

# THE USE OF CALLUS TISSUE IN FOREST TREE BIOTECHNOLOGY: STUDIES *IN VITRO*

## Summary

Callus, occurring *ex vitro* as wound tissue, is a subject of extensive biotechnological *in vitro* research, including: obtainment of secondary metabolites, pathogenicity studies at embryonic level, cryopreservation of plant material, obtainment of transformed plants and influence of heavy metals on plants. Callus can be obtained, among others, as an indirect effect of somatic embryogenesis and organogenesis *in vitro*. Hence, there is considerable interest in application of this method in forest trees and in callus obtained as a result thereof. Callus of woody plants, induced *in vitro* under the effect of elicitors in the form of fungi, produces secondary metabolites, such as: monoterpenes and isoprenoids in *Betula* sp. and phenolic glycosides in the family Salicaceae. These secondary metabolites have been used not only in the pharmaceutical and cos-

metic industries, but also as strong repelling agents against herbivores. On the other hand, studies in dual *in vitro* cultures have shown that non-embryogenic callus of e.g. *Pinus sylvestris* subjected to a stress factor such as pathogenic fungus, produces in response low molecular weight proteins classified as PR-type (pathogenesis related) immune proteins. These observations give the basis for the assessment of pathogenicity and the level of threat posed by the fungus at the cellular level. Also, cryopreservation of embryogenic callus is widely used, among others, in gene bank reservoirs of valuable plant genotypes. Biotechnological studies involving callus of different forest tree species complement and support the development of disciplines such as physiology, phytopathology or plant breeding and selection.