Ozone reduces fungal spoilage of fruits and vegetables

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This is Dr. Ian Singleton in the ozone lab. Credit: Newcastle University

Storing fruits and vegetables in ozone-enriched environments reduces spoilage explains a scientist at the Society for General Microbiology's Spring Conference in Harrogate. Dr Ian Singleton explains how ozone treatment could be a safe, effective replacement for pesticides as it leaves no residue on foods.

It is estimated that up to 30% of fresh produce can be lost due to microbial spoilage. Dr Singleton from Newcastle University explains

that low levels of gaseous ozone are able to prevent fungal spoilage in a wide range of stored fresh produce, including strawberries, tomatoes, grapes and plums. His work has shown that enriching the storage environment with ozone causes a substantial decline in fungal spore production as well as a reduction in visible lesions on fruits that are already infected. Fruit stored at low levels of ozone for up to 8 days prevented almost 95% of disease from developing, depending on the fruit and levels of fungal infection.

Fungal contamination is the most common cause of spoilage of stored fruit, salads 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.

Dr Singleton explains why alternative methods to reduce fungal spoilage are needed. "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."

Interestingly, Dr Singleton's team found that exposing tomatoes to ozone before infecting them with fungus also reduced spoilage. "This suggests that ozone treatment exerts a 'memory' or 'vaccination' effect that protects fruit from damage. It is unclear how this phenomenon works, but is certainly worthy of further, detailed investigation," suggested Dr Singleton.

Careful work is also needed to optimize levels of ozone and length of exposure for each variety of produce. "Different fruits have been shown to have different tolerances for ozone. We need to look carefully at how

we control the atmospheric concentration of the gas in stores and transit containers, since levels of ozone that are too high can damage produce, causing financial losses"

Provided by Society for General Microbiology