

Ozone 'vaccine' protects tomatoes against fungal attack

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Exposing fruit to a burst of ozone gas is similar to 'vaccinating' them against fungal attack, scientists at Newcastle University have found.

The team, led by microbiologist Dr Ian Singleton and plant biologist Prof Jerry Barnes, of Newcastle University, has shown that exposing tomatoes to ozone before infecting them with fungus reduced lesion development by up to 60 per cent - potentially increasing the shelf-life of the fruit by 2-5 days.

Presenting their findings today at the Society for General Microbiology's Spring Conference 2011, Dr Singleton said the ozone was behaving like a vaccine - triggering the tomato plant's defences and arming it against attack.

"We found that when tomatoes are exposed to a burst of ozone it acts in a similar way to a vaccine, changing the fruits' defences and bracing them against attack," explains Dr Singleton, a lecturer at Newcastle University's School of Biology.

"This suggests that [ozone treatment](#) exerts a 'memory' or 'vaccination' effect that protects fruit from spoilage and understanding this mechanism could lead to new ways of extending the shelf life of [fresh produce](#) and reducing waste."

It is estimated that up to 30 per cent of all fresh produce is lost due to microbial spoilage. Fungal contamination is the most common cause of

spoilage of stored fruit and vegetables and the risk of microbial contamination increases with longer storage periods.

From the 1950s onwards, heat treatment was replaced with cheap and effective synthetic fungicides, often used in combination with pre-pack sanitation treatment containing chlorine or bromine.

Ozone is generally considered to be a safe, effective replacement for pesticides because it leaves no residue and has been accepted by USA regulators as safe to apply on fresh produce.

The gas is used to improve storage of a variety of fruits and vegetables, including strawberries, grapes, tomatoes and plums, without causing any deterioration in produce quality when used in the correct way.

Dr Singleton explained: "There are public concerns over pesticide residues on fresh produce. Ozone is a viable alternative to pesticides as it is safe to use and effective against a wide spectrum of micro-organisms. Importantly, it leaves no detectable residues in contrast to traditional methods of preserving fresh produce."

Dr Singleton said the next step for the Newcastle team was to understand the mechanism by which the ozone was triggering this protection response.

"Different fruits have been shown to have different tolerances for ozone," he explained. "The levels of [ozone](#) we exposed the tomatoes to were roughly the same as what you would get outside on a sunny day."

Provided by Newcastle University

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