Dissolvine® E-Mn-13

Dissolvine® E-Mn-13 is a product developed mainly for usage for manganese deficient crops through foliar application, in hydroponic systems and for use on manganese deficient soils. For other applications and products please ask for our other Akzo Nobel Micronutrients products.

Dissolvine® E-Mn-13 contains 128 grams manganese per kg of product as **Mn-disodium-EDTA** derived from ethylenediaminetetraacetic acid.

Crops and Soils Susceptible to Manganese Deficiency

Cereal crops like, wheat, oats and other arable crops as soybean, sorghum, cotton, peanut, potato, pea and sugarbeet are susceptible to manganese deficiency. The horticultural crops tomato, strawberry, brassica, apples, pears, peach, plum, grapes, olives, apricots and citrus. Manganese has to be applied to most high productive crops and soilless media for productive and economic growth.

Manganese deficiency can be expected in dry alkaline and calcareous soils, and organic soils. Manganese is easily immobilized by adsorption to organic matter. Limed peat soils are therefore well known to be manganese deficient. Uptake of Mn decreases rapidly in soils with pH 6 and higher. Also highly leached soils are poor in manganese supply. Excessive Mn contents can be found in acid soils with high ground water levels and can cause toxicity. Steaming of soils for desinfection causes higher Mn contents.

Effects and Symptoms of Manganese Deficiency

Manganese is involved in many redox processes in the plant, e.g. photosynthesis. Inhibition of photosynthesis even occurs with mild Mn deficiency. Mn deficiency disturbs the N-metabolism and destructs chloroplasts causing interveinal yellowing, chlorosis, in mainly middle - young leaves. In later stadia red-brown necrosis spots appear. Cereals develop greenish grey spots, flecks and stripes on the basal leaves (*grey speck*). Lower lignin contents and lower Mn concentrations of tissues at infection sites of parasites decrease the disease resistance of Mn deficient plants. Similar effects are produced by Fe (in fruit, cabbage and tomato) and Mg (in cereals). High Mn contents in the plant causes Fe deficiency.

These are the most frequent symptoms of Manganese (Mn) deficiency:

- Interveinal yellowing, chlorosis in younger leaves of dicotyls
- Red brownish necrotic spots
- Greenish grey spots in lower leaves of cereales (*grey speck*)
- Reduction in disease resistance

Directions for Use

Dissolvine® E-Mn-13 is meant for application to plants, after diluting with water.

Application of the Product

The product is recommended for foliar application and in hydroponic systems. Application to the soil is possible, though foliar feeding is preferred.

A. Soil Application

In soil conditions Mn can be easily replaced by iron at the EDTA complex. Therefore best results are obtained when iron contents in the soil and irrigation water are low, otherwise foliar application is recommended.

Dissolve in water and apply to the soil close to the plants or trunks. After each application water carefully to enhance nutrient uptake. Application must be made in a way that ensures the solution to reach the roots. **Dissolvine® E-Mn-13** is totally water soluble and therefore very suitable for fertigation

B. Hydroponics

In hydroponics **Dissolvine® E-Mn-13** improves the efficacy of Fe-chelates. Though the pH in the irrigation water is around pH 6, the pH in the fertilizer tank can be very low. **Dissolvine® E-Mn-13** is stable from pH 3 - 10. Never bring **Dissolvine® E-Mn-13** in direct contact with concentrated acids.

Vegetable crops (tomato, cucumber etc.) do need 10 µmol Mn/l (0.55 mg/l) continuously, flower crops 5-10 µmol Mn/l (0.27-0.55 mg/l). Consult table A for equivalents in grams of product.

C. Foliar Application

Foliar feeding provides a rapid response and is recommended when fast correction is necessary or soil application is expensive and impractical, or impossible, for example if the soil is extremely wet. Repeated applications might be necessary. For improving leaf coverage it is advisable to add a wetting agent, efficacy may be further increased by adding urea.

Dissolve the product to a suitable concentration, and apply with spraying equipment. The pH of final concentration should be lower than 6.5, the final EC lower than 1. Dose rates for a specific crop should be tested first on a small scale. When manganese deficiency is severe, a repeat application should be made after 2 weeks.

Start treatment in early growth stage, but in general apply when there is sufficient leaf area to absorb the spray. To reduce the risks of leaf scorching avoid application during hot, sunny days. Treatments in the early morning are preferred.

Compatibility

The product can be mixed with most other fertilizers and agrochemicals without inactivation, precipitation or scorching problems. Do not mix with chemicals based on metal compounds. With liquid fertilizers use the mixture without delay. Test mixed product first on a small scale.

Mixing

Add the required amount of product to a half filled sprayer tank, then complete the filling process. Ensure that sprayer nozzles are adequate for 200-1000 liters water/ha. Use the higher volume under dry conditions, when treating larger crops and at dense foliage.

Precautions

- √ Store in original container, keep tightly closed and store in cool dry place.
- √ Store away from children, pets, livestock and foodstuff.
- √ Wash hands after application and before meals.

No health hazards are involved in normal handling of **Dissolvine® E-Mn-13** but it is advisable to follow the above precautions.

Packing

The product is packed 25 kg net in cardboard boxes with an inside polyethylene bag. Shelf life of the product is more than 3 years.

Dose Rates

The following dosages can be used as guidance. Always adapt to the crop and cultivar involved and to the local circumstances.

A. Glass house Crops:

Crop	Mn deficient soil / compost	Soilless culture*	Foliar application
	For every watering		2 weeks interval
Vegetables	6 g/1000 l	4 g/1000 l	0.1-0.5 g/l
Cut flowers	5 g/1000 l	2-4 g/1000 l	0.1-0.5 g/l
Potted flowers, pot plants		2 g/1000 l	0.1-0.4 g/l

*) For the dose rate of a 1m^3 tank, 100 times concentrated: multiply the amount of grams mentioned with 100.

B. Arable Crops and Open Field Horticultural Crops:

Soil application, arable crops	2-4 kg/ha	Apply pre-drilling or pre-planting to bare soil in a convenient volume of water, cultivate after spraying.
Soil application, horticultural crops	2-4 kg/ha	Apply through the watering system. Use enough water to wet the top 10 cm of the soil. Use clean water immediately afterwards to wash the manganese chelate from the foliage. Or use the last 5 minutes the foliar application rate.
Citrus	15-50 g/pl	
Grape	10-20 g/pl	
Foliar application	1-2 kg/ha	Apply in a water volume that gives adequate coverage of the crop (200-1000 L). Do not exceed a concentration of 0.1%.
Soybean	3 x 1 kg/ha	
Cereals	1-2 kg/ha	
Citrus,apple,pear	1-2 kg/ha	
Grape	1-2 kg/ha	

1 kg/ha = 0.9 lbs/acre 1 g/l = 0.13 oz/gal

Main characteristics

- Solubility in water: 800 g/l (20 ºC)
- EC (1 g/l): 0.39 mS/cm
- Chloride free