Title Replacing DPA post-harvest treatment by strategical application of novel storage technologies controls scald in 1/10th of EU's apples producing area

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Abstract

Superficial scald is a physiological disorder specific to many commercially relevant apple varieties, that is induced probably by chilling at the beginning of storage and develops in a later stage. Scald symptoms vary, but are always the expression of damage of dermal cell layers. Susceptible cultivars would incur important market losses if not treated post-harvest with the antioxidant diphenylamine (DPA) in order to prevent the development of scald. However, concern on DPA residues and on the related, possible use of fungicides is growing by consumer, environmentalists and retailer. Moreover, in EU the post-harvest use of DPA is scheduled to loose its approval (2011), but it is being appealed (2012). In case of no approval the MRL will be reduced, possibly affecting non-treated but cross-contaminated fruit. A strategy involving different storage technologies, maturity and marketing window concepts, could replace the use of DPA for a complete apple growing region. Research on storage at very low O_2 levels in dynamic controlled atmosphere (DCA) by the means of monitoring the chlorophyll fluorescence response (HarvestWatch), demonstrated control of scald on different susceptible cultivars, grown in a sensitive climate, for several seasons, even after long term storage. The research results regarding DCA were scaled up, leading to procedure protocols for the practice. Storage techniques based on the ILOS principle proved to be efficient enough for the shorter term. In alternative, the scald prevention methodology is complemented by the post-harvest treatment with the ethylene perception inhibitor 1-MCP, up to the combination of the latter with DCA conditions, further improving the storability of certain cultivars. The feasibility of replacing completely DPA in practice got proved already in the storage season 2010-11 by the ≈1 Mio. tons apple fruit producing area in the South Tyrol (Italy).