

Objectives & Rationale

Decay control is an ongoing problem in the stone fruit industry. There are still too few postharvest treatments available for stone fruit. Numerous technologies are available in other industries [i.e. controlled atmosphere (CA) storage, drenching/dipping, UV, ozone]. The aim of this study is to test different technologies to reduce decay of plum.

Methods

Different inoculation methods (spray and pipette inoculation) and spore concentrations of *Botrytis cinerea* and *Monilinia laxa* were evaluated on Angeleno plum. Three CA storage regimes (6% O₂:15% CO₂, 9% O₂:12% CO₂ and 12% O₂:9% CO₂) and regular atmosphere (RA) were tested. Six dip treatments and untreated control (UTC) were tested. These treatments included ascorbic acid + bioflavonoids (AaB) (1X and 2X doses), peracetic acid + hydrogen peroxide (PaHp) (1X and 2X doses), fludioxonil (Flu), and fludioxonil + pyrimethanil (FluP). Two O₃ gas treatments (1h application time, 2h application time) and UTC were tested. Integrated methods were tested that included O₃ (2h application), CA (6% O₂:15% CO₂), O₃ & CA, and RA storage with (AaB and Flu) or without (UTC) fungicide treatments. Plums were stored for ±6w at -0.5 °C and 10d at 10 °C (shelf life) before evaluation.

Key Results

CA regime 1 (6% O₂:15% CO₂) and 2 (9% O₂:12% CO₂) significantly reduced decay; decay severity reduced by 65% with regime 1 and 50% with regime 2. CA regime 3 was ineffective. AaB was ineffective and PaHp showed low levels of control (depending on method and concentration). Since Flu provided 100% control, the contributing effect of pyrimethanil was not noticeable. The 2h application of O₃ (>0.14 ppm) was the most effective O₃ treatment. With regards to treatment integration, plums treated with combinations of O₃ & CA, O₃ and Flu exhibited the lowest disease incidence, decay severity and sporulation compared to CA, RA and in most cases AaB. O₃ on its own and in combination with CA were the most effective gas treatments and Flu the most effective fungicide treatment. The treatments and treatment combinations did not have a negative effect on the quality and taste of Angeleno plums.

Conclusion and Discussion/Recommendation

Combining O₃, CA storage and fungicides resulted in improved efficacy against *B. cinerea* and *M. laxa* on Angeleno plums. The treatment combinations thus show potential to reduce decay, extend storage life and can be used to assist in reducing fungicide resistance build-up, and maintain or gain access to stringent markets by lowering MRLs (depending on implementation and management). More research is needed to include other stone fruit types and cultivars, and continue optimisation of an integrated control method.