

# Prestorage conditioning, diphenylamine improve condition of 'honeycrisp' apple

March 26 2014

---

Since the introduction of 'Honeycrisp' apples in 1991, the variety has become a consumer favorite for its unusual texture and delicious flavor. Honeycrisp has increased in popularity with growers as well; Michigan, New York, and Washington boast significant numbers of 'Honeycrisp' orchards. As the growing area dedicated to the variety has grown, the need to find better methods for improving storage performance has become more important to growers. Because 'Honeycrisp' is very sensitive to low temperatures and can be damaged by controlled-atmosphere conditions, long-term storage of the apples can be challenging.

Carolina Contreras and Randy Beaudry from the Department of Horticulture at Michigan State University and Nihad Alsmairat from the Department of Horticulture and Crop Science at the University of Jordan published a study in *HortScience* that revealed some important information for [apple](#) producers. "Our work was conducted in two phases," Beaudry explained. "The first phase was designed to determine whether 'Honeycrisp' apples were susceptible to controlled-atmosphere injury, to determine the relative influence of O<sub>2</sub> and CO<sub>2</sub>, and to identify a treatment combination that would reliably generate symptoms so that control measures could be subsequently evaluated." In the second phase, the scientists evaluated options for avoiding injury to 'Honeycrisp' during controlled-atmosphere storage. Fruit were conditioned at 3° C, 10° C, and 20° C for 5 days and then exposed to one of nine different storage treatments.

In the first experiment, 'Honeycrisp' exhibited a high sensitivity to both low oxygen and elevated CO<sub>2</sub> levels. "We found that the controlled-atmospheres used induced injuries typical of those associated with CO<sub>2</sub> (i.e., small brown lesions and associated lens-shaped cavities) and also larger dark brown lesions with often irregular margins," the authors said. "The extent of the injury was higher for those fruit in an atmosphere with elevated CO<sub>2</sub> for each level of O<sub>2</sub>."

Subsequent experiments took place over 3 years, during which the researchers reproduced the controlled-atmosphere (CA) injury from the preliminary study with varied intensity. Although the researchers observed high variability between orchards and years, they found two treatments that effectively controlled the CA injury. "We found that the brown lesions in the cortex were completely suppressed by DPA application, even when the prestorage conditioning temperature was 3° C," Beaudry said. "The incidence of cavities ranged from 0.1% to 0.3% under the same DPA treatment. On the other hand, the most affected treatment was 3/3 followed by 3/0, 21/0, and 21/ 0 plus 1-MCP."

The authors noted that, while there is good progress toward determining optimal storage recommendations for 'Honeycrisp' additional studies are still warranted. "For instance, although the 7-day prestorage conditioning treatments provided some protection against the development of CA injury, shorter durations should be investigated to prevent quality loss resulting from excessive ripening, which could cause increased skin greasiness and undesirable flavor profile."

The study includes additional recommendations for handling 'Honeycrisp' in prestorage conditions.

**More information:** The complete study and abstract are available on the ASHS HortScience electronic journal web site:

[hortsci.ashspublications.org/c ... ent/49/1/76.abstract](http://hortsci.ashspublications.org/c...ent/49/1/76.abstract)

Provided by American Society for Horticultural Science

Citation: Prestorage conditioning, diphenylamine improve condition of 'honeycrisp' apple (2014, March 26) retrieved 26 June 2024 from <https://phys.org/news/2014-03-prestorage-conditioning-diphenylamine-condition-honeycrisp.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.