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Investigation of sound absorption properties of nonwoven webs produced from chicken feather fibers

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Abstract

As a consequence of modern life and technology, noise causes many negative side effects, especially with regard to health. Today, the presence of acoustic problems in transport vehicles such as airplanes, cars and train wagons has become one of the major problems of modern life. Many methods and materials have been developed to provide acoustic comfort in indoor spaces. One of them is the development and application of sound-absorbing materials. Nonwoven webs, which are considered to be the most ideal materials for sound insulation, have micron-sized pores as well as large surface areas. Among these materials, materials with double-layered porosity have greater effect. In recent years, researchers are increasingly turning to the development of sound-absorbing materials from production waste and natural materials that are easily decomposed in the environment. In this study, the sound-absorbing properties of nonwoven webs produced from chicken feather fibers, a by-product in chicken production and a significant amount of waste, were investigated. For this purpose, nonwoven web samples with different parameters were produced by using different binding materials by using thermal bonding method. The sound absorption coefficient and sound transmission loss values of the samples were measured and evaluated. As a result of the analyses, the influence parameters such as thickness, bulk density and porosity on the sound insulation properties of the produced samples was revealed. The assumptions concerning the mechanism of sound insulation of nonwoven webs produced from chicken feather fibers are detailed. Studies have shown that nonwoven webs from chicken feather fibers can be used as soundproof materials because of their good sound-absorbing properties.

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