



# IRON CHELATE

(CHELATING AGENT-EDTA)



A chelate for use only on agricultural and horticultural crops, ornamentals, alpine, pot plants, herbaceous flowers and calcifuge plants to remedy iron deficiency. Can also be used in the manufacture of soluble and liquid fertilizers.

## GUARANTEED ANALYSIS

Iron (Fe)..... 13.2%

13.2% Chelated Iron (Fe)  
Derived from: Iron EDTA (ethylenediaminetetraacetic acid).

### F501

#### FOR TREATMENT OF SOILS AND CROPS WHERE IRON DEFICIENCY IS DIAGNOSED OR SUSPECTED.

To improve foliage absorption and effectiveness, add Nu Film 17 to all foliar applied sprays. **Miller Iron Chelate** is particularly suitable for foliar application, inclusion in liquid feeds and hydroponic mixes and for soil application where the pH does not exceed 6.5, i.e. acid soils.

For highly alkaline soils Miller's Ferriplus is recommended.

#### MIXING

**Miller Iron Chelate** is soluble in water. Add the weighed amount of the powder, slowly, to the bulk of the water and stir or agitate until dissolved.

#### SYMPTOMS OF IRON DEFICIENCY

Iron deficiency shows up as chlorosis (a reduction in the green color of the leaves) early in the season, starting with the youngest leaves.

Leaf chlorosis may vary in severity from a pale green to yellow or white. There may be interveinal chlorosis, where the leaf veins stand out in darker green as an intermediate stage between slight and severe symptoms. The deficiency is often referred to as lime induced chlorosis.

On fruit trees and ornamentals leaf symptoms of severe deficiency may be followed by dieback of shoots and the eventual death of the tree.

On grasses and cereals there is a yellow striping of the leaves, the veins remaining green at first.

#### DIAGNOSING IRON DEFICIENCY

The simplest way is by the typical foliage symptoms of the deficiency. Iron is present in most soils, in quantity, but is often made unavailable to plants by a number of conditions. Soil analysis is of no value in respect to total iron content, but the other information from a full analysis such as available iron, can often help to forecast the probability of iron deficiency. Tissue analysis can often confirm iron deficiency.

The availability of iron can be reduced by high chalk or lime content in the soil, high pH, high phosphate, high levels of copper, manganese, zinc and nickel, bicarbonate ions in the soil or irrigation water, potash deficiency, poor drainage and extremes of temperature and moisture.

The deficiency is most common on soils derived from the chalk, limestone or magnesium limestone, on marls and poorly drained clays and on soils that have been overlimed and heavily dressed with superphosphates.

These conditions may also induce manganese and occasionally magnesium and zinc deficiencies in combination with iron deficiency. Combinations of these deficiencies may give rise to confusing foliage symptoms.

Repeated soil applications of **Miller Iron Chelate** usually alleviate the symptoms in the first year or two, but sometimes the chlorosis returns, especially in the older leaves. This is usually induced manganese deficiency, as a consequence of upsetting the balance between iron and manganese.

If this occurs it is advisable to apply a manganese chelate such as Miller Manganese Chelate in combination with **Miller Iron Chelate** in the ratio of one part Manganese Chelate to two parts Iron Chelate.

Iron deficiency can also occur on acid sandy soils, especially if high in copper, manganese, molybdenum, nickel and zinc. The excessive use of sewage sludge high in these elements can induce iron deficiency. The use of **Miller Iron Chelate** can alleviate some of the effects of other heavy metal toxicity.

#### APPLICATION RATES OF MILLER IRON CHELATE

##### 1. Field Crops - before sowing or planting - soil application

Rate: 4 lbs. per acre (4 kg. per hectare)

Apply in a suitable volume of water, by sprayer and cultivate into the soil immediately after spraying. If spraying is not possible, **Miller Iron Chelate** may be diluted with sand or fertilizer and spread evenly by hand or fertilizer spreader.

##### 2. Field Crops - foliar application

Spray with  $\frac{1}{2}$  to 1 lb./acre ( $\frac{1}{2}$  to 1 kg./hectare) of **Miller Iron Chelate** plus 2 to 3 lbs./acre (2 to 3 kg./hectare) Miller Nutri-Leaf or urea, early in the season. Repeat if necessary after 2 to 3 weeks.

**Miller Iron Chelate** is compatible with many pesticide sprays but if mixed with pesticides then omit the urea and only use a low rate of Miller Nutri-Leaf (2 to 3 lbs. per acre). Absorption is greatest when foliar spraying is done during early morning or late evening.

##### 3. Soil Application to Fruit and Nut Trees, Bushes and Vines

Apples, pears, apricots, cherries, peaches, nectarines, plums, grapes, citrus, almonds, walnuts, pistachios, pecans, avocado, mango, papaya, blackcurrants, blueberries, gooseberries, raspberries, blackberries, pineapples and reductants: Apply the chosen rate of **Miller Iron Chelate**, taken from the following table, evenly to the whole area beneath the branch spread of the trees or bushes, in a suitable volume of water, by tree sprayer, injector or watering can and wash down to the root zone by flooding, hosing or irrigation. Rootfeed - the best time for application is towards the end of the dormant season, but early enough to allow the winter rains to wash the **Miller Iron Chelate** down to the roots.

In areas where flooding or irrigation is practiced as soon as growth starts then apply **Miller Iron Chelate** before flooding or irrigating.

	Slight Deficiency	Severe Deficiency
Fruit bushes	1 Tbsp. - $\frac{1}{3}$ Oz. - (10 Gm)	2 Tbsp. - $\frac{2}{3}$ Oz. - (20 Gm)
Small fruit trees (5 ft. -10 ft.)	2 Tbsp. - $\frac{2}{3}$ Oz. - (20 Gm)	4 Tbsp. - 1 $\frac{1}{3}$ Oz. - (40 Gm)
Medium fruit trees (10 ft. -15 ft.)	4 Tbsp. - 1 $\frac{1}{3}$ Oz. - (40 Gm)	7 $\frac{1}{2}$ Tbsp. - 2 $\frac{2}{3}$ Oz. - (80 Gm)
Large fruit trees (Taller than 15 ft.)	10 Tbsp. - 3 $\frac{1}{2}$ Oz. - (100 Gm)	18 $\frac{1}{3}$ Tbsp. - 6 $\frac{2}{3}$ Oz. - (200 Gm)

The higher rate should be used if there is a dense growth of weeds or grass beneath the trees.

Small Fruits - treated on broadcast basis, such as grapevines, cane fruits and strawberries - use at the rate of 4 lb./acre (4 kg./hectare).

#### 4. Foliar Spraying of Fruit and Nut Trees, Bushes and Vines

Symptoms of iron deficiency can be alleviated by foliar spraying with **Miller Iron Chelate**, provided the chlorosis is not too far advanced. Spray with  $\frac{1}{2}$  to 1 lb./acre ( $\frac{1}{2}$  to 1 kg./hectare) of **Miller Iron Chelate** plus 2 to 3 lbs./acre (2 to 3 kg./hectare) Miller Nutri-Leaf or urea. Apply for complete coverage of the foliage. Use Nu Film 17 in the spray to improve absorption into the leaves.

**NOTE:** Foliar applications of any iron salt or chelate under conditions of high temperature and high light intensity may cause slight leaf scorch. Pears, peaches, plums and apricots seem to be the most susceptible. For these crops the rate of use should not exceed  $\frac{1}{3}$  lb./100 gal. (50 gm/100 liters).

DO NOT MIX MILLER IRON CHELATE WITH PESTICIDE SPRAYS ON FRUIT.

The addition of Miller Nutri-Leaf or urea is to assist the absorption of iron into the leaf. Maximum absorption of foliar sprays occurs when spraying is done during early morning or late evening.

#### 5. Application to Ornamentals, Roses and Flowers

	Slight Deficiency	Severe Deficiency
Shrubs	1 Tbsp. - $\frac{1}{3}$ Oz. - (10 Gm)	2 Tbsp. - $\frac{2}{3}$ Oz. - (20 Gm)
Roses and Container grown nursery stock	1 $\frac{1}{2}$ tsp. - $\frac{1}{6}$ Oz. - (5 Gm)	1 Tbsp. - $\frac{1}{3}$ Oz. - (10 Gm)
Azaleas, camellias, magnolias and rhododendrons	1 Tbsp. - $\frac{1}{3}$ Oz. - (10 Gm)	2 Tbsp. - $\frac{2}{3}$ Oz. - (20 Gm)
Annual and perennial flowers	$\frac{1}{2}$ tsp. - $\frac{1}{15}$ Oz. - (2 Gm)	1 $\frac{1}{2}$ tsp. - $\frac{1}{6}$ Oz. - (5 Gm)

**NOTE:** The lower rates should be used for recently planted stock.

Apply as a spray between the rows and cultivate into the soil, early in the season. If possible irrigate after application.

#### 6. Repeating Applications

It may take one or two years of applications at the higher rate to correct serious, longstanding deficiencies. Thereafter use the lower rate, annually to prevent the trouble recurring.

#### 7. Peat/Sand Composts

Plants grown in peat/sand composts are liable to suffer from iron deficiency under conditions of high temperature and high light intensity if overwatered - especially if the water contains bicarbonates, if the pH rises and phosphate and nitrate levels are high.

The deficiency can be prevented by adding **Miller Iron Chelate** to the compost at  $\frac{1}{4}$  oz. to  $\frac{1}{2}$  oz. per cubic yard (10 to 20 gms. per cubic meter) when preparing the mix. Deficiencies in pot plants are most effectively treated by watering with a 10 gm/10 liter solution of **Miller Iron Chelate**, once a week, until the symptoms disappear.

**8. Applications recommended for Turf:** (Includes Lawn, Sod and Golf Courses) - Apply **Miller Iron Chelate** at  $\frac{1}{2}$  lb. to 1 lb. per acre in sufficient water for good coverage. Follow with thorough watering.

#### INDUCED MANGANESE DEFICIENCY

The repeated use of iron salts and chelates for either soil or foliar application may induce manganese deficiency. This shows up as interveinal yellowing on the older leaves in addition to the chlorosis on the younger leaves caused by the iron deficiency. The induction of manganese deficiency can be prevented by adding Miller Manganese Chelate to the iron chelate foliar sprays in the ratio one part Miller Manganese Chelate to two parts of **Miller Iron Chelate**.

**CAUTION:** Do not apply more than 1 lb. per acre of any single chelate or mixture of chelates per foliar application as crop injury may occur. Multiple chelate applications should be made at no less than 10 to 14 day intervals to reduce the potential for crop injury.

#### PRECAUTIONS

Wash hands with soap and water before meals and after work. Store in the original container, tightly closed, in a dry place. Store away from children, pets, livestock and foodstuffs.

Information regarding the contents and levels of metals in this product is available on the internet at <http://www.aapfco.org/metals.htm> Use this product in accordance with good agronomic practices, which include utilizing proven spray equipment set for proper coverage. Do not make applications when temperatures are too hot, as crop damage may occur. Applications should be made at temperature levels and when other environmental conditions in your area are such that your experience indicates the application will be compatible and will accomplish the desired result.

**NOTICE OF WARRANTY:** Miller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Miller. In no case shall Miller be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the buyer. MILLER MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

Information concerning the raw materials composing this product can be obtained by writing to Miller Chemical & Fert., LLC., P.O. Box 333, Hanover, PA 17331. Please refer to the product/batch number found on this container.

Prod. No. 21861

## KEEP OUT OF REACH OF CHILDREN

Manufactured For  
**MILLER CHEMICAL & FERTILIZER, LLC**  
P.O. Box 333  
Hanover, Pennsylvania 17331, USA

Net Weight 55 lb (24.95 kg)

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