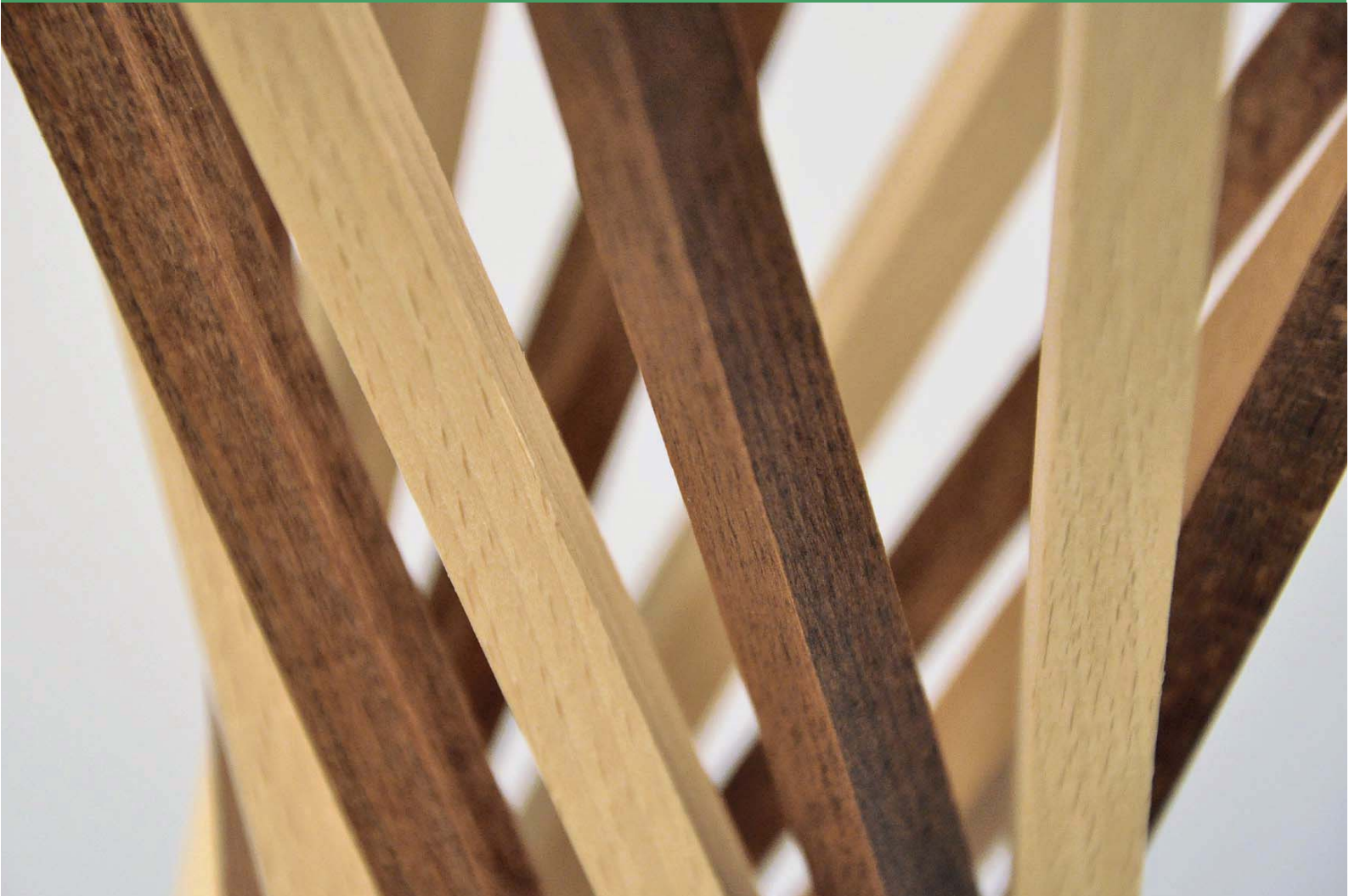


Book of Abstracts



COST Action FP1407 - 3rd Conference „Wood modification research & applications“

Kuchl, September 14-15, 2017

**Salzburg University of Applied Sciences
Forest Products Technology & Timber Constructions**

in collaboration with
the Society of Wood Science and Technology &
the European Conference on Wood Modification



FH Salzburg



ModWoodLife

COST Action FP1407

Understanding wood modification through an integrated scientific and environmental impact approach (ModWoodLife)

Wood modification research & applications

Third COST Action FP1407 International Conference

Kuchl, Austria

14-15 September 2017

Editors: Gianluca Tondi, Marko Posavčević, Andreja Kutnar and Rupert Wimmer

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Fixing tannin in wood: Characterization of the treated wood

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Keywords: wood preservatives, flavonoid, aldehyde, anhydride, weathering

The tree protects its wood physically through the bark, but also chemically by synthesizing substances which prevent degradation against biological (e.g. animal, insects, fungi) and radiative attacks (UV –rays). The idea we would like to pursue is simple increase the concentration of substances that the nature already synthesizes trying to fix them properly in wood without affecting their efficacy. It appears easy but it is not. Sensibility against leaching, fungal decay and in particular against weathering were observed (Tondi *et al.* 2012). During outdoor exposures, indeed, relatively fast discoloration and increased crack formation were observed. Two phenomena were identified to explain these weaknesses: i) the stiffness of the tannin polymers which do not resist the continuous swelling and shrinking cycles and ii) the polymerized tannin which do not maintain the typical radical-scavenging properties of the native tannin and therefore it is strongly degraded by the sun rays (Tondi *et al.* 2013). Recently, several studies were done by adding molecules which enhanced the elasticity of the formulation, but only contained improvements were registered against weathering (Tondi *et al.* 2017).

In this contribution new flavonoid co-polymers of formaldehyde, glyoxal, maleic anhydride, furfural and furfuryl alcohol are presented for their leaching resistance and their biocidal activity were investigated. In Fig.1 the effect of the hardening time and temperature on the situ-polymerization of tannin are presented.

It was observed that selecting tailored hardening parameters it is possible to achieve very satisfactory fixation of the polymer in wood. However, these formulations presented only limited biological properties against fungi and therefore contained amount of boric acid and copper sulphate were added. The results of the biological screening tests against *Coriolus versicolor* are presented in Fig.2 and they show high efficacy for all the formulations added of 1% boric acid and satisfactory results also for the tannin-hexamine and tannin-furfural formulations added of 3% copper sulphate.

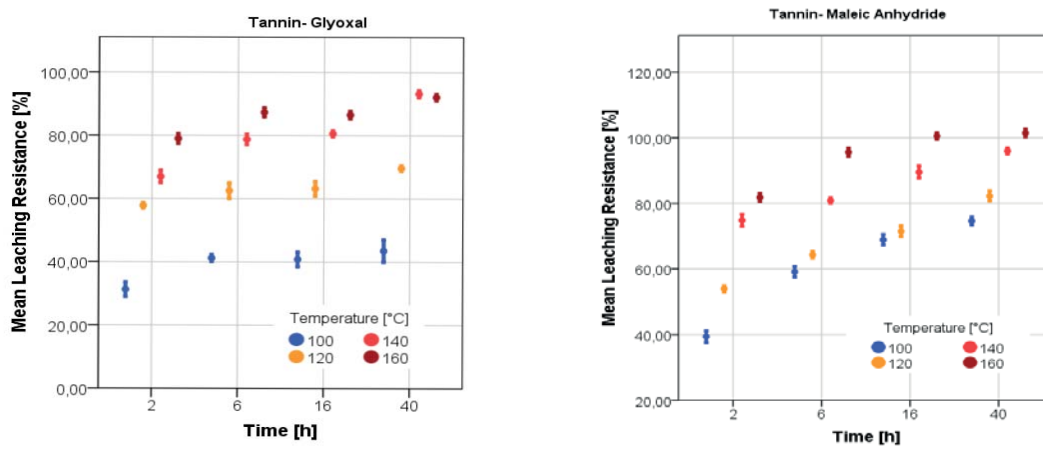


Figure 1: Time and temperature effect in the leaching resistance of tannin-based polymers.

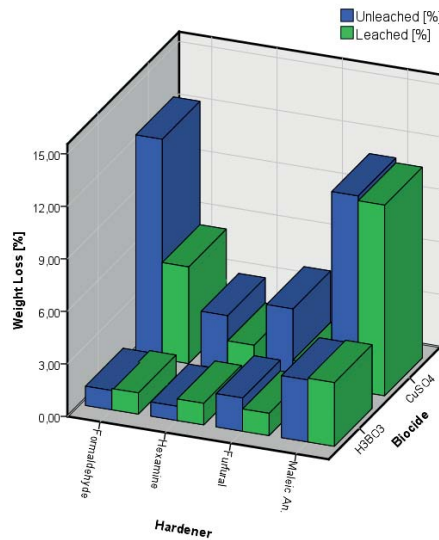


Figure 2: Weight loss of tannin-copolymers specimens added of different amount of biocide.

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