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(57) Abstract :
Textile fibers, both synthetic and natural, are fundamental components in various engineering applications. However, due to environmental concerns associated with synthetic fibers, there has been a growing interest in natural fibers as sustainable alternatives. In recent years, natural fibers, particularly those derived from Agave americana, have gained significant attention for their potential use in engineering, including civil and acoustic applications. Acoustic materials, which are essential for reducing unwanted noise in building, mobile, and home technologies, can benefit from the use of natural fibers. To explore the feasibility of using Agave americana fibers in civil engineering, a survey was conducted among builders and civil professionals. The survey indicated a strong potential for integrating green building concepts, particularly in addressing waste disposal challenges. To enhance the properties of Agave americana fibers, they were subjected to biosoylation and enzyme treatments with cellulase to modify their surfaces. The treated fibers were then evaluated using various analytical techniques, including spectrophotometric analysis, chemical composition analysis, moisture content and regain measurements, water absorption tests, density determination, tensile strength and elongation tests, thermogravimetric analysis (TGA), scanning electron microscopy (SEM), and Fourier transform infrared spectroscopy (FTIR). These assessments confirmed the fibers' suitability for use in engineering applications, demonstrating improved performance characteristics.

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