

Potassium Nitrate

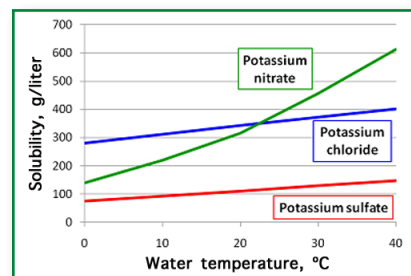
Potassium nitrate (KNO_3) is a soluble source of two major essential plant nutrients. It is commonly used as a fertilizer for high-value crops that benefit from nitrate (NO_3^-) nutrition and a source of potassium (K^+) free of chloride (Cl^-).

Production

Potassium nitrate fertilizer (sometimes referred to as nitrate of potash or NOP) is typically made by reacting potassium chloride (KCl) with a nitrate source. Depending on the objectives and available resources, the nitrate may come from sodium nitrate, nitric acid, or ammonium nitrate. The resulting KNO_3 is identical regardless of the manufacturing process. Potassium nitrate is commonly sold as a water-soluble, crystalline material primarily intended for dissolving and application with water or in a prilled form for soil application. Traditionally, this compound is known as saltpeter.

Chemical Properties

Chemical formula:	KNO_3
N content:	13%
K_2O content:	44 to 46%
Water solubility (20°C)	316 g/L
Solution pH	7 to 10



Water solubility of common K fertilizers



KNO_3 crystals & prills.

Agricultural Use

The use of KNO_3 is especially desirable in conditions where a highly soluble, chloride-free nutrient source is needed. All of the N is immediately available for plant uptake as nitrate, requiring no additional microbial action and transformation in the soil. Growers of high value vegetable and orchard crops sometime prefer to use a nitrate-based source of nutrition in an effort to boost yield and quality. Potassium nitrate contains a relatively high proportion of K, with a N to K ratio of approximately 1:3. Many crops have high K demands and can remove as much or more K than N at harvest.

Applications of KNO_3 to the soil are made before the growing season or as a supplement during the growing season. A diluted solution is sometimes sprayed on plant foliage to stimulate physiological processes or to overcome nutrient deficiencies. Foliar application of K during fruit development can be advantageous for some crops, since this growth stage often coincides with high K demands during the time of declining root activity and nutrient uptake. It is also commonly used for greenhouse plant production and hydroponic culture.

Management Practices

Both N and K are required by plants to support harvest quality, protein formation, disease resistance, and water use efficiency. Therefore, KNO_3 is often applied to soil or through the irrigation system during the growing season to support healthy growth.

Potassium nitrate accounts for only a small portion of the global K fertilizer market. It is primarily used where its unique composition and properties are able to provide specific benefits to growers. It is easy to handle and apply, and is compatible with many other fertilizers. This includes usage for many high-value specialty crops, as well as grain and fiber crops.

The relatively high solubility of KNO_3 under warm conditions allows for a more concentrated solution than for other common K fertilizers. Careful water management is needed to keep the nitrate from moving below the root zone.

Non Agricultural Uses

Potassium nitrate has long been used for fireworks and gunpowder. It is now more commonly used in food to maintain the quality of meat and cheese. Specialty toothpastes often contain KNO_3 to alleviate tooth sensitivity. A mixture of KNO_3 and sodium nitrate ($NaNO_3$) is used for storing heat in solar energy installations.