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Packaging film could prolong shelf life of perishables

PhD student Tan Yi Min (left) and Associate Professor Thian Eng San with the result of their research – an environmentally-friendly packaging material formed by combining a grapefruit seed extract and chitosan – a biodegradable polymer derived from crustacean shells. ST PHOTO: ALPHONSUS CHERN

NUS researchers develop biodegradable material that could help delay fungal growth

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Researchers have developed a new food packaging material that could double the shelf life of perishable food like bread.

When packaged in the new material, fungal growth in bread sets in only at 10 days, experiments show. In comparison, such growth sets in after three days when a common food packaging made of polyethylene, a synthetic resin, is used.

The environmentally-friendly material, developed over three years by a National University of Singapore (NUS) team, is formed by combining a grapefruit seed extract and chitosan – a biodegradable polymer derived from crustacean shells.

Both chitosan and the grapefruit seed extract work together to slow down fungal and bacterial growth.

The material also blocks ultraviolet light, hence slowing down the degradation of food products from oxidation and deterioration caused by the chemical action of light.

It is biodegradable and made entirely of natural compounds.

The material is created through a one-day process in which chitosan and the extract of grapefruit seed are mixed, filtered, cast in Petri dishes and then placed in an oven to dry. The final product is a thin transparent film.

"Extending the shelf life of food products also means reducing food waste and, as a result, reducing the rate of global food loss," said PhD mechanical engineering student Tan Yi Min, 27, who co-led the research.

"This will bring about both environmental and economic benefits."

Associate Professor Thian Eng San, 41, from the NUS department of mechanical engineering, said grapefruit seed was chosen as it also has anti-odour properties, which could be useful in packaging strong-smelling food like durians.

Prof Thian, the other co-leader of the research, noted that the raw materials needed to produce the film are, however, 30 per cent costlier than those of polyethylene.

But he is confident that the cost could be comparable if it is produced on a large scale in the future.

Another way to make the higher cost worthwhile is to use the material to package more expensive food items like cheese and seafood such as salmon and prawns, he added.

Prof Thian and Ms Tan will conduct further studies on the material with other food products, such as red meat and seafood, to assess how far it can slow down microbial and fungal growth.

They also aim to find out how long it will take for the material to completely biodegrade.

The material is expected to hit the market in three to five years.

Professor William Chen, director of the Food Science and Technology Programme at Nanyang Technological University, said the invention of a new food packaging material that can prolong the shelf life of food is welcomed.

However, there is a need for further studies to ensure the safety of the new material, he added.

REDUCES FOOD WASTE AS WELL

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