



By Fred Searle

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## Clay 'boosts fresh produce shelf life', researchers claim



The clay-coated packaging helped prevent tomatoes from rotting in tests

Scientists in Istanbul find that antimicrobial clay packaging can help prevent bacterial contamination and excessive build up of ethylene

**C**lay nanoparticles, as unlikely as it may sound, are being touted as the latest trick for extending shelf life with fresh produce packaging.

Scientists at Sabanci University in Istanbul have developed a film coated with clay 'nanotubes' that they claim could be used help prevent bacterial contamination and the excessive build up of ethylene.

According to the researchers, the film prevents over-ripening and microbial growth, which could help improve the shelf life of perishables, including fresh fruit, vegetables and meat.

Results of the research were presented at the 254th National Meeting & Exposition of the American Chemical Society (ACS), the world's largest scientific society, on 21 August.

Dr Hayriye Ünal, who led the study, said: "Food packaging that is capable of

interacting with food can contribute to safety and prevent economic losses from spoilage. Specialised films that can preserve a wide array of foods are highly sought after."

In the UK it was calculated that around £13 billion worth of edible food was thrown away in 2015, with fresh produce one of the main contributors to this waste. In the US, meanwhile, the Department of Agriculture, estimates that about 30 to 40 percent of the food that farmers produce in the country goes to waste.

Over the past two decades, scientists have been developing alternative ways to preserve food, with an extensive focus on packaging. Numerous issues, primarily the versatility of the materials, have hindered progress.

"While companies can already make many films that prevent fruit and vegetables from drying out,

incorporating additional properties in the same film is a challenge," Ünal said.

Bacterial contamination and permeability to both oxygen and water vapour are major issues that scientists are addressing. Another challenge is to prevent too much ethylene, a compound naturally released by fruits and vegetables, from building up underneath packaging and causing the contents to overripen and rot.

To provide a gas barrier in their packaging, Ünal's team started with a polyethylene film and incorporated clay 'halloysite nanotubes', which are small, hollow cylinders.

The nanotubes prevent oxygen from entering the film, and prevent water vapour and other gases from escaping. In addition, they stop ethylene building up by absorbing it.

The researchers loaded these nanotubes

with a natural antibacterial essential oil

After ten days, tomatoes wrapped with the

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found in thyme and oregano called carvacrol and coated the inner surface of the packaging film with the loaded nanotubes to kill microbes.

The team wrapped tomatoes, bananas and chicken in the film to test its effectiveness over varying amounts of time compared to foods wrapped in plain polyethylene.

new film were better preserved than the control vegetables. In addition, the new film helped bananas stay firmer and more colourful after six days compared to the control fruit.

Moving this technology to industry will require some additional work, Ünal said. The next step in her team's research will involve testing the film to make sure it is safe and nontoxic.

and Technological Research council of Turkey.

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