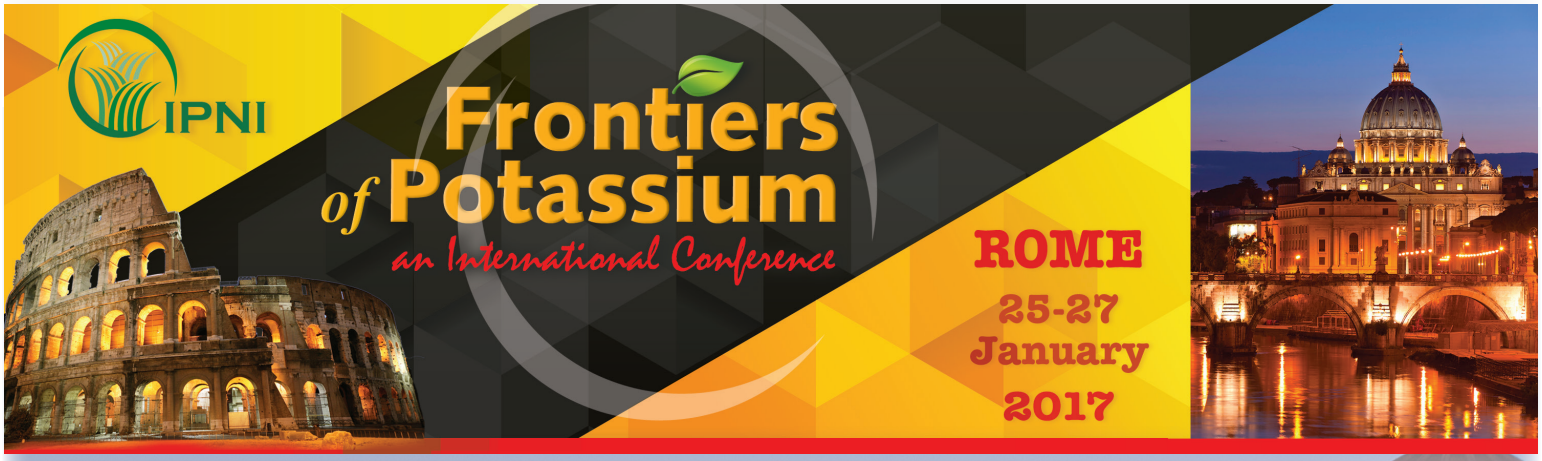


# Selecting the ▶ RIGHT POTASSIUM SOURCE

**Guidelines for selecting the most appropriate K source for plant nutrition will be one of many topics discussed at the January 2017 Frontiers of Potassium Science Conference (kfrontiers.org).**

The principles of 4R Nutrient Stewardship involve selecting the Right Source of nutrients, applied at the Right Rate, at the Right Time, and in the Right Place. Since there is no single correct combination of these factors, expertise is needed to make appropriate decisions for local crops and conditions.

Potassium (K) can be added to soil in several forms. Crop residues often contain a significant amount of K that is recycled back to the soil as it decomposes. However, crop residues cannot replace the K that is removed from the field during crop harvest. Animal manure often contains significant amounts of K that is readily available for plant uptake.

Soils in need of additional K most frequently receive applications of inorganic fertilizers. These K fertilizers are mined or harvested from geologically rich deposits around the world and processed to remove impurities. The largest deposits of K minerals are found in Canada and Russia. The most common K fertilizer sources are:

## ▶ Potassium chloride (KCl, Muriate of potash):

Potassium chloride is the most widely used K fertilizer due to its relatively low cost and because it contains more K than most other fertilizers. It is highly soluble and immediately available for uptake by plant roots. The chloride portion of the fertilizer is an important plant nutrient that is lacking in some regions. The high solubility and salt content requires that the fertilizer not be placed close to germinating seeds. It can be red, white, or pink in color, depending on what source it came from.

## ▶ Potassium sulfate ($K_2SO_4$, Sulfate of potash):

Pure deposits of potassium sulfate are relatively rare, but it is easily separated from other potassium salts. This fertilizer provides a valuable source of sulfur, which is often lacking in the soil for healthy plant growth. This K fertilizer is less soluble and has less potential salinity than potassium chloride. Some plants are sensitive to high chloride concentrations, so alternative K sources may be desirable.

## ▶ Potassium nitrate ($KNO_3$, Nitrate of potash):

This fertilizer is particularly useful when a highly soluble, chloride-free nutrient source is needed. Both the nitrogen and the K are required in large amounts by most plants, and this fertilizer source fulfills these needs. It is also commonly used as a foliar spray onto plant leaves during the growing season.

## ▶ Langbeinite ($K_2SO_4 \bullet 2MgSO_4$):

Langbeinite is a popular fertilizer where the addition of several nutrients is required for optimal plant growth. It has an advantage that K, Mg, and S are all contained within a single particle, which helps provide a uniform distribution of nutrients when spread on the field. It is also used where a chloride-free source of K is appropriate.

All K-containing fertilizers provide the same K nutrition to crops. The main difference is in the elements that accompany the K. In some circumstances, it may be best to add or avoid applications of chloride, sulfate, nitrate, or magnesium in the fertilizer. Common K fertilizers also differ in the speed that they dissolve in water. Other non-agronomic factors, such as economics and field logistics also need to be considered.

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