THE EFFECT OF TIME AND TEMPERATURE OF SATURATED WATER STEAM ON ACIDITY AND WOOD COLOUR IN THE PROCESS OF THERMAL MODIFICATION OF SILVER BIRCH WOOD COLOUR

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ABSTRACT

*The aim of this paper is to determine the correlation between change in acidity and colour of wood species Betula pendula Rot. in the CIE-L*a*b* colour space in the process of heat treatment of woodturning blanks with dimensions of 40 x 90 x 800 mm, and saturated water steam in the range of temperatures from t = 105 to 135 °C, as well as the time of heat treatment from τ = 3 up to 12 hours. Wet silver birch wood changes pH in the range of pH = 5.3 ÷ 3.2 due to partial hydrolysis of hemicelluloses and extraction of water-soluble substances, and it loses whiteness (gets darker). Increment in the value of the coordinate of the red colour a* and slight changes in the coordinate of yellow colour b * lead to colour levels of varying intensity of the brown colour.*
*Colour coordinates of birch wood in the CIE L*a*b* colour space with dependence on temperature of saturated water steam t and the time of heat treatment τ are described using the equations:*
$L^* = 83.6232+0.4815 \cdot t-1.9377 \cdot \tau -0.0041 \cdot t^2-0.0068 \cdot t \cdot \tau +0.1091 \cdot \tau^2$,
$a^* = 6.7847-0.0795 \cdot t+1.2265 \cdot \tau+0.0007 \cdot t^2-0.0026 \cdot t \cdot \tau-0.0511 \cdot \tau^2$,
$b^* = 19.8107-0.0014 \cdot t +0.7326 \cdot \tau-9.3472E-5 \cdot t^2-0.0027 \cdot t \cdot \tau-0.0255 \cdot \tau^2$.

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