

Life cycle assessment (LCA) of particleboard: Investigation of the environmental parameters

ABSTRACT

Particleboard is not entirely a wood replacement but a particular material with its properties, making it more effective at different times than heavy or solid wood. The world's biggest concern is environmental problems with formaldehyde as a particulate board binder that can lead to human carcinogenic agents. A cradle-to-gate life cycle assessment (LCA) of particleboard production was performed using openLCA software. The impact assessment was carried out according to the software's features. This preliminary investigation aims to analyze the chemical composition of particleboard and identify its environmental impact. The Fourier-transform infrared spectroscopy (FTIR) system was used to track the functional group of aliphatic hydrocarbons, inorganic phosphates, and main aliphatic alcohols found in particleboards made in Malaysia. Based on the FTIR results, aliphatic groups were found in numerous aggravates that the spectroscopic infrared was likely to experience. The most important vibrational modes were C-H, at approximately 3000 cm^{-1} , and -CH deformations around 1460 cm^{-1} and 1380 cm^{-1} . Eight effect groups demonstrated that 100% of the input and all analyses produced the same relative outcome. The life cycle of a product is determined by pollution of the air, water, and soil. Thus, particleboard has a minimal impact on the environment, except for global warming.