

Abstract

Lichens are known for their sensitivity to environmental changes, however, the tolerance to different changes may vary among particular taxa. There are lichen species extremely sensitive as well as very tolerant to pollution. The species growing in areas with a higher content of heavy metals belong to the second group. These sites may be of natural origin (ore), but very often they have arisen as a result of anthropogenic activities (emissions in industrial and urban areas, various heaps etc.).

The interaction between photobiont and mycobiont in the thallus can probably explain the success of lichens in environment enriched by heavy metals.

The stress caused by heavy metals leads to increasing production of reactive oxygen species in cells of photobiont and mycobiont. Reactive oxygen species cause lipid peroxidation, damage of proteins and nucleic acids, and the degradation of chlorophylls. Although mycobiont provides the photobiont cells partial protection (particularly thanks to binding of metal ions to the cell wall and the formation of water-insoluble secondary metabolites), photobiont is exposed to high amounts of metals. Therefore, both symbionts have developed a range of detoxification mechanisms.

The aim of this thesis was to summarize the findings on the effect of heavy metals on the physiology of lichens with emphasis to detoxication mechanisms, such as formation of metallothioneins, phytochelatins or secondary metabolites, that help lichens to reduce the effects of heavy metals.

Keywords: lichens, heavy metals, detoxication, tolerance, reactive oxygen species