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Keywords: coating, wood, water, absorption, desorption, MRI

As a result of the VOC regulations, a transition towards waterborne coatings has been made. Generally, waterborne coatings are intrinsically more sensitive to water. This higher sensitivity to water may negatively affect the durability of wood, due to microbiological growth. To prevent this, knowledge on the barrier properties of coatings is needed.

Our studies focus on understanding the moisture transport through alkyd (solvent and waterborne) and acrylic model coating formulations applied on teak, oak and pine. One of the key research question focuses on the importance of the interface on the barrier properties (both wetting and drying) of the coating, e.g. due to grains raising and penetration. To answer this question, Magnetic Resonance Imaging on both the uncoated and the coated wood is applied. MRI signal relaxation analysis (T_2) unravels whether water is free in the lumen or bound to the cell wall. Our results show that the moisture permeability depends on the specific combination of wood and coating, since the coating influences the moisture sorption of wood in different ways. For example, on pine sapwood, the acrylic coating increases the total drying time seven times compared to uncoated wood by sealing the surface.