Cell wall polysaccharides: endogenous ligands for the plant cell lectins

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Plant lectins are defined as any plant proteins that contain at least one non catalytic domain, which reversibly binds to specific mono and oligosaccharides. This interaction depends of the sugar carbons C2, C3 and C4 hydroxyl groups orientation, in some cases also distinguishing the α and β anomers. This ability to recognize carbohydrates is the basis for the lectin interaction with the cell surface, producing a series of modifications in the cell physiology. Its roles in the interaction *Leguminosae-Rhizobium* symbiont, as well as its poisonous effect, protecting the plant against microorganisms and animals predators are well established. Lectins are already used as tools in the study of biological systems, in the recognition of sugars of the cell surface, in the recognition of cells neoplasia, as well as matrix in the glycoconjugate isolation. The endogenous role of the lectins still constitutes an object of speculation. For the lectins play this role, it is necessary the existence, in the plant, of specific receptors. Such receptors should contain the sugar for which the lectin shows binding specificity and have to be present in amounts corresponding to the high concentration of the lectin in the tissue. The endospermic and cotyledonary cell wall reserve carbohydrates are associated to the hardness, cell expansion and water uptake, giving resistance and protection to the protoplasm contained in its interior. They can, also work as signal molecules, participating in the communication cell-cell, as defense instrument or in the recognition of symbiont bacteria. As galactomannans and xyloglucans, present in the cellular wall of endosperms and cotyledons, contain terminal non reducing α- and β-D-galactose, respectively, they have been used, in our laboratory, for the isolation of D-galactose-binding lectin from *Euforbiaceae* and *Moraceae* seeds. Thus, the α-D-galactose-binding lectins from *Artocarpus incisa* and *A. integrifolia* only binds to the gatactomannans, while the *Ricinus communís* lectin that binds preferentially the β anomer, interacts more strongly with the xyloglucans. These cell wall reserve polysaccharides (galactomannans and xyloglucans) may, thus, be excellent candidates to play the role of endogenous lectin receptors. A lectin - endogenous receptor system, where both molecules are present, in high concentrations in the cotyledon, was isolated from seeds of *Mucuna sloanei* L. (*Leguminosae-Papilionoideae*). A galactoxyloglucan was extracted (from previously treated with boiling water for 20 min) with H_2O (1:100, m:v) at room temperature. The supernatant, obtained after centrifugation (10.000 x g, 7 ^{o}C, 20 min), precipitation with ethanol (70%) and resolubilization in H_2O, was freeze dried. The obtained galactoxyloglucan, specifically interacted with lectins D-galactose ligand. The lectin was extracted from cotyledons (NaCl 0.15 M, 1:80 m:v), purified by affinity chromatography, on a galactomannan matrix (crosslinked *Adenanthera pavonina* gum) and characterized as a D-galactose-binding lectin. The isolated lectin and the galactoxyloglucan showed a strong interaction. Thus, the lectin could be retained in a matrix prepared by crosslinking the polysaccharide with epichlorohydrin, being liberated by addition of a solution containing D-galactose. On the other hand, the galactoxyloglucan could be retained in a matrix of the lectin immobilized on Sepharose. The lectin – galactoxyloglucan interaction was also determined by fluorescence spectroscopy, when a suppressive effect was observed for the lectin spectrum. This in vitro interaction is, thus, a strong indication of a correspondent in vivo interaction.