

### Abstract:

Superficial scald (scald) is one of the major physiological disorders that occur during long term cold storage of apples. Scald is currently controlled by the postharvest application of diphenylamine (DPA), however there is a growing need to seek alternative control methods. A promising reliable alternative to DPA is 1-methylcyclopropene (1-MCP, SmartFresh™). The aim of this storage project was to assess 1-MCP (SmartFresh™) on apple quality and superficial scald development during storage. Preclimacteric 'Granny Smith' and climacteric 'Red Delicious' apples were treated with SmartFresh™, DPA (current approved rate) or left untreated (control) before storage at 0°C in either air or controlled atmosphere (CA, 2% O<sub>2</sub> and 1% CO<sub>2</sub>). SmartFresh™ was applied in an air tight container as soon as possible after harvest. The results showed that both the commercial DPA and SmartFresh™ treatments controlled superficial scald equally well in both 'Red Delicious' and 'Granny Smith' apples stored in air and CA for up to eight and ten months, respectively. CA storage maintained the quality of untreated and SmartFresh™ treated fruit. However even under CA storage, some quality benefits such as retention of firmness in 'Red Delicious' apples were observed in SmartFresh™ treated fruit during storage and after storage compared to untreated control or DPA treated fruit. The pre-storage SmartFresh™ treatment also significantly reduced the levels of internal ethylene in both apple varieties in air and CA stored fruit and at all removal times for up to ten months storage. The lowering of ethylene production and action in the treated fruit reduced or lowered subsequent physiological effects during storage. This was evident in the retention of flesh firmness and green background colour in SmartFresh™ treated fruit.