

## How Does Gaseous Ozone Application to Wine Grapes Positively Impact the Wine

Below excerpt written in the 2021 published Molecules wine white paper by: *Margherita Modesti, Colleen Szeto, Renata Ristic, WenWen Jiang, Julie Culbert, Keren Bindon, Cesare Catelli, Fabio Mencarelli, Pietro Tonutti, and Kerry Wilkinson.*

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*“Plant tissue responds rapidly to O<sub>3</sub> and within ~2 h of exposure, ozonation induces the formation and accumulation of different reactive oxygen species (ROS), mainly hydrogen peroxide, in the cell wall and plasma membrane. When ROS production exceeds the capacity of scavenging systems to maintain the optimal redox status, oxidative stress occurs. The oxidative stress induced by O<sub>3</sub> exposure can stimulate cellular defense mechanisms, including biosynthesis of antioxidants such as glutathione, ascorbate and polyphenols. Another defense mechanism triggered by oxidative stress is the increased activity of various enzymes, including uridine50-diphospho-gluconosyltransferases (UGTs), which play indirect roles in ROS-removal. Glycosylation (and deglycosylation) of antioxidants and phytohormones plays an important role in plant defense mechanisms. Oxidative stress induces UGT activity, which can in turn increase glycosylation processes, and this might explain the observed increase in VP glycosides following 3 ppm O<sub>3</sub> treatment of smoke-affected grapes (at t = 6). Glycosylation of smoke-derived VPs likely reflects a detoxification strategy, i.e., glycosylation allows compartmentalization and stable storage of small and toxic/reactive molecules, such as VPs, by lessening their volatility through derivatization.”*