Objectives & Rationale

Previously, the South African apple and pear industry relied on diphenylamine (DPA) for controlling superficial scald disorder; however, increasing consumer concerns and reduction in maximum residue levels (MRLs) resulted in the industry rather using alternative control strategies. Since DPA is not used on fruit exported to the EU, it may lead to other fruit quality problems. The past few seasons a lot of internal browning issues occurred. The aim of this project is to determine the effect of DPA on fruit quality. These results may lead to a re-evaluation of the current recommended CA regimes for South African pome fruit.

Methods

Optimum harvested ‘Cripp’s Pink’ apples from three sites from two production areas were subjected to five postharvest treatments. The trial was repeated over two seasons. Fruit quality evaluations were done after three storage periods.

Key Results

In 2017, fruit from the three sites in Grabouw had diffuse browning after 3 months of storage in all the treatments. In two of the sites, the DPA+RA and RA stored fruit tended to have the lowest percentage of diffuse browning after 6 and 9 months. In all the sites, the DPA+RA and RA fruit had soft scald after 6 months followed by 14 day shelf-life. In two of the sites all the treatments had soft scald after 9 months followed by 7 day shelf-life. Fruit from the three sites in Ceres had diffuse browning after 3 months storage which increased during the longer storage periods. Soft scald was found on RA and DPA+HCA stored fruit in all the sites at various storage periods. In 2018, all the treatments from all the sites from Grabouw resulted in diffuse and radial browning from 3 months storage. In two of the sites the DPA+RA and RA treatments tended to have the lowest percentage of internal browning. Soft scald was found on DPA+RA and RA stored fruit.

Conclusion and Discussion

The application of DPA did not prohibit the development of internal browning, neither diffuse nor radial browning. No CO₂ injury was found at DPA plus 2.5% CO₂. The trial included variables that we knew would induce browning such as farms with a historic internal browning problem and storing of apples at -0.5°C. The importance of step-wise cooling is evident since the SF+CA treatment at 1°C also had internal browning. The fact that the industry is currently having internal browning issues is probably related to a combination of factors.