Researchers have created a non-petroleum plastic film that is compostable and made from renewable materials

There is a growing interest in creating sustainable and renewable packaging. At Springwise, we have previously seen packaging pouches made from recycled billboards and milk bottles made from biodegradable plastic. Now, researchers at Georgia Institute of Technology have created a flexible, plastic material out of crab shells and tree fibres. The tree fibres contain cellulose, and crab shells contain a material called chitin. Both of these are natural biopolymers. Researchers hope that the material made from these natural polymers could eventually replace petroleum-based plastic wrap to keep food fresh.

The process of creating the material begins by first suspending cellulose nanocrystals and chitin nanofibers in water. This liquid was then sprayed on a surface in alternating layers. Once dried, the material formed a flexible film similar to plastic wrap. The film was strong, transparent and compostable. The researchers compared their material to PET, or polyethylene terephthalate, one of the most common petroleum-based materials in the transparent packaging of snack foods and soft drink bottles. According to J. Carson Meredith, a professor in Georgia Tech’s School of Chemical and Biomolecular Engineering, “Our material showed up to a 67 percent reduction in oxygen permeability over some forms of PET, which means it could in theory keep foods fresher longer.”

Packaging like PET, that keeps food fresh, needs to prevent oxygen from passing through. The crystalline structure of the new film therefore acts as an oxygen barrier. The researchers also point out that, unlike PET, their product is based on renewable resources. The chitin comes from crab and...
shrimp shells left-over from the shellfish food industry, and the cellulose can also be harvested from wood waste at mills. The researchers will next focus on ways to scale up the manufacturing process to make it cost-effective, and on improving the material’s ability to block water vapour.

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