BEECH WOOD (*FAGUS SYLVATICA* L.) SURFACE CARBONIZATION FOR NON-BEARING FACADE ELEMENTS OF WOODEN BUILDINGS

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INTRODUCTION

The growing interests in ecological constructions increases the effort to use renewable and easily recyclable materials. Wood is a sustainable, ecological, low-cost choice for outside wooden elements of buildings. Beech wood (*Fagus sylvatica* L.) is one of the important wooden species in Europe with a wide use in wood processing industry. In the Czech Republic the beech wood (*Fagus sylvatica* L.) is the most widespread deciduous tree (7.5 % in 2011) with an expanding potential. So new possibilities of using beech wood (*Fagus sylvatica* L.) in other related fields, such as construction should be finds. It is predestined by its material properties, such as particular strength and rigidity for using in construction. But in exterior the beech wood (*Fagus sylvatica* L.) is subject to twisting, swelling, weathering and biological degradation. From this perspective it can be considered unstable and unsuitable for outdoor use. Unsuitable properties of wood can be temporarily or permanently eliminated using selected methods of modification (chemical, thermal, mechanical, etc.). Wood carbonization process is one sided modification process that can be used to create hydrophobic and durable surface.

ACKNOWLEDGEMENT:
This research was financed by funds provided by Internal Grant Agency MENDELU (project No. LDF_VP_2020040)

MATERIALS AND METHODS

For experiment was used European beech wood (Fagus sylvatica L.) from Czech forest enterprise. The samples of dimensions 45 x 45 x 25 mm were sawn from sapwood boards with an average oven dry density 645 kg/m3.

CARBONIZATION PROCESS
For experiment were taken the samples with similar densities to minimize variation. The samples were charred at atmospheric pressure using the contact heating laboratory device.

Figure 1: Contact heating laboratory device with built-in NiCrNi sensor and electronic controller with range 50 – 500 °C.

Temperature (°C)	Time I. (min)	Time II. (min)
200 °C	15	30
250 °C	5	15
300 °C	2	5
350 °C	1	2
400 °C	0,5	1

Figure 2: Time-temperature regimes of modification process. The specimens were sorted into two groups according to orientation of charred surface (radial and tangencial).

WETTABILLITY MEASUREMENTS
Surface wettability of samples was measured by water floating according to EN 927-5. The weighing was repeated at 2, 4, 6, 8, 10, 24, 48, 72 h.

In each group was another 10 groups with 5 specimens representing time and temperature of modification process.

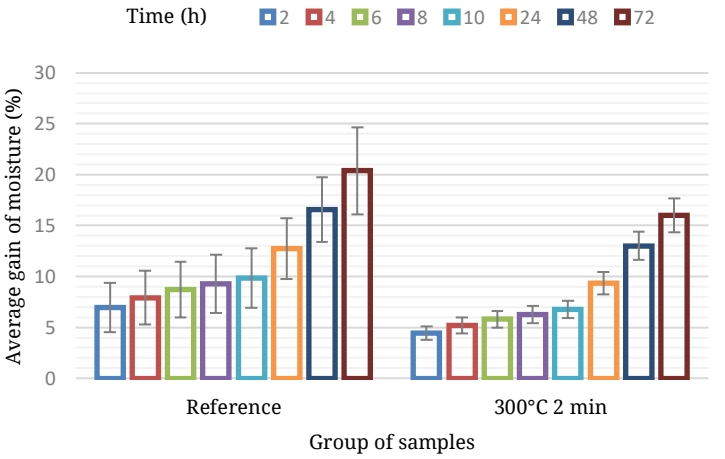

Figure 3: Tangetial moisture measurement. The best optimalization for carbonization of tangential samples was 300°C 2 min.

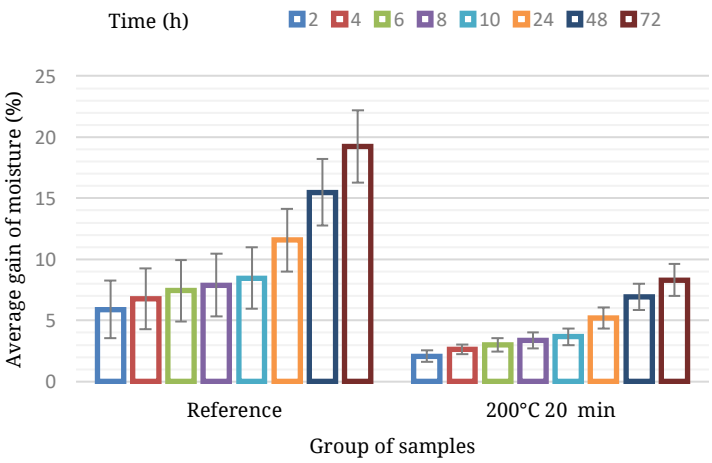

Figure 4: Radial moisture measurement. The best optimalization for carbonization of radial samples was 200°C 20 min.

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