



Association between Lignin and Carbohydrates in Wood (Springer Series in Wood Science)

Tetsuo Koshijima, Takashi Watanabe

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As in other scientific fields, the importance of boundary areas in wood research, such as that between lignin chemistry and hemicellulose chemistry, continues to increase. Although the utilization of individual wood components has advanced to an appreciable extent, research into oligomeric or polymeric compounds of two or more different components has made little progress. By contrast, in other fields, glycoproteins and proteoglycans have been found to form biochemical active centers in enzymes and microbes. The association between lignin and carbohydrates in lignified plants was first recognized in 1866. However, research has advanced slowly because of difficulty in the isolation and determination of wood glycoconjugates, which likely have an important influence on the formation of wood, pulping behavior, pulp quality and digestibility by ruminants. Most plants contain both hydrophilic polysaccharides and hydrophobic lignins in their tissues. Lignins have been recognized to not only give mechanical strength or rigidity to a tree or wood, but also to prevent invasion by fungi, and provide cell wall material, especially in the tracheids and vessels that deliver water extracted from the soil to the top of woody plants. However, in trees, lignins have been found to interact with the polysaccharides, particularly hemicelluloses, with which they coexist, leading to the formation of another chemical component, a kind of glycoconjugate. Therefore, it is necessary to include lignin or p-hydroxycinnamic acids in any discussion on wood hemicelluloses.

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