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# Yellowing and IR-changes of spruce wood as result of UV-irradiation.

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Volume: 69, Issue: 2, Pages: 97-105

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## Abstract

The yellowing and IR-changes of spruce wood as a result of UV-irradiation were studied using two different types of xenon lamps ( $\lambda > 300$  nm;  $I(0) = 50$  mW cm<sup>-2</sup>) and  $\lambda > 280$  nm;  $I(0) = 17.5$  mW cm<sup>-2</sup>). Changes in the IR spectra as well as the yellowing of the irradiated wood surfaces show the influence of UV light on the wood modules. The UV-irradiation (72 h;  $\lambda > 300$  nm;  $I(0) = 50$  mW cm<sup>-2</sup>) decreased the lignin content on the surface by up to 20% of the original values. The colour difference of yellowing ( $\Delta E$ ) exhibited a systematic trend to higher values with increasing irradiation time. Our results show that the photoyellowing (UV-Vis detection) correlates very well with lignin degradation (IR detection). This result is in agreement with the quinone formation as the chromophoric reaction product of lignin decay. The degradation, yellowing, and oxidation kinetics differed only little using different light sources. The absorbed light intensity, which depends on wavelength, the intensity distribution of the light source and the absorption spectrum of lignin, influenced the degradation rate. Under the current experimental conditions, the absorption spectrum of lignin was the most important factor. Therefore, irradiation with  $\lambda > 280$  nm is useful for rapidly monitoring the UV-degradation of wood

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