

ETICHA, D., STAß, A., HORST, W.J. (2005): Localization of aluminium in the maize root apex: Can morin detect cell wall-bound aluminium? J. Exp. Botany 56,1351-1357.

Abstract

Morin is a fluorochrome, which forms a fluorescent complex with Aluminium (Al) and is thus used to localize Al in plant tissues. However, reports about the cellular distribution of Al – apoplastic vs. symplastic – based on morin staining are often conflicting. The objective of this work was to investigate whether Al localization with morin staining can show the proper cellular distribution of Al. Fresh root cross-sections were made from root apices of maize (cv Lixis) treated with 25 µM Al for 6 h and stained with morin. Fluorescence microscopic investigation showed Al-morin fluorescence in the cytosol but not in the cell wall. This is in contrast to the growing evidence which shows that Al mainly accumulates in the cell wall, especially bound to the pectic matrix. Therefore, *in vitro* analyses were made to study whether morin can form a fluorescent complex with Al, which is bound to pectin, cell wall and other Al-binding ligands such as phosphate, galacturonate, DNA, and ATP. Compared to the control treatment without Al-binding ligands, fluorescence intensity was reduced by about ten-fold in the presence of pectin and isolated cell walls, but fairly unaffected in the presence of phosphate and galacturonate. Al associated with DNA and ATP also formed a fluorescent complex with morin. This implies that although Al is mainly accumulated in the cell wall, it cannot be detected with morin as it is tightly bound to cell-wall pectin. Thus, morin staining should not be used to study the distribution of Al between cell compartments.