

## Kieserite

*Kieserite is a naturally occurring mineral that is chemically known as magnesium sulfate monohydrate ( $MgSO_4 \cdot H_2O$ ). It is mined from geologic marine deposits and provides a soluble source of both Mg and S for plant nutrition.*

### Production

Kieserite is primarily obtained from deep underground deposits of minerals in Germany. It is present in the remnants of ancient oceans that were evaporated and are now buried beneath the earth's surface. These mineral resources contain a variety of valuable plant nutrients. The ore is brought to the surface where the magnesium salts are separated from potassium and sodium salts using a unique, dry electrostatic (ESTA) process.

The fine crystalline kieserite is sold for direct application to soil, or it is granulated to a larger particle size that is better suited for mechanical fertilizer spreading or for bulk blending with other fertilizers.

### Chemical Properties

Chemical formula:	$MgSO_4 \cdot H_2O$
Mg content:	16% (kieserite fine); 15% (kieserite granular)
S content:	22% (kieserite fine); 20% (kieserite granular)
Solubility:	417 g/L (20°C)
Solution pH:	9



*Fine kieselite*



*Granulated kieselite*

### Agricultural Use



*Mining operation to recover kieselite*

Kieserite provides a highly concentrated form of two essential plant nutrients—Mg and S. Since kieselite applications have no major effect on soil pH, it can be supplied to all kinds of soil, irrespective of soil pH. It is commonly used prior to or during the growing season to meet the nutrient requirement of crops. Due to its high solubility it can be used to supply both Mg and S during peak periods of crop demand. Since kieselite is an earth mineral mined from naturally occurring deposits, it is permitted as an organic nutrient source by some organic certifying agencies.

Kieserite itself is not used as foliar fertilizer or in fertigation systems, but it serves as raw material for the production of Epsom salt ( $MgSO_4 \cdot 7 H_2O$ ), which is totally soluble and suitable for both fertigation and foliar application.

### Management Practices

Many soils are low in Mg and require supplemental nutrients to support crop yield and quality. Sandy-textured soils and soils with a low pH (such as highly weathered tropical soils) are frequently characterized by a low Mg supply for plants. Under these conditions, it is a prerequisite to raise the Mg content in the soil by adequate fertilization.

Splitting Mg applications into two or more doses is recommended in areas with high precipitation in order to avoid leaching losses. Soils in temperate climates with higher clay content may have higher Mg contents and are often less prone to leaching losses.

Fertilizer Mg application rates vary depending on factors such as the specific crop requirement, the quantity removed during harvest, and the ability of soil minerals to release adequate Mg in a timely manner to support crop yield and quality. Kieserite application rates are typically in the range of 200 to 300 kg/ha for many crops. Additional Mg and S demands during peak growth periods demand can be met by foliar application of materials such as Epsom salt or a variety of soluble nutrient sources.

Abbreviations and notes: Mg = magnesium; S = sulfur.

