

The aim of the project is to study the chemical composition of the froth produced by nymphs of the spittlebug *Aphrophora alni* (Fallén, 1805), with regard to the nymphal host plant and the composition of the spittlebugs' endosymbionts. Small and medium molecule compounds will be studied, followed by the initial analysis of their potential pharmaceutical application. Moreover, endosymbionts residing in the internal specialized structures of the spittlebug nymphs and their potential influence on the chemical composition of the produced froth will be identified using molecular biology methods. One of the most important goals is to test whether it is possible to modify the chemical composition of the froth by changing the insect host plant. The 'chemodiversity' of the froth produced by nymphs may be potentially important from the pharmaceutical point of view.

A variety of chemical compounds from insect secretions have immunological, analgesic, antibacterial, antiviral, anticoagulative, antineoplastic, diuretic, anaesthetic, antirheumatoid and/or other properties. People around the world have been using insects and other arthropods, both in folk medicine and as a food source for years. Despite many potential applications, the insect-derived natural products attract less attention than those from vertebrates. Recent investigations conducted on the froth secreted by the spittlebugs' nymphs show that secretions of some species have some antiviral (e. g. against HIV) and anticancer properties. Although the nymphal froth of spittlebugs has attracted some attention of researchers, it still has not been analysed thoroughly enough. Very few papers have been published on the chemical composition of the froth. Mello et al. (1987) proved there are at least nine different peptides (mostly glycopeptides), as well as acidic proteoglycans. Subsequently, Campo et al. (2011) discovered compounds derived from fatty acids, such as alcohols, γ -lactones, 1-monoacylglycerole, pinitol, and poly-3-hydroxybutyric acid. It has also been proved that the nymphal froth components act as an effective repellent for predators, and also have some other biological characteristics.

The project requires an interdisciplinary research consortium, called NIL-UG, to perform the studies aimed at the precise description of chemical properties of the spittlebug nymphal froth, understanding major determinants of its 'chemodiversity', and assessment of the possible medical use of the froth-derived compounds in the future. The knowledge gained will allow us uncovering biological activities of the chemical substances from the spittlebug nymphs' secretions. The project will make it possible to characterize the nymphal secretions accurately, also in terms of new chemical substances with pharmacological activity. The newly formed team will consist of experts in qualitative and quantitative analytical chemistry, entomologists, cell biologists and microbiologists. Combining these disciplines will allow us performing basic research in a broader perspective, which will result in significantly broadening the knowledge and experience in each of those. As a consequence, it will give us the opportunity to gain an outcome in social and medical areas.

The research may result in the future formulation of new chemical compounds playing a significant role in medical practice. The research consortium will also create the 'room' for three Ph.D. research projects integrating the experience in various scientific disciplines. The project proposal will result in a number of papers in international journals, and will contribute to the progress in drug science and public health in Poland.