Schisandra henryi* C.B. Clarke - increasing the production of secondary metabolites by biotechnological methods, and evaluation of biological activity of the material obtained *in vitro and in vivo

The use of individual parts of plants as medicinal raw materials in folk medicine has been known for centuries. Current modern phytotherapy is based, among others on the use of medicinal properties of plants known from traditional Chinese medicine (TCM). One such species is *Schisandra chinensis* (Turcz.) Baill. - East Asian plant known from TCM, whose therapeutic effect has now been confirmed by numerous scientific studies. *Schisandrae chinensis fructus* is a raw material with pharmacopoeial monographs not in Asian countries, but also in European and American countries. Fruit extract shows, among others hepatoprotective, adaptogenic, anti-tumor and anti-inflammatory effects. Biological properties are determined by the unique chemical composition of *S. chinensis* in which dibenzocyclooctadiene lignans perform a main role.

The research work under the project covered another, endemic (occurs only in the province of Yunnan in China) species from the same family - *Schisandra henryi* C.B. Clarke, whose therapeutic properties are known in TCM. An analysis of the available literature shows that the chemical composition of *S.* henryi is partly similar to the chemical composition of *S. chinensis*, because it also contains dibenzocyclooctadiene lignans. Importantly, other terpenoid, polyphenol and lignan compounds are also found in *S. henryi* fruit extracts; in this specific only for this species.

This information prompted us to deepen our knowledge of the *S. henryi* species and to carry out phytochemical analyzes, studies on biological activity and to look for other methods of obtaining plant material, like as biotechnological methods. Preliminary studies gave promising results and prompted the continuation of further biotechnological research on the *S. henryi* species.

Plant biotechnology is a science discipline that is constantly evolving and allows new opportunities, in particular from a pharmaceutical point of view, to use plant *in vitro* cultures as sources of obtaining valuable secondary metabolites with medicinal properties. The aim of the project is to increase the production of secondary metabolites with high activity in *in vitro* cultures of *S. henryi* through biotechnological methods like as supplementation with precursors, elicitation and cultivation *in vitro* cultures in bioreactors. The project will also examine material obtained from *in vivo* conditions – cultured in Poland.

The conducted research will answer the question whether *in vitro* cultures of *S. henryi* can be a valuable source of biologically active compounds of therapeutic significance? In addition, the project will learn the composition and biological properties of extracts from plants grown in European conditions.

As part of the project, biotechnological studies of *in vitro* plant cultures and comparative chemical composition of *S. henryi* leaves based on chromatographic methods will be carried out. The project involves running various types of *in vitro* cultures of S. henryi: shaken (microshoot and callus) and microshoot in bioreactors. Extracts from the leaves of the parent plant and from *in vitro* cultures of *S. henryi* will be evaluated for antioxidant, anti-inflammatory, antiproliferative, anti-bacterial and anti-fungal activity.

The research will allow comparative assessment of *in vitro* cultures and the parent plant *S. henryi*. The results will answer the question whether plant *in vitro* cultures can be an alternative source of biologically active substances.