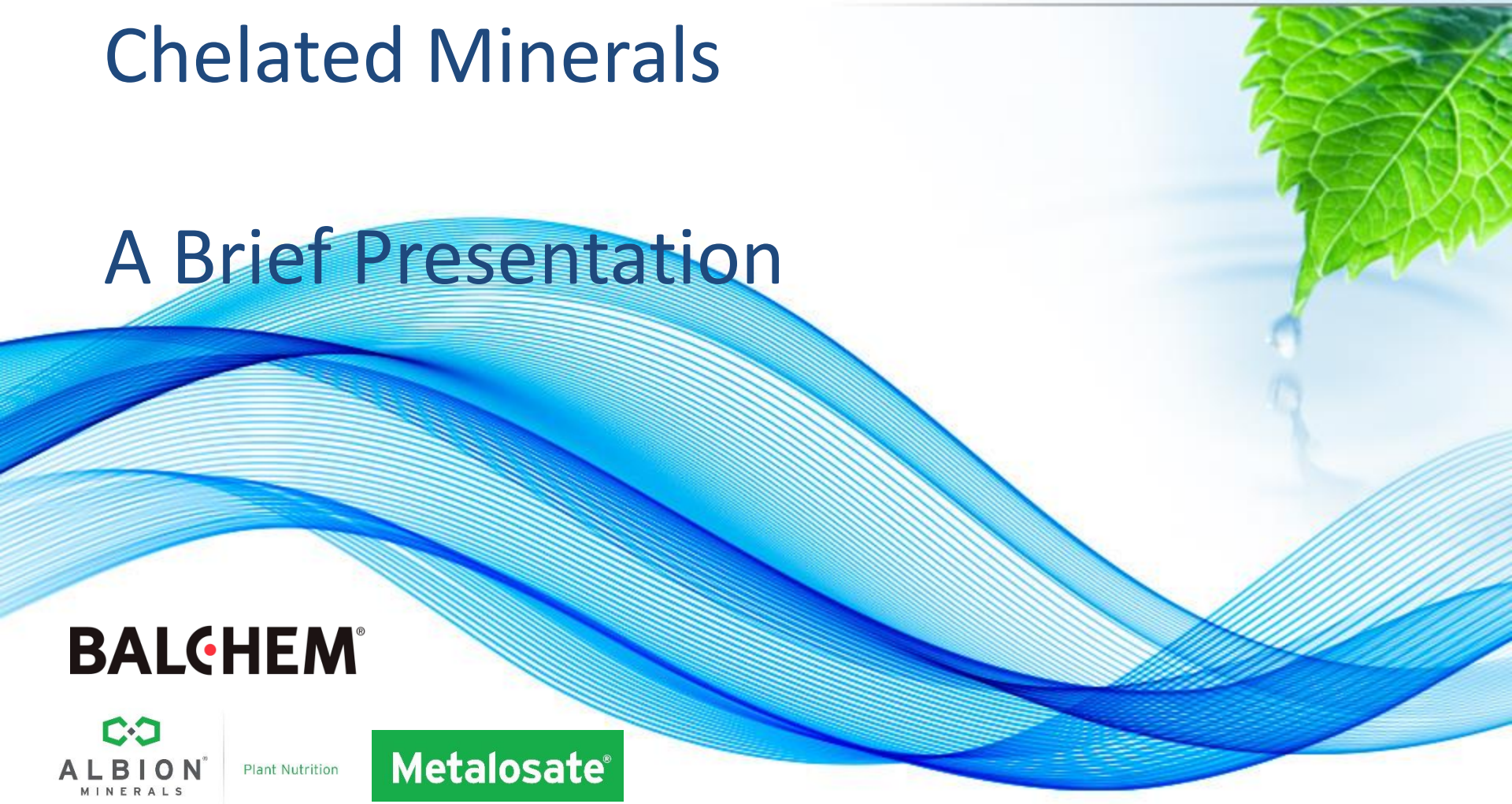
Metalosate®
Foliar Amino Acid Chelated Minerals

A Brief Presentation

The Mineral People™



BALCHEM®

ALBION® MINERALS Plant Nutrition

Metalosate®

History

Albion Laboratories, Inc., was founded in 1956 by Dr. Harvey H. Ashmead with the idea of developing a method of improving mineral nutrition through the science of chelation.

Today, Albion enjoys the well-earned reputation in the mineral nutrition industry as the leader for providing safe, high quality mineral amino acid chelates that are proven effective for HUMAN, ANIMAL, and PLANT nutrition.

Metalosate®

Albion's Divisions

Plant Nutrition

After years of agricultural research in the laboratory, the greenhouse, and in the field, the Plant Division was added to Albion in 1976

Animal Nutrition

Albion began operations as a factory for manufacturing vitamin and mineral premixes for fortifying animal feeds in 1966

Albion's Human Division was "born" in 1970

Human Nutrition

Metalosate®

Human Nutrition Products

BALCHEM ALBION MINERALS

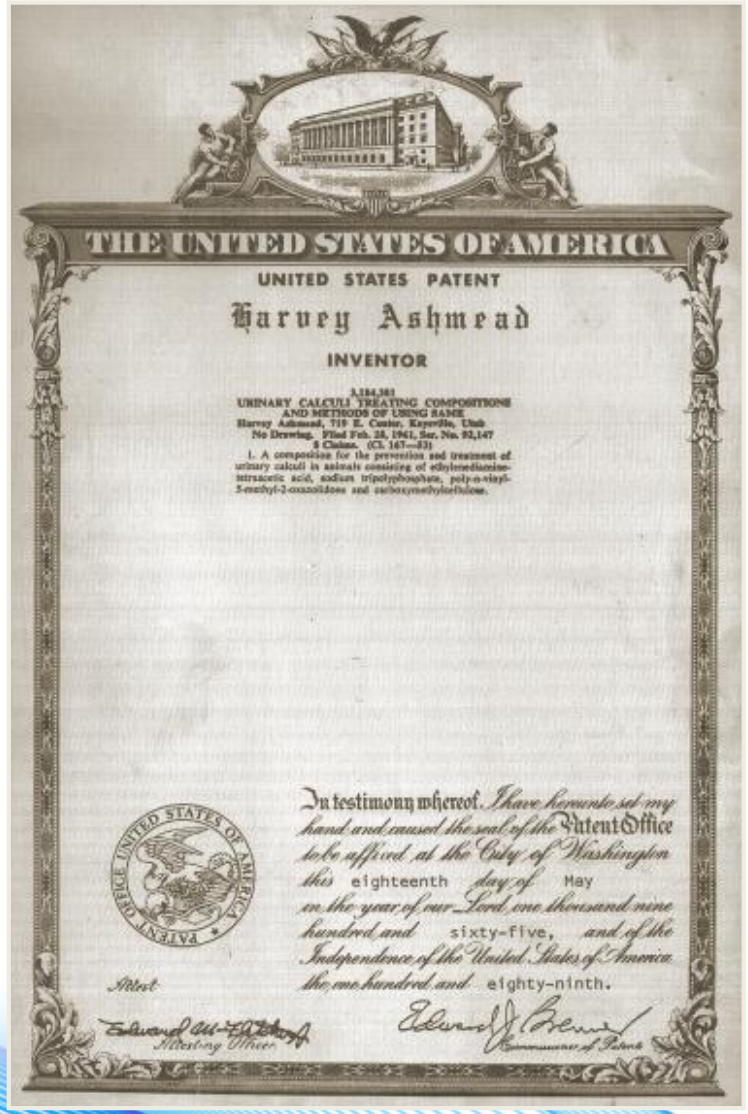
Many companies around the world quickly accepted Albion's research and incorporated Albion's amino acid Chelates in their own brands of products.

Metalosate®

Industry Leader

Albion's first patent was granted in 1965.

Since that time over 130 patents on mineral chelation and nutrition technology have been granted to Albion scientists in many countries worldwide.



THE UNITED STATES OF AMERICA

UNITED STATES PATENT

Harvey Ashmead

INVENTOR

3,184,381

URINARY CALCULI TREATING COMPOSITIONS AND METHODS OF USING SAME

Harvey Ashmead, 719 E. Center, Kaysville, Utah

No Drawing. Filed Feb. 28, 1961, Ser. No. 92,147

5 Claims. (Cl. 167—33)

1. A composition for the prevention and treatment of urinary calculi in animals consisting of ethylenediaminetetraacetic acid, sodium tripolyphosphate, poly-n-vinyl-5-methyl-2-oxazolidone and carboxymethylcellulose.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this eighteenth day of May in the year of our Lord one thousand nine hundred and sixty-five, and of the Independence of the United States of America the one hundred and eighty-ninth.

Attest

Metalosate®

BALCHEM ALBION MINERALS

Metalosate®

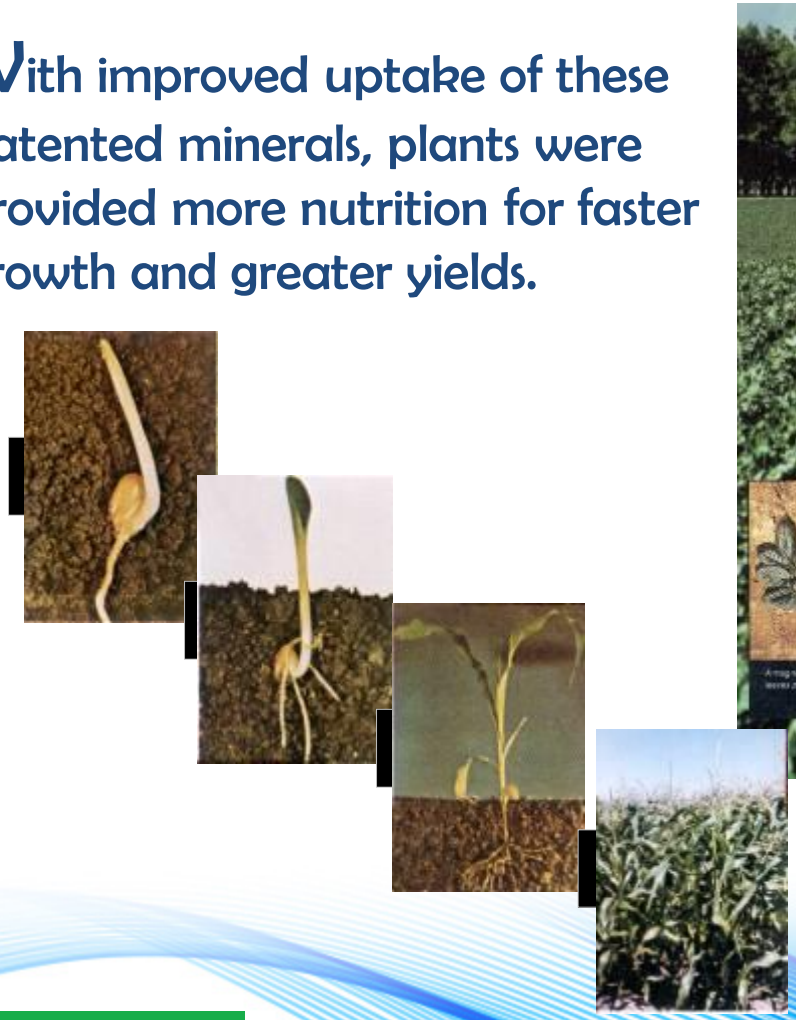
Plant Nutrition

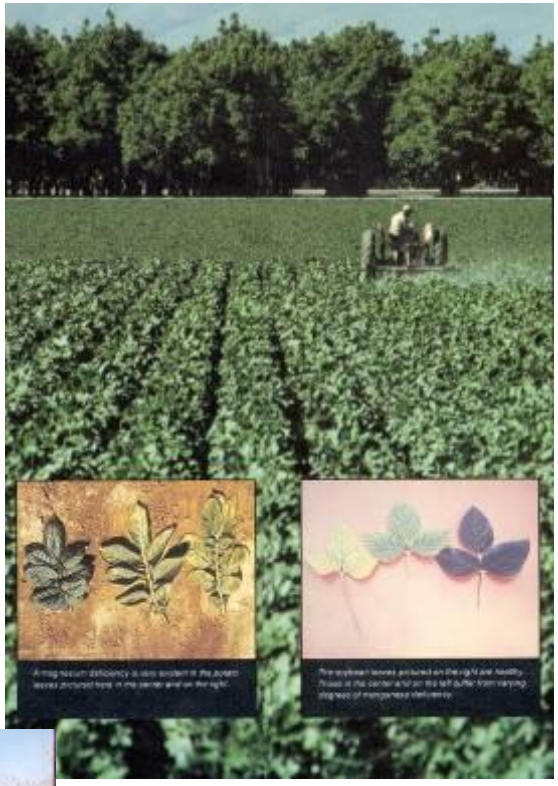
Research on the use of amino acid chelates in plant nutrition began in the late 1960s. With the development of Albion's amino acid chelates, Albion was able to pioneer a foliar method of applying mineral nutrition directly on the leaves because these chelates didn't burn the leaves.

Metalosate®

Plant Nutrition

With improved uptake of these patented minerals, plants were provided more nutrition for faster growth and greater yields.





Metalosate®

WHAT ARE EXACTLY THE METALOSATE® PRODUCTS

The Metalosate® products are patented chelated minerals specifically designed for application on plants. They are unique because the minerals are chelated with amino acids from plant origin. Since amino acids are the basic building blocks of protein, they are natural molecules found in all living things.

Because Albion uses natural amino acids to chelate the minerals, they are rapidly absorbed, translocated and metabolized by plants, animals and humans.

Metalosate® Products are:

- **Rapidly absorbed** (within three hours they are inside apple tree leaves)
- **Safe & Effective** (can be sprayed on small flowers and fruit without damage)
- **Easy to use** (mix well with most fungicides and pesticides)
- **Quality support** (TEAM leaf analysis recommendations)

Product Composition

Product name	K	Ca	Mg	Fe	Mn	Zn	Cu	B	Mo
Metalosate® Boron	-	-	-	-	-	-	-	5.000%	
Metalosate® Calcium	-	6.00%	-	-	-	-	-	-	
Metalosate® Copper	-	-	-	-	-	-	4.00%	-	
Metalosate® Crop-up	-	-	0.50%	0.25%	2.50%	1.25%	0.25%	0.025%	
Metalosate® Iron	-	-	-	4.00%	-	-	-	-	
Metalosate® Magnesium	-	-	2.10%	-	-	-	-	-	
Metalosate® Manganese	-	-	-	-	5.60%	-	-	-	
Metalosate® Multimineral	-	1.00%	1.00%	0.50%	0.50%	0.50%	0.50%	-	0.1%
Metalosate® Potassium	24%	-	-	-	-	-	-	-	
Metalosate® Zinc	-	-	-	-	-	6.80%	-	-	
Metalosate® Zinc Plus	-	-	0.50%	0.25%	1.00%	2.80%	0.25%	0.025%	

For More Information

Visit our website: http://www.albionminerals.com
Watch our video: https://youtu.be/qJ9RHfMCpZ0
Contact us:

Felix Fares
Area Manager Europe/Middle East/ N. Africa
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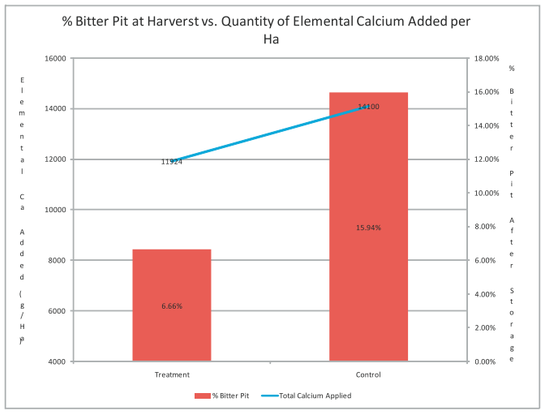
A Series of Technical Information and Essential Plant Research

EFFECTS OF METALOSATE® CALCIUM ON APPLE QUALITY IN FRANCE AND POLAND

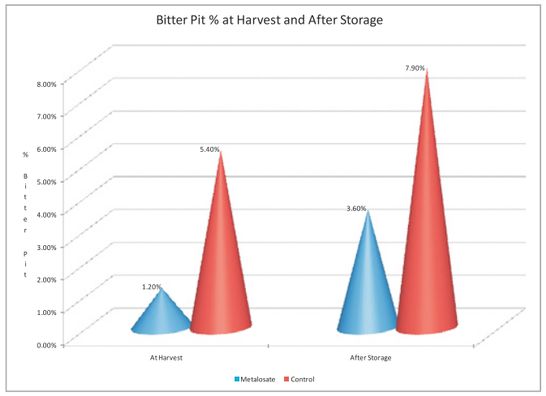
Less Bitter Pit on Braeburn Apple with Metalosate® and T.E.A.M.® - Lycée de Pouillé - Pont de Cé - France - 2008

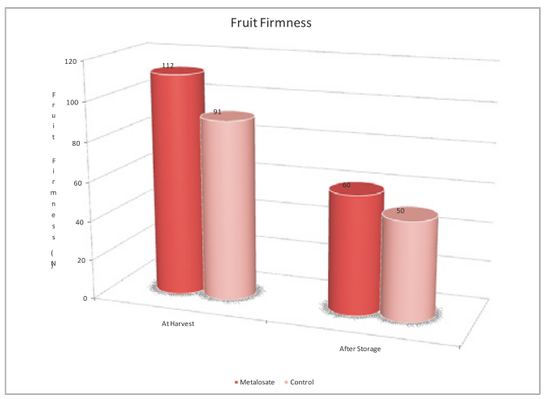
This trial took place in 2008 in near the city of Angers, in north west France, at the agricultural and horticultural technical school de Pouillé. The study compared the effects of Metalosate(R) and T.E.A.M(R) program compared to the school foliar program on the bitter pit rate of Braeburn apples after storage. The highlight of the Metalosate(R) program was the addition of three applications of Metalosate(R) Calcium at full flowering, petal fall, and fruit set followed by other sources of calcium such as CaCl2 and CaNO3. The Metalosate program used less elemental calcium per Ha than the School's program. The conclusion of the trial was that with less elemental calcium per hectar, the Metalosate(R) program resulted in less bitter pit at harvest and after storage.



Effect of Metalosate Calcium on Quality and Storability of "Jonagold" Apples. The Research Institute of Pomology and Floriculture - Skierniewice - Poland - 2008

Metalosate Calcium sprayed at full flowering, petal fall, and fruit set, followed by the traditional Calcium Chloride program (5 times starting 45 days after full flowering increased Calcium level substantially in the fruit and improved its quality and storability.





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WHY YOU SHOULD BE RECOMMENDING METALOSATE® PRODUCTS

The Metalosate® products are patented amino acid chelated mineral products specif cally designed for foliar application. The advantage of using amino acid chelated forms of minerals is that the amino acids surround and protect the minerals from adverse interactions. These interactions can take place in a solution, in the soil or on the surface of the leaf. They often render non-chelated minerals unavailable to the plant. Because Albion Advanced Nutrition uses natural amino acids to chelate the minerals in the Metalosate® products, they are rapidly absorbed, translocated, and metabolized by plants.

Solubility in water is essential for absorption by plants. This is true of the systemic chemicals as well as nutrients. The material must be soluble to pass through the surfaces and into the cells of the plant. Insoluble mineral salts, all oxides, most hydroxides, carbonates and phosphates, and some sulfates cannot be ef ciently absorbed by the plant. When foliar application of these forms of minerals is made, they simply coat the external surfaces of the plant with the unavailable mineral. All of the Metalosate® products are completely soluble in water and are consequently available for absorption by the plant.

Albion's amino acid chelates are very small molecules. Consequently, they readily pass through the plants' barriers against absorption, including the cuticle, the cell walls and cell membranes. Albion's research has indicated that plants can absorb 90% or more of foliar applied Metalosate® products within two or three hours. Because absorption of the Metalosate® products is so ef cient, much lower doses can be applied to achieve measurable responses in the crops.

The Metalosate® products are available as calcium, magnesium, potassium, zinc, iron, manganese, copper, and boron packaged as individual elements. For proven results and healthier prof ts, put them to work for you.

Metalosate® Product Line

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METALOSATE® ZINC APPLIED TO GOLDEN DELICIOUS APPLES

BY JEREMY O'BRIEN

Introduction

In areas with high-pH calcareous soils, zinc def ciencies are widespread. This is a problem found in many of the apple producing areas of the Western United States.

Little leaf is a common visual symptom of zinc def ciency on fruit tree shoots. In the case of severe zinc def ciency, one may observe shoot die back, defoliation, and chlorosis. This project was carried out by Thor Lindstrom and James Frisby, Utah State University and was initiated to determine if two in season zinc applications of Metalosate® Zinc are more ef ective at increasing zinc levels in the leaves than the standard practice of applying zinc sulfate as a delayed dormant spray.

Left: Normal Apple Leaf
Right: Little Leaf in Apple
Caused by Zinc Def ciency

Materials and Methods

The trees used in this trial were Golden Delicious apples on EMLA-26 rootstock. These trees were planted in the spring of 1995 and have historically had zinc levels which are considered def cient (<15 ppm). All trees were irrigated with a micro-sprinkler system.

The treatments were as follows:

1. Control (untreated trees)
2. Trees sprayed with a zinc sulfate product containing 50% zinc.
3. Trees sprayed with Metalosate® Zinc.

The zinc sulfate product was applied on April 11 at a rate of 10 lbs./acre in 100 gallons of water (11 kg/ha in 379 liters of water). The developmental stage of the trees at the time of application was ½-inch (1.3-cm) green (delayed dormant spray).

The Metalosate® Zinc was applied on May 7, and again on June 6. Each application was applied at a rate of 1 qt./acre in 50 gallons of water (2.3 L/ha in 189 liters of water). The June 6 application was at petal fall and the May 7 application was applied f ve days before the f rst cover spray.

The trial was set up as a completely randomized block design. Each replication consisted of 2 trees with 4 repetitions for each treatment. Leaf samples were collected on July 20th from all treatments and analyzed for zinc content.

Results and Discussion

Table 1 is a summary of the results from the leaf analyses. The leaf zinc levels from the trees sprayed with zinc sulfate were not signif cantly better than the untreated-control trees. Leaves from the Metalosate® Zinc treatment had signif cantly higher zinc levels. Metalosate® Zinc proved to be much more ective than zinc sulfate at increasing leaf zinc levels when applied as discussed in this trial.

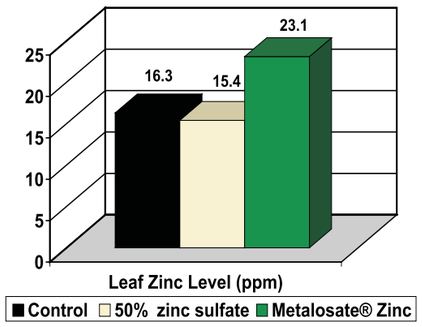

Table 1. Apple Leaf Zinc Levels

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THE INFLUENCE OF METALOSATE® POTASSIUM ON QUALITY PARAMETERS IN BRAEBURN APPLES

Introduction

Reports indicate that potassium applications may be benef cial in apple and pear cultivars that color poorly. This project was initiated to investigate the potential of enhancing the red color in braeburn apples by applying Metalosate® Potassium. This cultivar was selected due to its history of poor color and high susceptibility to bitter pit. Since it is considered that potassium sprays may interact negatively with calcium, apples were also checked for bitter pit development after a period of storage.

Materials and Methods

This trial took place at the Waterval farm, Villersdorp, Western Cape, South Africa. The trial was done on Braeburn apples that were 13 years old. All trees received a calcium program for the control of bitter pit. The program consisted of eight applications of two dif erent calcium materials. One was a calcium carbohydrate material and the other was calcium nitrate.

The applications of Metalosate Potassium were made using a motorized backpack sprayer. Four applications were made at a rate of 2.5 liters/hectare (34.2 f . oz/acre) at six, four, two, and one weeks before harvest. All applications included an organo silicate wetting agent.

Results and Discussion

The apples were harvested on 8 March 2005, by selecting ten apples randomly from the four quadrants of each tree. The apples were assessed for color, pressure (f rmness) and sugar content on the 14th and 15th of March 2005.

A color assessment was done the day before harvest (7 March 2005) and again immediately after harvest. The apples were classed into eight color classes and counted. The percentages of apples in the export class were calculated for the Metalosate Potassium treatment and also for the control. On 7 March (the f rst assessment) there was a 9.5 percent increase in the percentage of export class apples.

On March 15th there was an 8.7 percent increase. Both of these represent a statistically signif cant increase in number of export fruit due to the application of Metalosate Potassium.

The incidence of bitter pit was lower in the Metalosate treated fruit compared to the control. The dif erence was not statistically signif cant.

Fruit pressure was also measured in the treatments with the data indicating that fruit treated with Metalosate Potassium had statistically signif cantly increased fruit pressures after a period of storage at room temperature.

Sugar content in the apples was also evaluated. Metalosate Potassium statistically increased the sugar levels in the fruit when compared to the control.

The application of Metalosate Potassium positively inf uenced quality parameters. The level of bitter pit did not increase when Metalosate Potassium was applied. Signif cant increases in the red color of Braeburn apples resulted in more apples falling into the export class. In addition to this, f rmness and sugar content were improved.

Figure 1. Color Classif cation of South African Braeburn Apples

If you would like the full text of this project, please contact your local Albion representative.

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