

## **Thermal Pest Control (TPC) does not show the expected protective effects, but it can be improved**

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Thermal Pest Control (TPC) is a short-duration compressed hot air treatment that can be blown over the grapevine canopies by a properly adapted farm tractor. In the last years, such air treatments have been recommended by technicians for enhancing the levels of vineyard protection against diseases, and improving grape production and quality. In the vineyards of the 'Serra Gaucha' region (southern Brazil), the methodology has been performed to control downy mildew and botrytis bunch rot, and has been frequently added to spray schedules, in parallel to chemical pesticides. This study deals with a variety of assays in order to: i) Sense, quantify and characterize the hot air fluxes blown by the equipment; ii) Evidence and characterize the biological activity of a pathogen structure (*Plasmopara viticola* sporangia) and the grapevine tissue (leaf) when they were exposed to a flux of hot air (FHA) analogous to TPC. *In vitro* and greenhouse trials showed that the oomycete sporangia were able to release zoospores to aqueous medium after ten applications of FHA (120°C/0.5s), instead of inactivating them. In addition, except by a slight deposition of lignin and significant increases of polyphenol-oxidases activities (PPO) in FHA-treated leaves, it was not observed coordinated responses of PR-proteins and systemic acquired resistance (SAR). However, field trials showed the FHA of TPC, when imposed during the grapevine flowering stage, could play a role in decreasing of downy mildew progress, since the FHA effectively causes a dispersion of the sporangia attached on the sporangiophores of leaf surface. This phenomenon, when imposed on flower caps, indeed reduced the dry berry incidence in bunches with ripened grapes, and could be taken into account for the TPC further improvements.

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