The ultraviolet radiation is considered as the main environmental factor deleterious to all living organisms. We are well aware of the fact that due to the progressive depletion of the ozone layer, increasingly higher doses of UV radiation will reach the Earth's surface. Ozone depletion will continue to grow and spread to more and more areas in subsequent years. Described facts indicate an urgent need to acquire knowledge about the natural strategies of photoprotection against harmful solar UV radiation developed by different organisms.

In the world of plants and animals are known multiple photoprotection mechanisms, such as accumulation of carotenoids, detoxifying enzymes, biosynthesis of antioxidants and secondary metabolites acting as UV-absorbing substances, including mycosporine-like amino acids. Mycosporine-like amino acids (MAAs) have attracted increasing research interest in recent years. The most intensive search for the presence of MAAs focused on freshwater and marine organisms. There are only a few previous results obtained for the terrestrial species. It is very surprising information, since it is obvious that both aqueous and land environments are constantly exposed to high doses of UV. Among the organisms whose existence is limited to only habitats on the Earth's surface are admittedly lichens. In this case, this makes them vulnerable to the effects of many environmental stress factors, such as the harmful UVR. Moreover its effects can be enhanced by other variable factors, like drought and high temperature. Thus, it is obvious that lichens, in most long-lived organisms, had to develop a very efficient photoprotective mechanism. The hypothesis of the presence of MAAs in lichens has been verified only in the case of cyanobacterial lichens, which are a rich source of new MAAs. Many researchers postulate that also such kind of new MAAs reservoir may be lichens with eukaryotic component (green algae), but their ability to synthesize these compounds has not been studied at all as yet. The answer to this postulate is our research project, which can verify the above hypothesis based on the lichen *Cladonia arbuscula.*

The main scientific aim of this project is a comprehensive analysis of MAAs synthesized profusely by the lichen *Cladonia arbuscula*. For this purpose, intensive basic research aimed to quantitative and qualitative identification of MAAs, determination of their chemical structure and physico-chemical properties and evaluation of their photoprotective and antioxidant activity were designed. These studies are fundamental in the process of exploring the non-enzymatic mechanism of energy dissipation in the lichen *C. arbuscula* and explaining the ecological importance of MAAs in the ecophysiology as well as chemotaxonomy of this organism. Already our first preliminary studies have shown that *C. arbuscula* synthesizes several different MAAs, so far not described in the literature. Of course, further analyses are necessary to their detailed identification and full characterization. Moreover, the content of MAAs in *C. arbuscula* thallus is very high. Thus, such a large production of MAAs by *C. arbuscula* is an interesting ecological issue in terms of its ecophysiology and energy economy, because MAAs synthesis is the process highly energy-expensive. However, these costs are disproportionate to the losses, which might arise from the impact of harmful UVR to organic molecules. This research certainly will get the answer to the question what are the reasons for their so abundant synthesis and will bring new information about their new properties.

In recent years the potential application of compounds, such as MAAs is also extensively considered. These substances are promising candidates for use in pharmaceutical and cosmetic applications, as an efficient photoprotectors. Thus, the obtained results will have a valuable role in the development of civilization. Realization of this project will offer a crucial background for their future applications and open broad perspectives for future research.

Therefore, these arguments fully justify for talking on this issue and indicate that the project's theme and scope have, in fact, an innovative character.