

Lectin activity and composition in the wheat cell walls under the effects of low temperature and inhibitors of calcium signaling pathway

Timofeeva O., Nevmerzhitskaya Y., Moscowkina M.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In the roots of winter wheat (*Triticum aestivum* L., cv. Mironovskaya 808) seedlings, the effects of neomycin (100 μ M), an inhibitor of phospholipase C, and diltiazem (250 μ M), a blocker of calcium channels on lectin activity and composition at low-temperature treatment (2-3°C) were studied. Hypothermia induced the appearance of two peaks of cell wall-bound lectin activity, e.g., in 0.5 and 6 h. Under these conditions, the inhibitors suppressed lectin activity. In 0.5 h of hypothermia, substantial changes in total profile of proteins were observed: lectins with mol wts of 85, 78, and 54 kD disappeared, and novel lectins with mol wts of 110, 105, 70, 50, and 34.5 kD appeared. In the presence of diltiazem, the set of lectin proteins remained similar to that in unhardened plants, and the increase in the lectin content and activity was observed only after 3-h exposure to low temperature. This indicates that blocking diltiazem-sensitive calcium channels slowed plant response to stress and did not permit the cell to start rapidly the development of defense mechanisms. The important role of lectins with mol wts of 110 and 60 kD in the formation of freeze tolerance is supposed because these lectins did not appear in the presence of diltiazem. © Pleiades Publishing, Ltd., 2010.

<http://dx.doi.org/10.1134/S1021443710020068>

Keywords

Arabinogalactan proteins, Calcium signaling pathway, Cell wall, Lectins, Low-temperature hardening, *Triticum aestivum*