

Zinc sulfate, sugar alcohol zinc sprays improve apple quality

19 November 2013



Scientists determined that zinc sprays applied at critical times in the growing cycle can enhance the quality of apples. Based on a cost analysis, the authors recommended application of sprays to apple leaves at four weeks before harvest. Credit: Dr. Ming Li

Zinc is vital for the healthy growth and reproduction of all organisms. In plants, zinc plays a key role in essential functions such as carbohydrate metabolism, photosynthesis, and sugar and starch synthesis. Apple, one of the world's most popular fruits, tends to be highly susceptible to zinc deficiency. A new study in *HortTechnology* recommends new protocols for using zinc sprays at critical stages on apple trees in order to enhance fruit quality.

Researchers sprayed 'Gala' and 'Fuji' [apple trees](#) in China with zinc sulfate (ZnSO₄) and sugar alcohol zinc separately during four different

developmental stages: 2 weeks before budbreak, 3 weeks after bloom, the termination of spring shoot growth, and 4 weeks before harvest. They then harvested the apples at maturity and analyzed the [fruit](#) for quality and zinc concentration.

According to the report, zinc sprays during the four different developmental stages increased zinc concentration of peeled and washed fruit at harvest without phytotoxicity. The treatments 3 weeks after bloom and 4 weeks before harvest increased average fruit weight of both 'Gala' and 'Fuji' apples. Other combinations of treatments were determined to increase fruit firmness, soluble sugar, and vitamin C levels in the cultivars. The scientists said that the effects of sugar alcohol zinc applications were equal to and "more pronounced" than those of ZnSO₄.

"Although the apple trees showed no [zinc deficiency](#) symptoms and the leaf zinc nutrition was at a low level, continuing zinc sprays on these trees was required to increase [fruit quality](#)," the researchers said. "We found that a single spray of sugar alcohol zinc was equal to or more effective than zinc sulfate at being absorbed by apple fruit tissue and improving fruit quality for trees grown under field conditions."

These experimental results offer new strategies for apple growers. Based on a cost analysis, the authors recommend that growers spray ZnSO₄ or sugar alcohol zinc, with 0.1% [zinc](#) and 0.04% nitrogen in the spraying solution, on the abaxial/adaxial surfaces of apple leaves to runoff at 4 weeks before harvest.

More information: horttech.ashspublications.org/.../nt/23/4/490.abstract

Provided by American Society for Horticultural Science

APA citation: Zinc sulfate, sugar alcohol zinc sprays improve apple quality (2013, November 19)
retrieved 17 October 2021 from <https://phys.org/news/2013-11-zinc-sulfate-sugar-alcohol-apple.html>

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