Book of Abstracts

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„Wood modification research & applications“

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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

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

Wood modification research & applications

Third COST Action FP1407 International Conference

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Understanding of the effect of natural saltwater treatment on durability, fibers densification and chemical modification of palm wood

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Nowadays, the Tunisian primary wood-processing industry consumes more than 872,000 m^3 of wood raw materials, of which only 119,000 m^3 are supplied by local forest resources. In addition, several natural lignocellulosic fibers, as those from palm woods, are available around the country but they remain poorly exploited. The palm-tree sector plays a very important role on both the socioeconomic and ecological levels, mainly in southern Tunisia. There are three million trees in Tunisian palm plantations, ensuring a potential significant wood production. This type of wood is used in various specific industries, mainly in the craft and furniture industries. In the past, Palm wood was also used as structural material. Its low natural durability and its low mechanical properties were improved by an ancestral preservative method consisting in the immersion of the trunk of the palm tree trunk freshly slaughtered for a period ranging from 1 to 2 years (depending on the species) in the salt waters of the Lake of *Chot Djerid*. This ancestral practice was disappeared, and it is always difficult to find more information on the different parameters involved in this kind of process. The objective of this STMS work was to assess the main technological qualities of palm wood preserved by salting while trying to retrace the steps of this natural and eco-friendly preservation process. Samples (boards) from two defect-free of common date palm cultivars (*Kentichi* and *Deglet Nour*) with ages ranging from 40- to 50-years and two sample (boards) preserved by salting in the *Chot Djérid* (*Kentichi* and *Deglet Nour*) were used for the experiments. Each wood samples were collected at the Regional Center of Research on Oasis Agriculture - Degache - Southern Tunisia. Densities (air-dried, water saturated, basic), mechanical properties, decay and termites resistances tests were performed on native and water salt treated palm woods.

The first results showed a significant increase of the air-dried density of palm wood samples which increases from 216 to 408 kg/m^3 after the wood salt water immersion. Basic and water saturated densities of Palm wood are also increased by salt water treatment but way less important than for the air-dried density. According bending test, salt water treatment allow to improve greatly the palm wood MOR in bending (from 15.8 MPa to 61.1 MPa) and MOR parallel to the fibers (from 11.9 MPa to 22.3 MPa). These results could be explain by the palm fibers densification occurred by the salt water impregnation into the wood.

Figure 1 (a) shows that treated palm wood has better decay resistance for each tested fungus (*Coniophora puteana* [CP]; *Poria placenta* [PP]; *Gloeophyllum trabeum* [GT] and *Coriolus versicolor* [CV]). Termite's resistance tests highlighted that native and treated palm wood had a similar degradation level after termite exposure, but the termite mortality rate was higher for the treated wood than that of native palm wood.

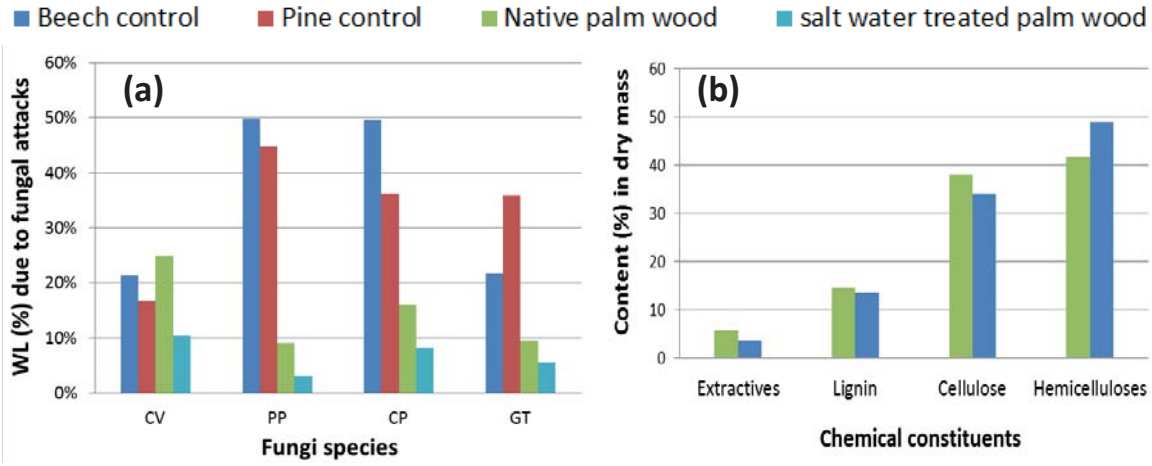

Figure 1: (a) Weight losses due to fungal attacks on native and salt water treated palm wood and (b) Percentage of different chemical constituents of native and salt water immersed palm woods.

According to Figure 1 (b), extractives, lignin and cellulose contents are slightly more abundant in the control samples except for the hemicelluloses which are more abundant in the treated palm wood sample. Mineral compounds analyses performed with MP-AES 4100 Agilent device are in progress, in order to evaluate the presence of several mineral compounds in palm wood, after salt water immersion that could explain the improvement of decay and termite resistance of the treated material.

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