










Investigation of physical, strength, and ductility characteristics of concrete reinforced with banana (Musaceae) stem fiber

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Abstract

Natural fibers derived from plant wastes possess a negligible carbon footprint and a high tensile strength. Therefore, researchers are focusing on the technical evaluation of cementitious materials with bio-based fibers. The stems of the banana plant consist of high-quality textile-grade fiber bundles possessing high tensile strength and toughness. Owing to these characteristics banana stem fiber (BSF) can be used as a reinforcement for plain concrete. Therefore, this study is devoted to the evaluation of the properties of concrete with various concentrations of BSF. The performance of BSF in concrete was also compared with artificial polypropylene fiber (PPF) at the same volumes of fibers (i.e., 0.25, 0.5, and 1%). The results revealed that 0.25% and 0.5% volumes of BSF were highly useful to the tensile and flexural strength of concrete. However, residual compressive and