Newer table grape varieties are in demand but are susceptible to fungal infection during cold storage. Sulphur dioxide (SO2) is the traditional treatment. It is highly effective against decay, but can cause the metal machinery used in the preservation process to corrode, as well as allergic reactions in some consumers.

Mass-marketed grapes remain in cold storage for several months at high humidity. Francisco Artés-Hernández and his team at the Technical University of Cartagena in Spain compared several different preservative methods with a new technique that involves exposing macroperforated packages of grapes at 0°C to cycles of 0.1 µl l¹ ozone.

Ozone treatment was found to be very effective at preservation, 90% as effective as SO2 under the best conditions. In addition, total phenolics – the antioxidant compounds found in many coloured fruits – increased in ozone-treated grapes, up to four-fold under certain conditions.

It is not yet known why polyphenol levels increase, but because these compounds are up-regulated in response to environmental stress in plant cells, it could be that the ozone is perceived as a biochemical insult.

Artés-Hernández says that 90% efficiency is already commercially viable, but that more work is needed to get the fungal control up to the same level as that conferred by the harsher SO2 treatment. The ozone treatment is also more expensive which means that companies using his treatment would need to aim for a niche market – people willing to pay more for a hypoallergenic, polyphenol-rich product.

As the ozone treatment would be expected to boost polyphenols in wine grapes as well, the new research opens up the possibility of creating a healthier wine. But Andrew Waterhouse, Chair of the Department of Viticulture at University of California, Davis, said: 'The problem is that it might take too long for the ozone to have its effect. The
treatments were for 60 days and no one will pick wine grapes and then store them. On the other hand, vineyards near cities or busy highways might be exposed to higher than normal ozone levels all season long.’ Waterhouse noted, however, that the ozone process could be tweaked to replace problematic sulphites added to wine during the liquification process. These sulphites are thought to be responsible for allergic reactions in some people. Polyphenols, natural compounds found in red wine, chocolate, coffee and many fruits, are believed to help prevent a variety of diseases including cancer and neurodegeneration. SO2 treatment or other cold-storage treatments are not known to boost these compounds in grapes.

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