

Sound absorption of oil palm trunks

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Thailand was listed as the third in palm oil production in the world with the plantation area of about 5600 km² as in 2010. The plantation area is increasing due to the demand for the oil. As a result, there is plenty palm biomass leftover after each replanting process of oil palm trees. Biomass from each part of oil palm tree has been investigated for various applications such as particleboard and compressed wood panels. In this work, we explore the possibility of using oil palm biomass as sound absorbing application using a standing wave tube for the frequency range of 300-2000 Hz. The biomass used in this work is oil palm trunk. Two different cutting directions, parallel and normal to the fibrous grain of the palm trunk, are considered. The processed biomass has the thickness and diameter of 12.5 and 114 mm, respectively. A biomass disk is then inserted into the standing wave tube at different distances away—0, 2, 4 and 6 mm—from the backing metal plate for the determination of the sound absorption coefficients. In addition, the disk is drilled for 3-mm diameter through holes of which are organized in periodic fashion with 10-mm separations. Our results show that the absorption coefficients for the cross-cut panel are slightly greater than those of the parallel-cut. This is possibly due to the panel porosity. The through-hole disk provides significant improvement particularly at frequency above 1000 Hz. Our work presents an alternative application for the oil palm biomass.

Summary

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