

Sustainable reinforcement for concrete has newly discovered benefits

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Fashionable people may turn up their noses at jute—the cheap fiber used to make burlap, gunny sacks, twine and other common products—but new research is enhancing jute's appeal as an inexpensive, sustainable reinforcement for mortar and concrete. The study appears in ACS' journal *Industrial & Engineering Chemistry Research*.

Subhasish B Majumder and colleagues note that there has been a resurgence of interest in using economical, sustainable natural [fibers](#), rather than steel or synthetic fibers, to reinforce the cement compositions used to make concrete and mortar, the world's most widely used building materials. That reinforcement makes cement compositions stronger and more resistant to cracks. Their previous research showed that jute works as a reinforcement fiber.

The new study discovered another advantage of jute, which is second only to cotton as the most widely used natural fiber. The addition of jute fibers also delays the hardening of [concrete](#) and mortar, which must be trucked to construction sites. "The prolonged setting of these fiber-reinforced cement composites would be beneficial for applications where the pre-mixed cement aggregates are required to be transported from a distant place to construction site," the report states.

More information: "Effect of Jute as Fibre Reinforcement Controlling the Hydration Characteristics of Cement Matrix" *Ind. Eng. Chem. Res.*, Article ASAP. [DOI: 10.1021/ie300607r](https://doi.org/10.1021/ie300607r)

Abstract

The present investigation deals with the effect of jute as a natural fiber reinforcement on the setting and hydration behavior of cement. The addition of jute fiber in cement matrix increases the setting time and standard water consistency value. The hydration characteristics of fiber reinforced cement were investigated using a variety of analytical techniques including thermal, infrared spectroscopy, X-ray diffraction, and free lime estimation by titration. Through these analyses it was demonstrated that the hydration kinetics of cement is retarded with the increase in jute contents in cement matrix. A model has been proposed to explain the retarded hydration kinetics of jute fiber reinforced cement composites. The prolonged setting of these fiber reinforced cement composites would be beneficial for applications where the premixed cement aggregates are required to be transported from a distant place to the construction site.

Provided by American Chemical Society

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