K-Mag® Insight

SUGARCANE



# Higher Yields are Available With K-Mag® Fertilizer

### The K-Mag Advantage

Provides a natural combination of Potassium (K), Magnesium (Mg), and Sulfur (S) - all in a single granule.

### FEATURES

- 3-in-1 nutrient source
- Low chloride
- Water solubility
- pH neutral

### BENEFIT

- Higher yield and profitability

## Why K-Mag?

The shortage of just one essential nutrient can shortchange sugarcane yields and quality. Growers can optimize yields and maximize profits by providing a balanced soil fertility program that ensures all 17 essential nutrients are available to plants.

K-Mag fertilizer provides three essential nutrients in a highly available and soluble form. Available in PREMIUM, GRANULAR and STANDARD grades, K-Mag provides 21–22% potassium ($K_2O$), 10.5–11% magnesium (Mg) and 21–22% sulfur (S).

Also known as langbeinite or potassium magnesium sulfate, K-Mag is sourced from ore beds deep beneath the earth's surface, where an isolated lake of ocean water once existed. Langbeinite is an evaporite mineral but becomes soluble upon soil application.

## Increasing Sugarcane Yields

Sugarcane (Saccharum officinarum) is native to Southeast Asia and was introduced to Europe during the 7th to 9th centuries, although it only took root in the coastal area between Málaga and Motril (Spain). Later, the Spanish took the plant first to the Canary Islands and then to the Americas, where it is widely cultivated.

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## Potassium (K)

It is the nutrient used in the greatest amount by the sugarcane crop; it is closely related to the processes of carbon assimilation, protein synthesis, starch formation, and the transport of sugars and proteins. One ton of sugarcane absorbs 1.67 kg of $K_2O$, meaning that a 224-ton harvest consumes approximately 375 kg of $K_2O$. Adequate K nutrition increases the crop's tolerance to pest and disease attacks; it increases stalk resistance to lodging and enhances drought tolerance. Due to the high demand for this nutrient by the crop, the levels of available K in the soil can be depleted over a relatively short period if replacement doses are not routinely applied. K deficiency symptoms are recognized when the margins of mature leaves become necrotic and may even dry out completely; growth is also delayed, internodes shorten, and stalks become thinner and weaker. When these deficiencies are observed, an irrecoverable yield loss has already occurred in that harvest.

## Magnesium (Mg)

It is a component of chlorophyll, the molecule that gives plants their green color and is essential for the process of photosynthesis, which is nothing more than the conversion of carbon dioxide and water into sugars. One ton of sugarcane absorbs 0.2 kg of Mg, meaning that a 224-ton harvest consumes approximately 45 kg of Mg. Mg deficiency decreases the amount of chlorophyll in the leaves, which in turn results in reduced photosynthesis, affecting both the yield quantity and quality.

In Figure 1, it can be seen that the rate of photosynthesis drops dramatically when leaf Mg levels are below 0.20%. The sugarcane response to Mg has been extensively documented. In a study conducted in the Philippines (Figure 2), Mg applications increased yield in almost all cases except at the highest dose (180 kg ha-1 of Mg). This dose is very high and may have affected K absorption. It is worth noting that the response to Mg is greater with higher K doses (450 kg ha-1) due to the strong interaction between K and Mg. As more K is applied to the soil, it becomes more difficult for the plant to absorb Mg. Considering that sugarcane is frequently fertilized with high doses of K, it is very important to ensure that the Mg absorption should not be depressed to the point that crop yield and quality are reduced.

The main advantage of using K-Mag is that it helps maintain an appropriate balance between K and Mg in the soil and in the plants. Additionally, K-Mag is highly soluble in water, which is a very important property to consider in a fertilizer for sugarcane; since the plant grows very quickly and produces a high volume of leaves. Insoluble or slowly soluble materials cannot release nutrients fast enough to meet the high demand of this crop.

Figure 1. Effect of Mg concentration on the photosynthesis rate of sugarcane

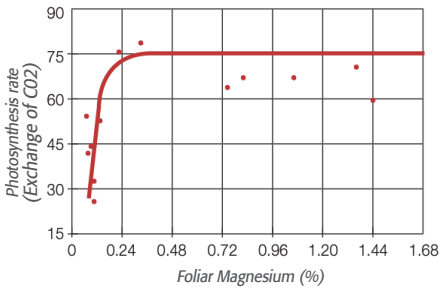
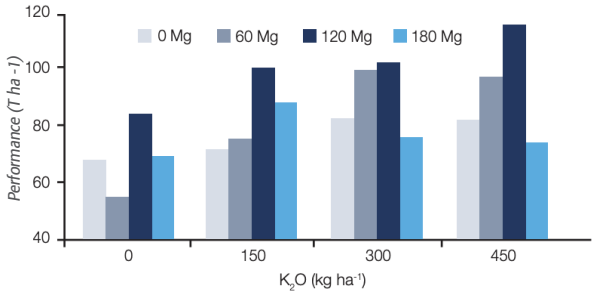



Figure 2. Effect of the potassium-magnesium interaction on sugarcane yield in the Philippines.




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## Sulfur (S)

Is a structural component of some amino acids and therefore is essential in protein synthesis; it is also involved in the process of photosynthesis and consequently in the formation of sugars. One ton of sugarcane absorbs 0.27 kg of S, so a crop of 224 tons consumes approximately 61 kg of S. Symptoms of sulfur deficiencies are more common in new leaves, which turn pale green or yellow. When the deficiency is severe, growth is stunted and chlorosis is generalized. Benefits of K-Mag Found in Sugarcane Nutrition Programs Different studies have demonstrated the beneficial effect of the joint application of Mg and K using K-Mag in sugarcane cultivation.

In China, the effect of an N-P-K dose was evaluated where all the K was supplied as potassium chloride (60% $K_2O$), versus the same amount of N-P-K, but with all the K coming from K-Mag (Table 1); the results show a positive effect both on green cane yield and on the total sugar content in the juices. The crop's requirements and soil depletion due to low K supplementation mean that the K dose is always higher than the Mg dose. The most effective way to use K-Mag is to apply it to meet the Mg requirements while the remaining K requirements are supplied using potassium chloride (KCl). Remember, when growing sugarcane, you should include K-Mag in your nutrition program. K-Mag is a mineral-based fertilizer, highly water-soluble, which, in the sulfate form, presents a unique and perfectly balanced combination of Potassium (22% $K_2O$), Sulfur (22% S), and Magnesium (11% Mg). Additionally, it has a neutral pH and low concentrations of chlorides.

Table 1. Sugarcane response to Mg application in the form of K-Mag (Guangdong, China).

| Treatment | Performance (kg ha1) | Total sugar content |
|---|---|---|
| N + P | 21,936 | 14.07% |
| N + P + KCl | 27,113 | 15.33% |
| N + P + KCl + S | 30,016 | 14.50% |
| **N + P + K-Mag** | **44,144** | **15.83%** |

Table 2. Sugarcane response to Mg application in the form of K-Mag (Veracruz, Mexico).

| Treatment | Performance (kg ha1) | Total sugar content |
|---|---|---|
| N + P + K + S | 89,100 | 11.30% |
| N + P + K + S + Zn | 97,300 | 16.20% |
| **N + P + S + Mg + Zn (K-Mag)** | **103,200** | **17.40%** |

Similar results (Table 2) were reported in Veracruz (Mexico), where the highest yields of green cane and total sugars were obtained with the treatment in which Mg and part of the K dose were applied in the form of K-Mag.

Make sure your sugarcane crop has all the nutrients it needs to thrive. Contact us today for information on how to add K-Mag to your balanced soil fertility program.

**KMAG.COM**
**1-877-BUY-KMAG (1-877-289-5624)**

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