ALBION®
PLANT NUTRITION

Minerals • Science • Chelates™

Metalosate®

Amino Acid Chelate Liquid Foliar Fertilizers

Nutrition Delivered™

WHAT MAKES THE METALOSATE® PRODUCTS SO EFFECTIVE?

Albion Plant Nutrition's Metalosate® foliar fertilizers are an exclusive, patented range of chelated minerals specifically designed for foliar application on plants. They are unique because the minerals are chelated with a range of highly bioactive amino acids. Amino acids are the basic building blocks of protein and are natural molecules plants aggressively assimilate. The amino acids are readily absorbed by the plant, carrying the attached mineral with it. The mineral is then rendered available for the plant to utilize within hours of application.

Only Metalosate® offers the one-two punch of highly bioactive amino acids and nutritional mineral to quickly and effectively increase plant health, hardiness and yield. Unleash the power Metalosate on your crops for:

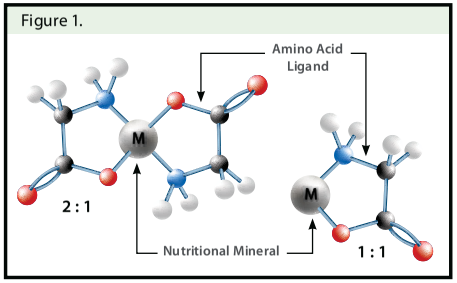
- Greater Assimilation into the plant
- Faster mineral nutrition delivery
- Hardier Plants
- Healthier Plants
- Higher Yields
- Better Fruit Sets
- Increased Vigor
- Higher Sugar Content

WHAT IS A CHELATED MINERAL?

Chelation is the process of attaching a specific organic molecule called a ligand to a nutritional mineral at two or more sites to form a ring structure. (See Figure 1) Chelates can either be synthetic or natural. Examples of synthetic chelating agents are EDTA, DTPA and EDDHA. Hemoglobin (found in blood) and chlorophyll are examples of natural chelates. Albion's amino acid chelates are chemically very similar to naturally occurring chelates found in plants.

The advantage of using an amino acid ligand chelated to the mineral is that it surrounds and protects the mineral from adverse interactions. These adverse interactions can take place in a solution, in the soil, or on the surface of the leaf. Non-chelated minerals are often rendered unavailable to the plant or are absorbed at very low rates. Because Albion's Metalosate products use natural amino acids to chelate the minerals, they are rapidly absorbed, translocated and aggressively metabolized by the plant.

Figure 1.



The structure of the Metalosate molecule minimizes the interaction of the mineral with the surrounding environment. They are absorbed and translocated quickly within the plant similar to other small nitrogen containing molecules. Once the Metalosate molecule is inside, the plant cells contain the necessary mechanisms to pull the chelate molecule apart, using the amino acid for cell growth and the mineral for its specific nutritional benefit.

Figure 2.Cross-section of a leaf blade.

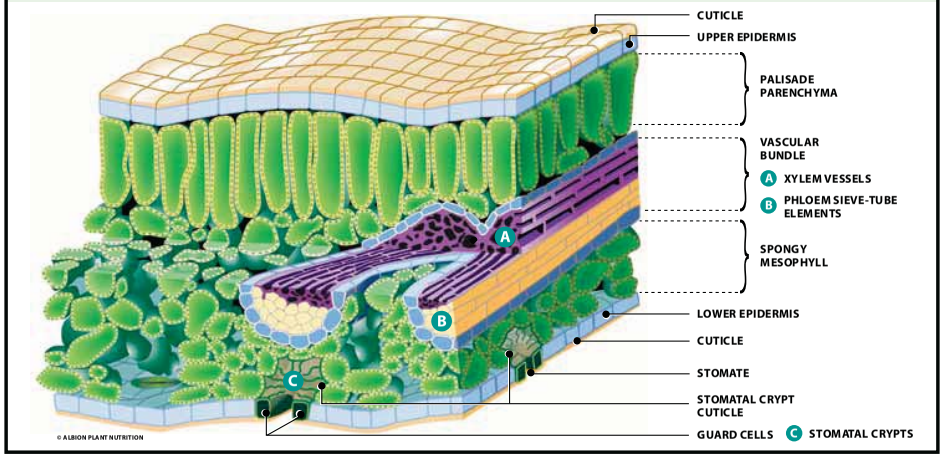


Figure 2 illustrates a cross section of a leaf. Note the cuticle, upper and lower epidermis, stomata with guard cells, vascular bundle and the other internal structures of the leaf. The concept that foliar absorption of minerals must take place through the stomata is not entirely correct. Researchers at Albion have observed the absorption of the Metalosate foliar mineral across all the surfaces of the leaf, including the upper surface where few stomata exist. Even the small amount that may get through the stomata must also cross the cuticle that lines the internal surfaces of the leaf. This means if the mineral is to reach the cells, absorption must take place across the cuticle of the leaf.

DOES SOLUBILITY MATTER?

Solubility in water is essential for absorption by plants. This is true of systemic chemicals as well as nutrients. The material must be soluble to pass through the surface and into the cells of the plant. Insoluble mineral salts, including all oxides, most hydroxides, carbonates, phosphates and some sulfates cannot be absorbed by the plant. When a foliar application of these forms of minerals is made, they simply coat the mineral on the external surface of the plant making it unavailable. In contrast, all of the Metalosate® products are completely soluble in water allowing it to absorb into the plant with the first few hours of application.

THE CUTICLE OF THE LEAF REPELS MINERALS

Figure 3 shows a greatly magnified cross section of the cuticle and outer cell walls of a leaf. In order for a nutrient to be effective when applied as a foliar spray, it must pass through the cuticle of the leaf. The cuticle is a thick waxy surface covering the leaf of most plants. These waxes are made up of fatty acids, which have a negative charge. When a metal salt is dissolved in water, the metal dissociates in the solution to form a positively charged mineral element. When this solution is applied to the waxy surface of the leaf, the positively charged mineral is attracted to and bound to the negatively charged leaf surface. This prevents the mineral from moving into the leaf where it can be utilized by the plant and left exposed to ultimately be blown or washed off and lost. In this way the waxy cuticle serves as a barrier by not allowing the positively charged mineral to be absorbed into the leaf.

ABSORPTION AND TRANSLOCATION OF THE METALOSATE® PRODUCTS

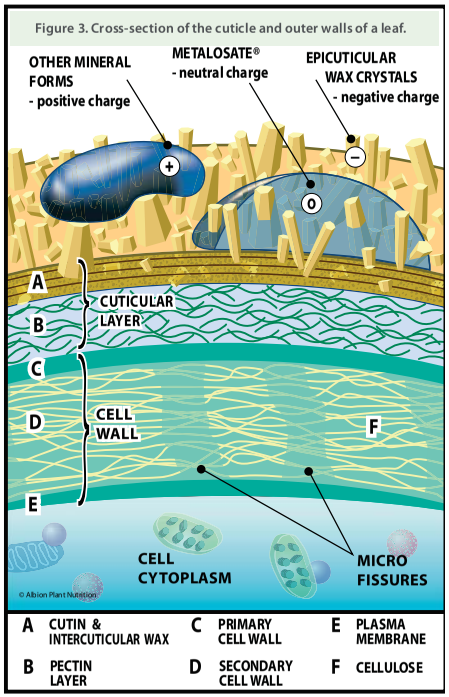
The mineral composition in Albion's Metalosate products is completely neutral in charge. They are neither attracted to nor repelled from the negatively charged surfaces of the leaf. Thus, they freely pass through the cuticle. When the amino acid bound mineral reaches the cell membrane, they are recognized by the mechanisms of absorption as a source of organic nitrogen. As a result, the entire chelate is taken into the cell very rapidly and efficiently where the mineral is finally disassociated with the amino acid. The amino acid is used for plant growth and the mineral for it particular nutritive value.

Other chelated mineral forms mentioned earlier may not be nutritionally beneficial. These other forms may be negatively charged and have a very large molecule structure thus cannot be absorbed into the plant's cell. Alternatively, the chelating agent can be so strong it does not release or disassociate the mineral once it gets inside the cell and cannot be utilized by the plant and in some instances can become toxic to the plant.

The unique Metalosate formula utilizes very small amino acid molecules. Consequently, they readily pass through the plant's barriers against absorption, including the cuticle 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.

For more specific information regarding the Metalosate® products and specific crop-nutrient programs in your area, please contact your local Albion Plant Nutrition Representative. Also ask about our exclusive T.E.A.M.® Report which analyzes plant or soil samples to diagnose the specific needs of your plants.

Figure 3. Cross-section of the cuticle and outer walls of a leaf.



GENERAL INFORMATION

LIQUID PRODUCTS

Albion Metalosate® Liquid Products are designed for foliar application on plants to prevent or correct nutrient deficiencies that may limit crop growth and yields. They are water soluble and nontoxic to plants when applied as directed. Metalosates® can be mixed with other most other foliar applied products like insecticides and fungicides but see individual product directs for compatibility. For best results, apply Metalosate® Liquid Products according to recommendations based on plant tissue or soil analysis.

Dilute Metalosate® Liquid Product water per specific directions on the label to ensure correct application rate. Apply by a spray method and in an adequate amount of water that will provide complete coverage of the plants. Use of a non ionic wetting agent may improve spray coverage of certain hard to wet plants. Do not apply Metalosates® foliar products undiluted.

Metalosate® Liquid Product can be included in a regular spray program on crops. Consult with an Albion Plant Nutrition representative on compatibility with other spray materials. The rate of application will depend on the crop, stage of growth, and severity of deficiency. The maximum recommended rates are for mature, full sized plants. Reduce the rates proportionately when spraying smaller plants.

Metalosate® Liquid Products may be used on:

- Legumes
- Grain crops
- Root crops
- Cucurbits
- Cole crops
- Leafy vegetables
- Deciduous fruits
- Vine crops
- Tropical and subtropical fruits
- Woody and herbaceous ornamentals
- and many other crops

METALOSATE® CALCIUM

GUARANTEED ANALYSIS (w/w):

Calcium (Ca) (Chelated)..... 6.0% (Derived from Calcium Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 32 to 64 fluid ounces per acre (1.5 to 4.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season. Mid and late season sprays directed to cover the fruit may help to reduce the effect of calcium related disorders. For post harvest fruit treatment, dilute at a rate of 0.5 to 1.0 gallon per 100 gallons (0.5 to 1.0 liter per 100 liters) of water.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

LIQUID PRODUCTS

METALOSATE® BORON

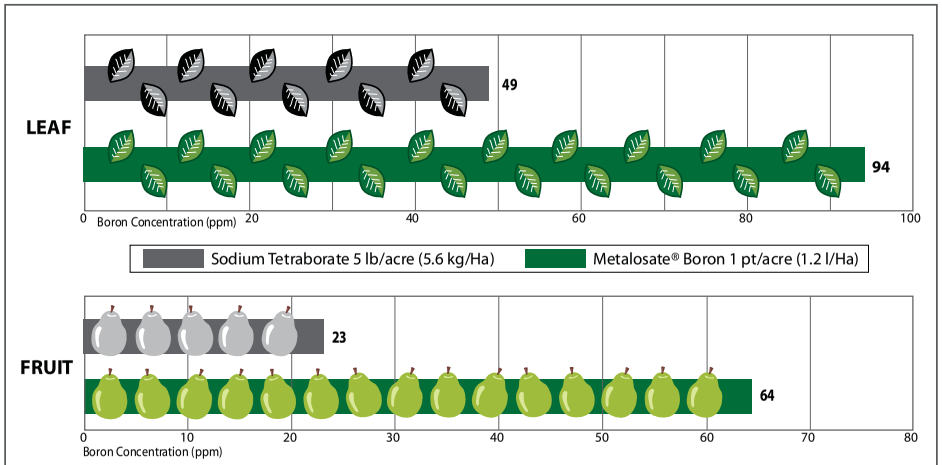
GUARANTEED ANALYSIS (w/w):

Boron (B) (Complexed)..... 5.0% (Derived from sodium tetraborate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 8 to 16 fluid ounces per acre (0.5 to 1.0 liter per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 12 to 24 fluid ounces per acre (0.75 to 1.5 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 8 to 16 fluid ounces per acre (0.5 to 1.0 liter per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 0.5 to 1.0 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 24 fluid ounces in 10 or more gallons (100 milliliters in 10 or more liters)of water and spray to complete coverage.

CAUTION: This material contains boron. Its misuse may cause serious injury to the crops. It should be used only under the direction of fertilizer consultants.



Leaf and fruit tissue levels of boron in pears as a result of foliar application of Metalosate® Boron compared to sodium tetraborate. The test orchard was located in North Washington.

METALOSATE® COPPER

GUARANTEED ANALYSIS (w/w):

Copper (Cu) (Chelated)..... 4.0% (Derived from Copper Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 4 to 8 fluid ounces per acre (250 to 500 milliliters per hectare) during the periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 8 to 16 fluid ounces per acre (0.5 to 1.0 liter per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 6 to 12 fluid ounces per acre (250 to 750 milliliters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 0.25 to 0.5 fluid ounces per 1000 square feet (3 to 5 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 16 fluid ounces in 10 or more gallons (50 milliliters in 10 or more liters) of water and spray to complete coverage.

METALOSATE® IRON

GUARANTEED ANALYSIS (w/w):

Iron (Fe) (Chelated)..... 4.0% (Derived from Iron Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 8 to 24 fluid ounces per acre (0.5 to 1.5 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

LIQUID PRODUCTS

METALOSATE® CROP-UP®

GUARANTEED ANALYSIS (w/w):

Magnesium (Mg) (Chelated)..... 0.50%
Boron (B) (Complexed)..... 0.025%
Copper (Cu) (Chelated)..... 0.25%
Iron (Fe) (Chelated)..... 0.25%
Manganese (Mn) (Chelated)..... 2.50%
Zinc (Zn) (Chelated)..... 1.25%

(Derived from Magnesium Amino Acid Chelate, Boric Acid, Copper Amino Acid Chelate, Iron Amino Acid Chelate, Manganese Amino Acid Chelate, and Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

CAUTION: This material contains boron. Its misuse may cause serious injury to the crops. It should be used only under the direction of fertilizer consultants.

METALOSATE® MAGNESIUM

GUARANTEED ANALYSIS (w/w):

Magnesium (Mg) (Chelated)..... 2.1% (Derived from Magnesium Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods or rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 32 to 64 fluid ounces per acre (2.0 to 4.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

METALOSATE® MANGANESE

GUARANTEED ANALYSIS (w/w):

Manganese (Mn) (Chelated)..... 5.6% (Derived from Manganese Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 8 to 24 fluid ounces per acre (0.5 to 1.5 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

LIQUID PRODUCTS

METALOSATE® MULTIMINERAL™

GUARANTEED ANALYSIS (w/w):

Calcium (Ca) (Chelated)..... 1.0%
Magnesium (Mg) (Chelated)..... 1.0%
Copper (Cu) (Chelated)..... 0.5%
Iron (Fe) (Chelated)..... 0.5%
Manganese (Mn) (Chelated)..... 0.5%
Molybdenum (Mo) (Complexed) . 0.1%
Zinc (Zn) (Chelated)..... 0.5%

(Derived from Calcium Amino Acid Chelate, Magnesium Amino Acid Chelate, Copper Amino Acid Chelate, Iron Amino Acid Chelate, Manganese Amino Acid Chelate, Molybdenum Amino Acid Complex, and Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

CAUTION: This product contains molybdenum. Long term feeding of forages with excess molybdenum may cause toxicity in ruminant animals. Consult a ruminant nutritionist before applying this product to crops that will be fed as forages to ruminants.

METALOSATE® MZ™

GUARANTEED ANALYSIS (w/w):

Manganese (Mn) (Chelated) ..... 3.0% Zinc (Zn) (Chelated) 3.0%

(Derived from Manganese Amino Acid Chelate and Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Citrus Crops:	Apply 32 to 64 fluid ounces per acre (2.0 to 4.0 liters per hectare) after the beginning of each growth flush. The application may be repeated at 2 to 4 week intervals during the periods of active growth.
Non Citrus Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

METALOSATE® POTASSIUM 0-0-24

GUARANTEED ANALYSIS (w/w):

Soluble Potash (K_2O) ..... 24.0% (Potassium derived from soluble potassium with amino acids)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 32 to 96 fluid ounces per acre (1.0 to 3.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 32 to 128 fluid ounces per acre (2.0 to 4.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 32 to 128 fluid ounces per acre (2.0 to 4.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

LIQUID PRODUCTS

METALOSATE® NPK 4-17-17

GUARANTEED ANALYSIS (w/w):

Total Nitrogen (N) 4.00%

1.2% Ammonical Nitrogen

2.8% Water Soluble Nitrogen

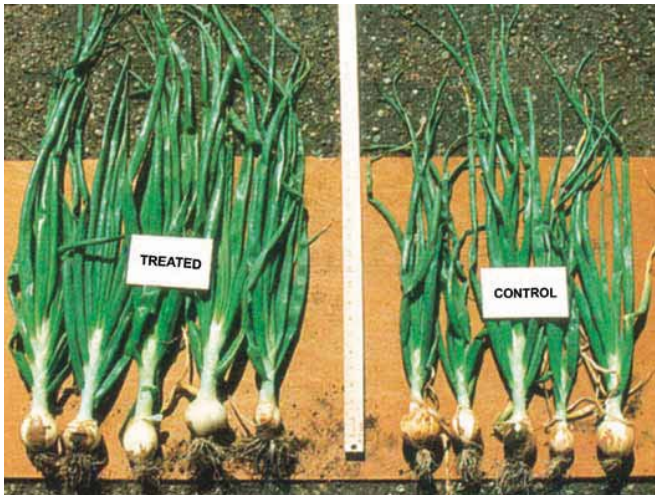
Available Phosphate (P_2O_5) 17.00%

Soluble Potash (K_2O) 17.00%

(Derived From: Urea, Ammonium Phosphate, and Potassium Phosphate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 32 to 64 fluid ounces per acre (2.0 to 4.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 32 to 64 fluid ounces per acre (2.0 to 4.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 32 to 64 fluid ounces per acre (2.0 to 4.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative-growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.



"Spray applications of Metalosate® products from T.E.A.M.® recommendations gave us bigger yields and increased our packout of larger sized onions…"

Jack Stevenson
J&J Produce
Layton, Utah

METALOSATE® TROPICAL™

GUARANTEED ANALYSIS (w/w):

Magnesium (Mg) (Chelated).....0.50%
Boron (B) (Complexed).....1.00%
Iron (Fe) (Chelated)..... 0.66%
Molybdenum (Mo) (Complexed)..0.10%
Zinc (Zn) (Chelated)..... 2.00%

(Derived from Magnesium Amino Acid Chelate, Boric Acid, Iron Amino Acid Chelate, Molybdenum Amino Acid Complex, and Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

CAUTION: This product contains molybdenum. Long term feeding of forages with excess molybdenum may cause toxicity in ruminant animals. Consult a ruminant nutritionist before applying this product to crops that will be fed as forages to ruminants.

This material contains boron. Its misuse may cause serious injury to the crops. It should be used only under the direction of fertilizer consultants.

LIQUID PRODUCTS

METALOSATE® ZINC

GUARANTEED ANALYSIS (w/w):

Zinc (Zn) (Chelated)..... 6.8% (Derived from Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 8 to 24 fluid ounces per acre (0.5 to 1.5 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season. On deciduous trees, 24 to 32 fluid ounces per acre (1.8 to 2.3 liters per hectare) may be applied in the oil sprays at the delayed dormant stage; post harvest applications of 32 to 48 fluid ounces per acre (2.3 to 3.5 liters per hectare) may be made while active, green leaves remain on the trees.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

METALOSATE® ZINC PLUS™

GUARANTEED ANALYSIS (w/w):

Magnesium (Mg) (Chelated)..... 0.50%
Copper (Cu) (Chelated)..... 0.25%
Manganese (Mn) (Chelated)..... 1.00%
Boron (B) (Complexed) 0.025%
Iron (Fe) (Chelated) 0.25%
Zinc (Zn) (Chelated) 2.80%

(Derived from Magnesium Amino Acid Chelate, Boric Acid, Copper Amino Acid Chelate, Iron Amino Acid Chelate, Manganese Amino Acid Chelate, and Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 16 to 48 fluid ounces per acre (1.0 to 3.0 liters per hectare) after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 16 to 32 fluid ounces per acre (1.0 to 2.0 liters per hectare) after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.
Turf:	Apply 1 to 2 fluid ounces per 1000 square feet (10 to 20 milliliters per 100 square meters) during periods of active growth.
Ornamental Trees, Shrubs, and Flowering Plants:	Dilute at a rate of 32 fluid ounces in 10 or more gallons (250 milliliters in 10 or more liters) of water and spray to complete coverage.

CAUTION: This material contains boron. Its misuse may cause serious injury to the crops. It should be used only under the direction of fertilizer consultants.

ALBION®
PLANT NUTRITION

Minerals • Science • Chelates™

Metalosate®

Amino Acid Chelate Soluble Powder Foliar Fertilizers

Nutrition Delivered™

GENERAL INFORMATION

SOLUBLE POWDER PRODUCTS

Albion Metalosate® Organic Foliar Fertilizers are mineral amino acid chelates in a soluble powder form. As liquid amino acids are a breeding ground for bacteria growth without a preservative, Albion's Organic Metalosates must be spray dried to powder form for use. Designed for foliar application to prevent or correct nutrient deficiencies that may limit crop growth and yields. They are water soluble and nontoxic to plants when applied as directed. For best results, apply Metalosate® Organic soluble powders according to recommendations based on plant tissue or soil analysis.

Mix Metalosate® Organic Soluble Powder products water per specific directions on the label to ensure correct application rate. Apply by a spray method and in an adequate amount of water that will provide complete coverage of the plants. Use of a non ionic wetting agent may improve spray coverage of certain hard to wet plants. Do not apply Metalosates® foliar products undiluted.

Metalosate® Organic soluble powders can be included in a regular spray program on crops. Consult with an Albion Plant Nutrition representative on compatibility with other spray materials. The rate of application will depend on the crop, stage of growth, and severity of deficiency. The maximum recommended rates are for mature, full sized plants. Reduce the rates proportionately when spraying smaller plants.

Metalosate® Organic Foliar Fertilizers may be used on:

- Legumes
- Grain crops
- Root crops
- Cucurbits
- Cole crops
- Leafy vegetables
- Deciduous fruits
- Vine crops
- Tropical and subtropical fruits
- Woody and herbaceous ornamentals
- and many other crops

REGISTERED MATERIAL
For Use In Organic Agriculture
Washington State Dept. of Agriculture

METALOSATE® CALCIUM

GUARANTEED ANALYSIS (w/w):

Calcium (Ca) (Chelated)..... 18.3% (Derived from Calcium Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 14 to 28 ounces (400 to 800 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season. Mid and late season sprays directed to cover the fruit may help to reduce the effect of calcium related disorders. For post harvest fruit treatment, dilute at a rate of 35 to 70 ounces (1,000 to 2,000 grams) per 100 gallons of water.
Grapes and Berries:	Make an application of 7 to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

SOLUBLE ORGANIC PRODUCTS

METALOSATE® CALCIUM BORON

GUARANTEED ANALYSIS (w/w):

Calcium (Ca) (Chelated)..... 13.0%

Boron (B) 5.0%

(Derived from Calcium Amino Acid Chelate and Sodium Tetraborate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 14 to 28 ounces (400 to 800 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 7 to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

CAUTION: This material contains boron. Its misuse may cause serious injury to the crops. It should be used only under the direction of fertilizer consultants.

METALOSATE® COPPER

GUARANTEED ANALYSIS (w/w):

Copper (Cu) (Chelated)..... 16.0% (Derived from Copper Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 1.75 to 3.5 ounces (50 to 100 grams) per acre during the periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 1.75 to 3.5 ounces (50 to 100 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 1.75 to 3.5 ounces (50 to 100 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

METALOSATE® IRON

GUARANTEED ANALYSIS (w/w):

Iron (Fe) (Chelated)..... 15.0% (Derived from Iron Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 7 to 21 ounces (200 to 600 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 7 to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

SOLUBLE ORGANIC PRODUCTS

METALOSATE® MAGNESIUM

GUARANTEED ANALYSIS (w/w):

Magnesium (Mg) (Chelated)..... 6.5% (Derived from Magnesium Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods or rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 14 to 28 ounces (400 to 800 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application 7 of to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

METALOSATE® MANGANESE

GUARANTEED ANALYSIS (w/w):

Manganese (Mn) (Chelated)..... 16.4% (Derived from Manganese Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 7 to 21 ounces (200 to 600 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 7 to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

SOLUBLE ORGANIC PRODUCTS

METALOSATE® MULTIMINERAL™

GUARANTEED ANALYSIS (w/w):

Calcium (Ca) (Chelated)..... 2.9%
Magnesium (Mg) (Chelated)..... 2.9%
Copper (Cu) (Chelated)..... 1.4%
Iron (Fe) (Chelated)..... 1.4%
Manganese (Mn) (Chelated)..... 1.4%
Zinc (Zn) (Chelated)..... 1.4%

(Derived from Calcium Amino Acid Chelate, Magnesium Amino Acid Chelate, Copper Amino Acid Chelate, Iron Amino Acid Chelate, Manganese Amino Acid Chelate, Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 14 to 28 ounces (400 to 800 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season.
Grapes and Berries:	Make an application of 7 to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

METALOSATE® ZINC

GUARANTEED ANALYSIS (w/w):

Zinc (Zn) (Chelated)..... 19.3% (Derived from Zinc Amino Acid Chelate)

RECOMMENDATIONS:

Field Crops and Vegetables:	Apply 7 to 14 ounces (200 to 400 grams) per acre during periods of rapid growth or nutritional stress. The application may be repeated 2 or more times through the growing season.
Tree Crops:	Make an application of 7 to 21 ounces (200 to 600 grams) per acre after the beginning of active growth. The application may be repeated at 2 to 4 week intervals through the growing season. On deciduous trees, 7 to 14 ounces (200 to 400 grams) per acre may be applied in the oil sprays at the delayed dormant stage; post harvest applications of 14 to 21 ounces (400 to 600 grams) per acre may be made while active, green leaves remain on the trees.
Grapes and Berries:	Make an application of 7 to 14 ounces (200 to 400 grams) per acre after active growth begins. The application may be repeated at intervals of one week or more through the vegetative growth period.

GUARANTEED ANALYSIS

Metalosate® (Liquid)

	B	Ca	Cu	Fe	K_2O	Mg	Mn	Mo	N	P_2O_5	Zn
Boron	5.0	-	-	-	-	-	-	-	-	-	-
Calcium	-	6.0	-	-	-	-	-	-	-	-	-
Copper	-	-	4.0	-	-	-	-	-	-	-	-
Crop Up®	0.025	-	0.25	0.25	-	0.5	2.5	-	-	-	1.25
Iron	-	-	-	4.0	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	2.1	-	-	-	-	-
Manganese	-	-	-	-	-	-	5.6	-	-	-	-
Multimineral™	-	1.0	0.5	0.5	-	1.0	0.5	0.1	-	-	0.5
MZ™	-	-	-	-	-	-	3.0	-	-	-	3.0
NPK 4-17-17	-	-	-	-	17.0	-	-	-	4.0	17.0	-
Potassium 0-0-24	-	-	-	-	24.0	-	-	-	-	-	-
Tropical™	1.0	-	-	0.66	-	0.5	-	0.1	-	-	2.0
Zinc	-	-	-	-	-	-	-	-	-	-	6.8
Zinc Plus™	0.025	-	0.25	0.25	-	0.5	1.0	-	-	-	2.8

GUARANTEED ANALYSIS (w/w)

Metalosate® (Organic Powder)

	B	Ca	Cu	Fe	Mg	Mn	Zn
Calcium	-	18.3	-	-	-	-	-
Calcium Boron	5.0	13.0	-	-	-	-	-
Copper	-	-	16.0	-	-	-	-
Iron	-	-	-	15.0	-	-	-
Magnesium	-	-	-	-	6.5	-	-
Manganese	-	-	-	-	-	16.4	-
Multimineral™	-	2.9	1.4	1.4	2.9	1.4	1.4
Zinc	-	-	-	-	-	-	19.3

GUARANTEED ANALYSIS (w/w)

Liquid to Powder Conversion:

1 liter = 400 grams powder
1 quart = 14 oz powder

ALBION'S T.E.A.M.® REPORT

AS A CUSTOMER OF ALBION PLANT NUTRITION WE OFFER AN EXCLUSIVE PROGRAM. THE T.E.A.M.® REPORT

Albion Plant Nutrition has developed a new method to evaluate plant tissue analysis results. This method relies on the development of a unique computer program called – Technical Evaluation of Albion Minerals (T.E.A.M). Albion's T.E.A.M. analysis not only evaluates how much of each nutrient is found in the tissue and compares that finding against its optimal level, but the T.E.A.M. program also measures the relationships between the minerals. The program ranks the minerals based on their limitation to optimal crop production. At the bottom of the report, recommendations are listed for the foliar application of nutrients to correct for nutrient deficiencies or imbalances.

Why Analyze

Plant tissue analysis is an extremely helpful tool in determining the nutritional needs of plants. It directly indicates the exact amount of each mineral that the plant is removing from the soil and accumulating in the leaves. Each analysis will represent a part of the overall crop nutrition picture. Plant tissue analysis is also a very effective way to determine if a current fertility program is efficient or if there are ways to modify it to achieve an increased benefit.

Visual symptoms of mineral deficiencies are oftentimes a misleading way of diagnosing the nutritional status of plants because the symptoms of different nutrient deficiencies are similar. Also, non-nutritional problems can appear very similar to deficiencies.

Critical Levels Method

In the past, tissue analysis was interpreted in a number of ways. One method relies on the critical levels of the minerals in the plant tissue. The critical level is defined as the point below which a nutrient deficiency will result in a 10% reduction in yield provided that all the other nutrients and growth factors are not limiting growth. Critical levels for each nutrient have been established by extensive Albion research in greenhouses using plants grown in nutrient solutions.

DRIS Method

Another way of interpreting plant tissue analysis is to look at optimal ranges. The Diagnosis and Recommendation Integrated System (DRIS) was developed to incorporate the importance of nutrient balance into plant analysis. This system relies very heavily upon yield and plant analysis data gathered from the field over an extended period of time. Ultimately, the system is designed to indicate the appropriate ranges for all the essential nutrients that will maximize quality and yield.

The DRIS system does not address the relationships that may take place between the minerals.

Macronutrients N,P,K & S

In the case of the macronutrients (N, P, K & S) the foliar application should only be considered a supplement to these elements being supplied by the soil. In most cases soil applications of these elements will be required in addition to the recommended foliar sprays.

When trying to determine plant nutritional needs, plant tissue analysis can provide some very important information. Being able to accurately interpret the results of a tissue test is critical to success. Albion's unique T.E.A.M. reporting system provides you with all of the necessary information to accurately diagnose and address specific nutritional problems.

Become a Metalosate user today to boost your crop yields and get the very best return on your investment. As a unique bonus you will be eligible for the exclusive T.E.A.M.® Report, used by successful farms world-wide!

Same Age Strawberry Plants

Growers Standard

Albion T.E.A.M.

ALBION'S T.E.A.M.® REPORT

Report: P0425001
Grower: Potato Grower
Send to: Albion Plant Nutrition
grower@business.com

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T.E.A.M.® Analysis Report

Lab Number: T60643 **Field:** Home Place **Date of Report:** 05-Apr-2010
Sample: 1 **Crop:** Potato **Sample Date:** 01-Apr-2010
Farm: Potato Farm **Variety:** **Stage of Crop:**

Analyzed Results

N	S	P	K	Mg	Ca	Na	NO_3-N	Fe	Al	Mn	B	Cu	Zn	Mo
			(%)								(ppm)			
7.60	0.62	0.89	2.69	0.34	0.68	0.110	3838	197	173	113	27	20	58	2.79

Optimal Ranges

4.00	0.25	0.30	3.50	0.50	0.70	Less than		100	Less than	60	25	10	30
6.00	0.50	0.70	6.50	1.10	1.20	0.150		200	250	200	60	25	70

Nutrient Level	Mineral Name	Nutrient Index
Very Low	Magnesium (Mg)	-36
	Potassium (K)	-36
Low	Calcium (Ca)	-26
	Boron (B)	-23
	Manganese (Mn)	-10
Optimum	Copper (Cu)	0
	Zinc (Zn)	3
	Iron (Fe)	14
High	Phosphorus (P)	34
	Sulfur (S)	34
	Nitrogen (N)	47
Very High		

T.E.A.M.® Recommendations

48.0 fl. oz./acre	Metalosate® Magnesium (Mg)
48.0 fl. oz./acre	Metalosate® Potassium (K)
24.0 fl. oz./acre	Metalosate® Calcium (Ca)
8.0 fl. oz./acre	Metalosate® Boron (B)

Comments: Samples are retained for a maximum of thirty days after analysis.

Soil Plant Water 2008 NAPT Participating Laboratory

Albion Plant Nutrition, Metalosate, T.E.A.M., and the Albion logo are trademarks of Albion Laboratories, Inc.

T.E.A.M. report sample

Metalosate®

Amino Acid Chelate Liquid Foliar Fertilizers

ALBION®

PLANT NUTRITION

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