Abstract

F. YAKU, Y. YAMADA and T. KOSHIJIMA: **Lignin Carbohydrate Complex Pt. II. Enzymic Degradation of AcidicPolysaccharide in Björkman LCC,** Holzforschung, **30**, 148 (1976).

Water-soluble lignin carbohydrate complex (HWF) was obtained by extracting with hot water of 70~80°C from the residual milled wood of *Pinus densiflora* that Björkman LCC had been previously extracted with dimethylformamide (DMF). The composition of the HWF was approximately identical with that of usual Björkman LCC. Fractionation of HWF resulted in neutral fraction (C-1-M), acidic fraction (C-1-A) and lignin rich fraction (C-1-R) by using DEAE Sephadex column as in the case of Björkman LCC. Further fractionation of C-1-A by gel filtration with Sephadex G-100 column revealed the presence of 10% higher molecular weight part (C-1-A-I) and 80% lower molecular weight one (C-1-A-II) in this fraction. The C-1-A-II was found to be uniform in respect to mloecular weight and contain 68.3% neutral carbohydrates, 31.6% uronic acid residues and 4.1% lignin. When C-1-A-II was hydrolyzed enzymically with β-glucosidase preparation purified from "Cellulosin", lignin moiety was degraded as well into four lower molecular weight fragments with or without carbohydrate. Since those lignin fragments without carbohydrates have been separated from C-1-A-II by the action of β-glucosidase preparation, they must combine glycosidically to reducing end of carbohydrate chain. Other lignin fragment with carbohydrate was low molecular weight LCC which was appeared by degradation of the carbohydrate moiety. In this case, it is assumed that uronic acid is linked to lignin by a uronide linkage. In this paper, it was showed that lower molecular weight lignin fragments combined to carbohydrate chain in the C-1-A-II.

T. YAMASAKI, K. HATA and T. HIGUCHI: **Dehydrogenation Polymer of Sinapyl Alcohol by Peroxidase and Peroxide,** Mokuzai Gakkaishi (J. Japan Wood Res. Soc.), **22**, 582 (1976).

A constitutional model of dehydrogenation polymer of sinapyl alcohol by peroxidase and hydrogen peroxide was established and discussed in relation to syringyl lignin.

K. TANAKA, F. NAKATSUBO and T. HIGUCHI: **Reactions of Guaiacylglycerol-a-guaiacyl Ether with Several Sugars. I. Reaction of Quinonemethide with D-Glucuronic Acid,** Mokuzai Gakkaishi (J. Japan Wood Res. Soc.), **22**, 589 (1976).

It was found that the reaction of the quinonemethide of guaiacylglycerol-β-guaiacyl ether with D-glucuronic acid gave the product in which the carboxyl group of D-glucuronic acid was linked by an ester linkage to the α-position of guaiacylglycerol-β-guaiacyl ether, and that the ester linkage was completely cleaved by both acidolysis and mild acidolysis. The linked position of D-glucuronic acid with the dilignol was determined by NMR spectrometry.

H. KURODA and T. HIGUCHI: **Characterization and Biosynthesis of Mistletoe Lignin,** Phytochemistry, **15**, 1511 (1976).

Mistletoe lignin was a typical angiosperm one based on the spectral (UV, IR, ^{13}C-NMR) and functional grou panalyses, and on degradation products (nitrobenzene oxidation and acidolysis), the analytical results of which were compared with those of the host lignin. L-Phenylalanine-[U-^{14}C] was efficiently incorporated into mistletoe lignin. Phenylalanine ammonia-lyase and cinnamate-4-hydroxylase were detected by incubation of the tissue slices under illumination. It was also found that *O*-methyltransferase activity of the crude homogenate catalyzed the methylation of 5-hydroxyferulic but not the methylation of caffeic acid. However, the latter methylation activity could be recovered by purification. These results indicate that mistletoe lignin is synthesized independently from that of its host.

M. SHIMADA and T. HIGUCHI: **O-Methyltransferases in Biosynthesis of Lignins,** Protein, Nucleic Acid and Enzymes, Feb., p. 410, (1976).

General problems on the assay methods and purification of different platn O-methyltransferases (OMT) are discussed. Significance of the substrate specificity of gymnospermous (monofunctional) and angiospermous (di-functional) OMT's is described in relation to the natural occurence of guaiacyl and syringyl lignins in plants.

M. SHIMADA: **Stereochemical Aspects of Biosynthesis of Cyanogenic Glucosides,** Kagaku to Seibutsu, **14**, 686 (1976).

Biosynthesis of cyanogenic glucoside dhurrin ((S)-p-hydroxymandelonitrile-β-D-glucose) was described from stereochemical aspects of the participating enzyme catalyses.

Sorghum microsomal hydroxylase is *pro*-S specific on α-hydroxylation of p-hydroxyphenylacetonitrile, whereas plant peroxidases do not have such a stereo-specificity in the elimination of methylenic hydrogens, which is consistant with the general observation that peroxidase-catalyzed polymerization or radical coupling does not produce optically active products.

T. ITOH: **Microscopic and Submicroscopic Observation of the Effects of Coumarin and Colchicine During Elongation of Pine Seedlings,** Plant &

Cell Physiol., **17**, 367 (1976).

The effects of coumarin and colchicine were investigated on a microscopic and submicroscopic level.

Both chemicals induced a high degree of cell swelling of intact pine seedlings in the concentration of $10^{-3}\sim7\times10^{-3}$ M coumarin and $6\times10^{-3}\sim10^{-2}$ M colchicine. In seedlings radially enlarged due to coumarin treatment, primary phloem regions were characterized by cell crushing. Furthermore, protrusion of many large or small vesicles were found closely attached to the plasmalemma of parenchyma cells. The relationship of the latter evidence with the possibility of breakdown of the cell wall is discussed.

Colchicine induced abnormal spiral thickenings, and the deposition of cell wall materials was somewhat disturbed when seedlings were treated with this chemical for a longer period (more than 10 days). Based on this evidence, it was suggested that colchicine did not completely destroy the organized pattern of spiral wall thickening.

T. ITOH: **Microfibrillar Orientation of Radially Enlarged Cells of Coumarin- and Colchicine-treated Pine Seedlings,** Plant & Cell Physiol., **17**, 385 (1976).

The wall structure of cortical parenchyma cells swollen by coumarin or colchicine was investigated using replicating and sectioning techniques.

Three main types of microfibrillar orientation, which were found to be similar to those of the wall structure of the control cells, were observed in the innermost surface of the walls of both coumarin- and colchicine-treated cells; one was parallel, one was oblique, and the third was perpendicular to the main cell axis.

No microtubules were found in the cortical cytoplasma of colchicine-treated cells. However, both longitudinally and transversely oriented microtubules, the distribution of which was sparse, were observed immediately under the plasmalemma of control and coumarin-treated cells.

These observations are discussed in relation to the changes in cell shape and microfibrillar orientation.