Use of biomaterials for thermal storage

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To date, biomaterials have only achieved brief mention in the context of thermal storage materials. Essentially all research and commercialization has been pursued with paraffin and salts. Among the biomaterials cited for these applications are mixtures of methyl stearate and methyl palmitate.

Thermal storage materials can be used in a variety of applications ranging from keeping pizza warm to delaying the freezing of bridge surfaces during winter nights. Among the larges potential markets for thermal storage materials are residential and commercial construction. In buildings, a thermal storage material can be used in combination with solar heaters, storing the daytime warmth to keep a residence warm during the night. Similar approaches can be used to store nighttime coolness during the summer to keep a house cool during the day. Thermal storage devices based on latent heats can store about thirty times more useful energy than water or rocks of equal mass, and so, these devices provide the predominant practical means for storing thermal energy.

The use of thermal storage materials in building construction provides one of the best ways to reduce greenhouse gases since electricity and/or fuel is replaced with renewable energy storage that is regenerated every 24 hours. The paper quantifies the benefits of these thermal storage devices and summarizes progress toward substantially reducing the costs of bio-based thermal storage materials.