

## Comparative analysis of remodelling of the apoplast in *Lotus corniculatus* L. symbiotic nodules under trace metal contamination

Marzena Sujkowska-Rybkowska \*, Arleta Kochańska-Jeziorska

**Abstract:** The metal-tolerant legume *Lotus corniculatus* L. and its metal-tolerant rhizobial symbiont has been identified in calamine tailing highly contaminated with trace elements including Zn, Pb and Cd. The cell wall reorganization is one of the most common plant strategy of trace metal avoidance. The aim of this study is to determine this avoidance mechanism in symbiotic nodules to tolerate toxic metals present in calamine wastes. Cell wall reorganisation under metal stress was examined by using histochemical methods and specific monoclonal antibodies against cellulose and non-cellulosic wall components in metal treated or untreated *L. corniculatus* nodules.

Microscopic analysis showed wall thickening of infected cells and higher content of cellulose, xyloglucan, pectins, arabinogalactan proteins, extensins, and callose in metal treated *Lotus* nodules.

The toxic metals presence activated apoplast modification in symbiotic nodules, which may protect infected cells from toxic ions and increase plant tolerance to heavy metal present in calamine wastes.

**Keywords:** toxic metals; legume; cellulosic