

***Erythro/threo* ratio of β -O-4-5 structures as an important structural characteristic of lignin. Part 4: Variation in the *erythro/threo* ratio in softwood and hardwood lignins and its relation to syringyl/guaiacyl ratio**

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Abstract

The proportion of *erythro*- and *threo*-forms of β -O-4-structures in lignin was elucidated by ozonation analysis of 21 wood species, and the relationship to the syringyl and guaiacyl composition was investigated. For all hardwood species, the *erythro*-form of β -O-4-structures predominated, although the extent varied widely, depending on wood species. In contrast, the proportion and amount of *erythro*- and *threo*-forms were very similar in all softwood species. The proportion of the *erythro*-form was greater in species with a higher methoxyl content in the

lignin (correlation coefficient, $R^2=0.83$). The S/V ratio (molar ratio of syringaldehyde and syringic acid to that of vanillin and vanillic acid) obtained by nitrobenzene oxidation was also strongly correlated with the proportion of the *erythro*-form ($R^2=0.99$). Accordingly, the syringyl/guaiacyl ratio is closely related to the *erythro/threo* ratio. This stereochemical characteristic of β -O-4-structures is discussed in relation to the process of lignin formation.

Keywords [β-O-4 structure](#), [erythro/threo ratio](#), [hardwood](#), [Klason lignin](#), [lignin](#), [methoxyl](#), [nitrobenzene oxidation](#), [ozonation](#), [softwood](#), [stereochemistry](#), [syringyl/guaiacyl ratio](#)