

MICROSCOPIC OBSERVATION AND ASSESSMENT OF THE DECAY RATE OF MODIFIED WOOD IMPREGNATED WITH NON-TOXIC CHEMICALS.

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Recently, we started to develop a wood modification procedure based on a Maillard type of reaction. The main goals are to obtain a treatment, which is non-harmful for the environment during and after the product life, and is based on non-toxic, cheap and water-soluble chemical reagents coming from renewable sources. Penetration of these chemicals into the wood cell wall and its reaction by heat to form polymers should cause bulking of the cell wall. This decreases the cell wall volume accessible to water. The lack of water in the cell wall should increase the dimensional stability of wood and decrease fungal attacks. Research in the field of wood modification, using non-toxic chemicals as well as studies to reduce fungal growth fit into the EFI priority research topic 'The role of nature-based solutions and wood construction enhancing health and wellbeing in urban areas' and was therefore able to perform a short scientific visit to NIBIO (Ås, Norway). There, I performed tests to study the susceptibility of my modified wood samples towards fungi. For this we prepared the miniblock test with brown and white rot fungi. For the results of the test we will have to wait for 9 weeks, but we saw that no contamination occurred and the fungi are growing. With scanning electron microscopy (SEM) and optical microscopy I wanted to obtain an answer on the questions: Are the chemical reagents really penetrating the cell wall? From the SEM and optical microscopy it could be seen that lots of reagents are present in the cell lumen. Due to colour changes of the cell walls we expect that reagents are penetrated inside. The most unexpected result came from the samples treated with ascorbic acid/TRIS/citric acid because it seems that the treatment damages the wood. It was not as straightforward as first expected to learn something about cell wall bulking by comparing the thickness of the cell walls. Nevertheless, I could conclude that my short scientific visit in NIBIO has been successful. I learned a whole set of new techniques which will be useful in coming research and stronger bonds were established with the people working in the host organisation.