

Abstract

All plant cells are encapsulated in a cell wall that determines the cells' shape and size and is essential to many of their vital processes. The cell wall of streptophyte plants is composed mainly of polysaccharides of high molecular weight. Cellulose, the main constituent of the plant cell wall, is synthesized by protein complexes bound to the PM, while hemicelluloses and pectins are synthesized in the Golgi apparatus. Several proteins that participate in the synthesis of cell wall polysaccharides have been identified, but hundreds of them remain to be discovered. Secretory pathway plays an important role in plant cell wall biogenesis as it transports cellulose synthase complexes and noncellulosic polysaccharide molecules to the cell surface. Some regulatory mechanisms that might be involved in cell wall material secretion, such as actin cytoskeleton, Ca^{2+} gradient or PIP kinases have been proposed; however, the regulation of this process is very complex and far from being understood. FT-IR spectroscopy is a method that can detect molecular vibrations and provide information about chemical composition of virtually all substances. It has been used successfully in screens for cell wall mutants, the study of interactions between cell wall polymers, as well as other areas of cell wall biology. FT-IR spectroscopy is proposed as a suitable tool for future research of the role of the secretory pathway in plant cell wall biogenesis.

Keywords

Cell wall, secretory pathway, FT-IR spectroscopy, cellulose, pectin, hemicellulose