**Abstract**

Lignin is an essential compound of all vascular plants. Recent studies have also shown its presence in non-vascular plants. Lignin is important for plant growth and development, provides a mechanical support to plant tissues and is also a major player in the response of plants to various stresses. Lignin is an aromatic heteropolymer and comprises classical lignin units – guaiacyl (G), syringyl (S) and p-hydroxyfenyl (H). The amount and ratio of these lignin units varies among plant species, organs and cell types. Nontraditional monomer units that can be deposited in lignin also increase the variety of lignin. Lignification, i.e. the formation and deposition of lignin, is a complex and precisely controlled process involving the synthesis of monolignols in the cytoplasm, their transport into the cell wall and subsequent polymerization. A number of enzymes are involved in the lignification process, and recent studies are gradually revealing the mechanisms of lignification regulation in various cells of plant body. This bachelor thesis summarizes the knowledge of the importance, synthesis and deposition of lignin, and also compares the mechanisms regulating lignification in different types of plant cells – tracheary elements, sclerenchyma and endodermal cells. An interesting phenomenon of lignification in xylem is the fact that it is partially non-cell autonomous. Living neighbouring parenchyma cells, which synthesize monolignols, contribute to lignification of tracheary elements. Conversely, the formation of the Casparian bands in the endodermis represents a very specifically directed local deposition of lignin into the cell wall only at the site of the emerging Casparian band.

**Key words**

Lignin, Monolignols, Phenylpropanoid pathway, Lignification, Tracheary elements, Sclerenchyma cells, Casparian bands