Session Topic: Modified atmosphere storage and packaging **ICR0383**

Validation of a Mathematical Model of Modified Atmosphere Packaging Systems for Apples

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Abstract

Modified atmosphere packaging (MAP) of horticultural products can provide significant shelf-life extension, but increases cost and there is considerable quality risk if the packaging is poorly designed (e.g. anaerobic conditions if temperature abuse occurs). A previously developed mathematical model for MAP was validated against experimental data measured for MAP of apples in cartons. Experiments covered a wide range of conditions including different film thickness, heat-sealed and folded films, presence of holes in the film, and constant and time-variable temperature storage regimes. The model closely predicted measured trends, but tended to under-predict CO_2 concentrations and performed less well when atmospheres were highly modified. Sensitivity analysis showed that this lack of fit could be explained by uncertainties in fruit respiration and film permeability data. The model provides a cost-effective tool to both support the design of MAP systems and define risks associated with potential deficiencies in the cool-chain.