

**ALLELOPATHIC PROPERTIES OF TRITERPENE GLYCOSIDES FROM
BILBERRY (*VACCINIUM MYRTILLUS* L.) ROOTS****Szakiel A.***Institute of Biochemistry, Warsaw University,
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Ericaceous dwarf shrubs in boreal forests, like bilberry (*Vaccinium myrtillus* L.), have the capacity to strongly restrict the growth of other plants. In recent years, the phenolic compounds of bilberry litter have been investigated in studies on allelopathic relationships in Scandinavian ecosystems. However, lately I could demonstrate the presence of triterpene derivatives in vegetative organs of the bilberry plant, including leaves and roots – the main litter-forming material.

The aim of this work was to investigate the profile of triterpenoids in bilberry litter and to compare it to the bilberry plant as well as to examine the influence of common compounds on the germination and growth of model plants (peppergrass *Lepidium sativum*, lettuce *Lactuca sativa*) and the main tree of forest ecosystems in central Poland - pine *Pinus sylvestris*.

Generally, main types of triterpenoids identified in the bilberry plant and in the soil are almost the same, however, there are considerable differences in relative proportions among them. Free ursolic and oleanolic acids dominate in all organs of the bilberry plant, whereas in the litter they are present in much smaller amounts. Monoglycosides of both acids strikingly prevail in the soil, whereas they occur in plants in remarkable but not the biggest quantities. Derivatives with more sugar residues have been detected in bilberry in trace amounts, whereas in the soil they were not revealed. Since the ratio of triterpenoids vary between the plant and the surrounding soil, it indicates that those substances may occur in the litter not only as a result of decay, but also an active exudation. It is of great interest, because lately we have demonstrated the secretion of oleanolic acid monoglucoside from *Calendula officinalis* roots to the surrounding medium.

The influence of two major fractions of compounds isolated from bilberry roots and litter, i.e. the mixture of free acids as well as their monoglycosides (conc. 10 µg/ml, comparable to that in the soil), on the germination and growth of plants was investigated. The germination of peppergrass was inhibited by 10 % and 27 % by free acids and their monoglycosides, respectively; whereas the further growth of the seedlings was reduced by the acids by 65 % (shoot length) and even stronger by monoglycosides (80 %). However, the most dramatic effect was exerted by the mixture of the two fractions, i.e. free acids together with their monoglycosides, which completely inhibited the germination. It can be due to the detergent-like action of free ursolic acid, which facilitates the penetration of monoglycosides into seeds. The germination of pine was inhibited by 45 % by free acids, 75 % by monoglycosides and 100 % by mixed fractions; whereas the germination of lettuce was totally inhibited in all conditions tested. Thus, the obtained results point to a participation of triterpenoids in allelopathic properties of the bilberry plant.