Title of project: Enhancing the quality of high pressure steamed Robinia wood (*Robinia pseudoacacia* L) at industrial scale

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Responsible for project/Project Leader/Contact: Prof. Dr. László Tolvaj

Robinia wood is a highly appreciated material for different applications, especially for outdoor conditions because of its outstanding biological durability and high mechanical stabiulity. The demand on the wood market for dark materials is still a well noticeable trend. However the utilization of dark tropical species is under heavy discussion, nevertheless because of the questionable sustainability of the raw material supply.
Recognizing these developments some European companies started to produce dark steamed Robinia in order to substitute dark tropical species for products like parquets and furniture. During the last decades numerous scientific investigations and industrial tests were performed in order to create reliable schedules for steaming of Robinia wood. Those investigations were mainly focusing on steaming at atmospheric pressure and below 100°C. Under these conditions the really dark colours could not be reached, or only during very time-consuming treatments, which are unrealistic for industrial applications.
The long treatment times at atmospheric pressure can be reduced effectively by using temperatures above 100°C in saturated steam atmosphere. The treatment above 100°C takes only days instead of weeks compared to normal temperatures and pressure. Beside the desired dark colour other quality aspects like internal stresses, cracks, deformations, colour homogeneity are very important factors for the yield and value of the final product. Compared to softwoods, the high density of Robinia wood, the extremely low permeability, and the high extractive content forecast a special behaviour during and after the treatment, as numerous industrial experiences and sometimes claims prove this.
An industrial autoclave of a volume of 125m^3 was investigated in this research work. The main target was to minimize the number and size of cracks, to reach homogen colour, and to minimize the internal stresses. Different influencing factors were defined like: steaming temperature, drying before or after the steaming, cooling of the chamber, and dimension of the treated wood material.

5 different schedules (treatment combinations) were defined and tested. After the treatments the final moisture content, the case hardening (internal stresses), the colour homogeneity, the number, size and location of cracks were recorded and evaluated.