

**Title** Heat treatment and molybdenum dips influences on flavedo soluble sugars of lemon to enhance resistance to chilling injury

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### **Abstract**

Lemon fruits are sensitive to low temperatures during storage, resulting in potential chilling injury. This is particularly so where cold sterilization for phytosanitary purposes is needed. It had been reported that ethanol soluble sugars in the rind play a role in stabilizing proteins and membranes under chilling conditions, especially if water loss occurs. It has also been reported that hot water treatments enhance such sugars in the rind. Previous work indicated that hot water (HWD) combined with molybdenum (Mo) dips decreases susceptibility to chilling injury. The purpose of this work was to investigate if the alcohol soluble sugar concentration can be altered by such treatment, and if the sugars may enhance resistance to chilling injury. Fruits were obtained from two sources, Ukulinga farm and Sun Valley Estates. Treatments included HWD at 47°C and 53°C, for 2 min and Mo at 1 µmol, 5 µmol, and 10 µmol for 10 min. The fruits were stored for 28 days at -0.5°C, and evaluated weekly for chilling injury. Ethanol soluble sugars were extracted and analyzed by HPLC. The dominant sugar found was glucose, which was high in fruits without chilling injury. Hot water dipping at 53°C also resulted in higher concentrations of glucose after 28 days storage, and Mo further enhanced this. Results were also influenced by fruit origin. The presence of glucose and enhancement of concentration by hot water at 53°C, and molybdenum may play some role in acclimating lemon fruits to chilling, although the mechanism still requires confirmation.