

### **Aim of the designed research**

Lichens and bryophytes have long been widely used in folk medicine, e.g. for treatment of skin diseases or difficult-to-heal wounds and burns. The therapeutic properties of both groups of plants are associated with their content of biologically active substances, e.g. polyphenolic acids.

Despite the availability of extensive phytochemical documentation of lichens and bryophytes, their properties are still unrecognized in many respects. Recent studies have shown that the phytotherapeutic potential of lichens may be related to the substantial accumulation of allantoin, i.e. a soothing compound that facilitates healing and regeneration of the epidermis. It is predicted that bryophytes tend to accumulate large amounts of this substance. The research proposed in the project is aimed at identification of the phytochemical properties of lichens and bryophytes and analysis of the biological activity of their extracts in terms of their use in skin care and treatment of skin diseases. The project consists in: a) analysis of the content of bioactive compounds (including allantoin), b) assessment of the biological properties of extracts, with particular emphasis on their importance in acceleration of wound healing, photoprotective properties, or role in limiting the activity of enzymes involved in the degradation of skin proteins.

### **Description of the research**

The planned research is based on analysis of at least 50 species of lichens and bryophytes to identify their phytochemical properties. First, the bioactive compounds present in the samples will be analyzed. Additionally, the role of selected elicitors on the accumulation of plant metabolites will be determined at this stage. Based on preliminary studies, two species of lichens and bryophytes will be selected for further analyses and their biological properties will be assessed. Moreover, an extraction method ensuring optimally high therapeutic activity of the compounds will be developed.

### **Major expected outcomes**

The main expected outcome will be the determination of the phytotherapeutic properties of lichens and bryophytes. Another expected result of the research will be the definition of phytochemical traits and determination of the role of selected biostimulants in the accumulation of bioactive substances by lichens and bryophytes. The assessment of the biological activity of lichen and bryophyte extracts will indicate their potential applications in phytotherapy. In addition to the theoretical value of the project, the research also has practical importance and can be directly useful for designing and production of drugs, medical cosmetics, or plant-based medical products with a natural composition.