

Potatoes - Issue 2

An increasing number of potato growers worldwide are realizing the benefits of including Sul-Po-Mag in their fertility programs. This naturally occurring mineral is an excellent source of water-soluble magnesium (10.5-11% Mg), sulfur (21-22% S) and potash (21-22% K₂O). These three nutrients are essential for the growth of all plants.

Why is Sul-Po-Mag especially suitable for application to potatoes?

Water Soluble Magnesium

Potatoes have a high demand for Mg. A 56 tons/ha crop will absorb 55 kg of Mg. In order for fertilizer nutrients to be absorbed by plants, they must first dissolve in the soil solution so water-solubility is a very important property of fertilizers. Sul-Po-Mag is a highly water-soluble fertilizer. The nutrients in Sul-Po-Mag begin to dissolve the instant they come in contact with soil moisture and this is especially beneficial for a rapidly growing crop such as potatoes.

When soils are low or deficient in Mg, potatoes respond markedly to fertilizer applications of this nutrient. Results shown in Table 1 are typical (data from USA).

Table 1. Potatoes A Mg Responsive Crop.

Mg applied (kg/ha)	Yield(ton/ha)
0	14.9
55	19.3
112	18.7
222	20.7

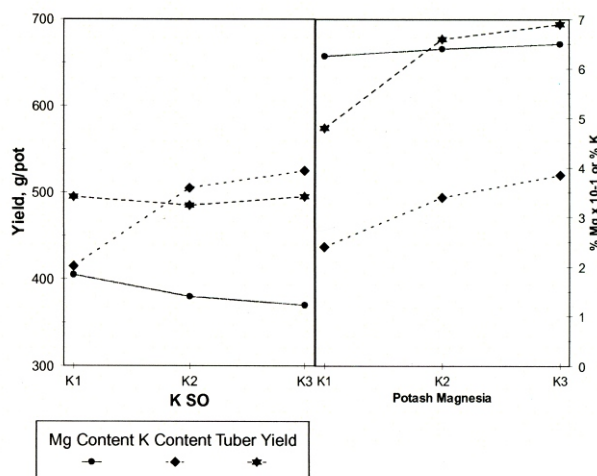
In addition to any effect on yields, Mg has also been found to increase the firmness of potatoes. Work in the U. S. showed that when subjected to equal amounts of pressure, Mg-fertilized potatoes showed less deformation than potatoes fertilized with identical rates of N-P-K, but no Mg. This is very important with respect to storability. A firm potato will be less likely to bruise, and will exhibit better baking and processing qualities. Another reason why Mg is such an important nutrient in potato fertilization programs has to do with the relationship between potassium (K) and Mg in soils

and plants. It's a well know fact that when potash fertilizer is applied to soils, it becomes increasingly difficult for plants to absorb Mg. And since potatoes are often heavily fertilized with K, this antagonistic effect of K on

absorption of Mg assumes great importance. This K/Mg relationship was clearly demonstrated by a series of experiments carried out in Germany (Figure 1).



Figure 1. K-Mg Teamwork Potatoes.



In this trial, soil levels of both K and Mg were low. K was applied to potatoes either alone (as sulfate of potash), or with Mg (as "potash-magnesia"). When K was applied as sulfate of potash there was absolutely no yield response. When one looks at nutrient levels in the plant tissue, the reason is obvious; K content is markedly increased with increasing K application (as K₂SO₄), as expected. But Mg content is depressed to deficiency levels (only slightly above 0.1%) at the K₃ level of application. When K is applied together with Mg, the Mg level in the tissue is raised to about 0.6% at

the K₃ application level and the yield response to increased K applications is considerable. This is a major reason for fertilizing potatoes with Sul-Po-Mag.

Non-Chloride Potash

Sul-Po-Mag is essentially chloride-free (less than 1% chloride). All the potash in Sul-Po-Mag is in the premium sulfate form. Many experiments have shown that compared to muriate of potash (KCl), sulfate of potash (K₂SO₄)-fertilized potatoes have a higher specific gravity. Baking and chipping quality is improved. Results in Tables 2 and 3 are typical.

Table 2. K Source Affects Specific Gravity.

K applied (kg/ha)	K Source	Specific Gravity
0	—	1.085
460	KCl	1.074
460	K ₂ SO ₄	1.079

Table 3. K Source Affects Specific Gravity.

K applied (kg/ha)	K Source	Specific Gravity	
		Russet Burbanks	Kennebecs
0	—	1.073	1.088
230	KCl	1.071	1.066
230	K ₂ SO ₄	1.073	1.076
230	Sul-Po-Mag	1.075	1.079

Sul-Po-Mag Application Rates For Potatoes

Sul-Po-Mag is used in potato fertilizer programs to supply the Mg requirements. The recommended rate will depend on the soil test, but typical rates are in the range of 170 - 340 kg/ha. This rate will supply 19 - 37 kg/ha Mg. It will also supply 37 - 75 kg/ha K₂O. But potatoes usually require more than this amount of K₂O, so the remaining K is usually supplied by sulfate of potash. If a fertilizer recommendation calls for 30 kg Mg and 225 kg K₂O, these amounts can be supplied as follows.

$$\begin{array}{rcl}
 275 \text{ kg Sul-Po-Mag} & = & 30 \text{ kg Mg} + 60 \text{ kg K}_2\text{O} \\
 630 \text{ kg K}_2\text{SO}_4 & = & 165 \text{ kg K}_2\text{O} \\
 \hline
 \text{TOTAL} & = & 30 \text{ kg Mg} + 225 \text{ kg K}_2\text{O}
 \end{array}$$