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—Scientific Note—

Phytotoxicity Threshold for Neutral Electrolyzed Water in Citrus

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This project investigated a method to control pests and diseases in a citrus under a protective screen (CUPS) environment to enable sustainable and economically viable citrus production. The screen prevents Huanglongbing disease by excluding the vector, the Asian citrus psyllid. However, the screen alters the growing environment and greasy spot (*Mycosphaerella citri* Whiteside) and citrus scab (*Elsinoe fawcettii* Bitancourt and Jenk) are problems. Neutral electrolyzed water (NEW) is a surface sterilant and therefore may be an effective tool for managing these diseases. NEW water has been used effectively in strawberry, tomato and gerbera production for disease management (Abbasi and Lazarovits, 2006; Hirayama et al., 2016; Mueller et al., 2003).

The specific objective of this study was to develop guidelines regarding concentration and frequency of application for using electrolyzed water in CUPS to minimize the phytotoxic damage this product may cause to citrus trees.

NEW was made by passing an electric current through a potassium chloride salt solution to generate hypochlorous acid and potassium hypochlorite. A total of five concentrations from 0 to 500 mg/L chlorine were tested against seedling non-grafted *Citrus sinensis* 'Valencia' plants with a mean height of 34 cm. growing in a greenhouse. Application intervals were once per week, twice, and five times per week for a total of 81 d. There were four replicates per treatment. Chlorophyll was measured weekly using an Apogee MC100 SPAD meter. Other measurements were taken at the end of the experiment: trunk diameter, number of leaves, tree height, leaf area and dry mass, and 11 essential nutrients nitrogen, phosphorus, potassium, magnesium, calcium, sulfur, boron, zinc, manganese, iron, and copper. The data were analyzed using the GLM procedure in SAS with dose, application frequency and their interaction as the independent variables.

Plants treated with 500 mg/L chlorine five times per week dropped most of their leaves by the end of the experiment. Plants treated with 250 mg/L chlorine five times per week were also damaged, showing reduced chlorophyll content, number of leaves, dry mass, and leaf area. Plants treated with 250 mg/L chlorine twice per week did not appear to show significant phytotoxic damage. The potassium in NEW water resulted in elevated concentrations of potassium in the leaves and a reduction in calcium concentrations.

Future work may include the application of electrolyzed water to mature trees in a CUPS environment and monitor disease incidence and yield. A trial is currently underway with both tangerine (*Citrus reticulata* 'Murcott') and grapefruit (*C.* × *paradisi* 'Ray Ruby') to assess phytotoxic damage and to determine if electrolyzed water has any effect on incidence of citrus scab and greasy spot diseases.

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