^1H NMR spectroscopy.

The second stage will include the measurement of antioxidative properties of the compounds. The series of tests will measure scavenging activity against two artificial radicals and three radicals of substantial biological significance. Moreover the impact of obtained compounds on chemically-induced DNA damage will be analyzed. Additionally anti-inflammatory properties of acquired terpenes will be investigated.

The accomplishment of the project's goals will provide observations required for further research that will eventually lead to practical implementation of triterpenes. The knowledge about pharmacology of wax constituents and impact of structure on their activity can lead to development of new therapy methods. The results acquired in the last stage can be remarkably important in regard to elderly people.

The data gathered during the project will also improve our general knowledge about triterpenes and their occurrence in plant cuticular waxes. The project leader will enhance his professional development through preparation of scientific publications, participation at international meetings and prospect to start doctoral studies.