

**THE EFFECT OF TREATMENT TIME ON
DIMENSIONALLY STABILITY, MOISTURE CONTENT
AND MECHANICAL PROPERTIES OF HEAT TREATED
ANATOLIAN CHESTNUT (*CASTANEA SATIVA* MILL.)
WOOD**

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ABSTRACT

In this study, the effect of treatment time on dimensional stability, moisture content, and mechanical properties of heat-treated Anatolian chestnut (*Castanea sativa* Mill.) were investigated. Test specimens were subjected to a temperature of 180°C at atmospheric pressure for five different treatment times (2, 4, 6, 8, and 12 hours). After the heat treatment of the specimens was completed, their moisture contents at relative humidity (RH) conditions of 45, 55, 65, 80, and 95%, their dimensional stabilities, their mechanical properties, e.g., bending strength, modulus of elasticity, and compression strength, were determined. The data obtained were analyzed using variance analysis, and then the statistical analysis of Tukey's test was conducted. The results showed that heat treatment resulted in decreased (i.e., improved) moisture content, enhanced dimensional stability, and reductions of the mechanical properties. The decrease of mechanical properties that resulted from the 12-hour test was greater than the reductions observed for the tests that lasted 2, 4, 6, and 8 hours.

KEY WORDS: treatment time, anatolian chestnut, mechanical properties, moisture content

INTRODUCTION

Heat treatment of wood is known to improve wood properties by reducing hygroscopicity, improving dimensional stability, and enhancing the resistance against biological attack. Nowadays, in Europe, the heat treatment of wood is conducted successfully on an industrial scale using steam, nitrogen, or oil as the heat-transfer and oxygen-excluding medium (Boonstra et al. 1998, Militz 2002). Another important aspect of heat-treated wood is strength reduction. According to Viitaniemi (1997), the effects of heat treatment of wood at temperatures between 185°C and 250°C are reduction of moisture content (MC) by 43 – 60%, reduction of shrinkage and swelling by 30 – 80%, and reduction of bending strength by 5 – 25%.