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Greening Mortar With Olive Waste

Construction Chemistry: Waste from olive oil production could shrink the building material's carbon footprint

Lucas Laursen

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GREEN ASH The ash left over from burning olive waste has the right chemical ingredients to partially replace cement in building mortar.

The cement industry is one of the world's largest producers of atmospheric carbon dioxide. The reason is that cement's calcium carbonate releases the greenhouse gas. Now researchers have shown that they can replace up to 10% of the cement in mortar mixtures without harming the strength of the widely used masonry paste. The cement's replacement is environmentally friendly, to boot: a waste product from olive oil production (*Environ. Sci. Technol.,* DOI: 10.1021/es200968a).

For decades, cement makers have substituted fly ash, a fine residue from coal-burning power plants, for part of the cement in mortar. The ash contains silicon and aluminum, which react with the cement to form a strong mortar. Over the past few years researchers have experimented with supplementing mortars with other sources of fly ash, including tire rubber and some forms of biomass.

Luis Sánchez Granados at the University of Córdoba, in Spain, and his colleagues decided to experiment with olive fly ash, which also contains silicon, calcium, and aluminum. This ash comes from factories that generate

heat or electricity by burning plant material left over from pressing olive oil.

The researchers replaced different fractions of cement with olive fly ash and measured the strength of the resulting mortars. The mortar grew weaker as the percentage of the olive ash in it rose, but it met industry strength standards with up to about 10% of the cement replaced. Used in mortars in the right proportion, Sánchez says, olive biomass would be low cost, produce little carbon dioxide, and help olive-oil-producing countries dispose of a major waste product.

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