Potassium nitrate product features and benefits overview

Potassium nitrate is a unique source of potassium by its nutritional value and its contribution to the health and yields of plants. Potassium nitrate features desirable chemical and physical properties, integrated with environmental qualities (Haifa, 2009).

Potassium nitrate outperforms other potassium fertilisers on crops of all types. Potassium nitrate increases yields and improves quality in vegetables, field crops, flowers and fruit and nut trees (Haifa, 2009).

Potassium nitrate is an ideal source of N and K for optimal plant nutrition. It is available in a variety of compositions and formulations, to suit specific crop requirements and growth environments (Haifa, 2009).

1. Potassium nitrate for efficient plant nutrition

- **Potassium nitrate is composed of 100 % plant macronutrients.** It comprises of potassium cation (K\(^+\)) and nitrate anion (NO\(^3\)-), with N-P\(^2\)O\(^5\)-K\(^2\)O analysis of 13-0-46. (13 % N are equivalent to 62 % NO\(^3\)- and 46 % K\(^+\))
O are equivalent to 38 % K, summing up to 100 % KNO_3. Potassium nitrate is the only fertiliser that supplies both macronutrients, highest in the composition of any plant.

- **Potassium nitrate is absorbed efficiently.** The synergistic effect between K^+ and NO_3^- facilitates the uptake of both ions by the plant roots. In addition, the affinity between the negatively charged nitrate and the positively charged potassium prevents adsorption of the latter to soil particles, making it available to plants for longer time.

- **Potassium nitrate is available in crystalline and prill form,** which allows for multiple application methods. Highly efficient application methods of fertigation, foliar sprays, side dressing and controlled-release fertilisation ensure that nutrients are applied at the right time, placement and rates.
  - **Crystalline** potassium nitrate products are ideal for application by fertigation and foliar sprays.
  - **Potassium nitrate prills** are suitable for split soil applications (side dressing).
  - **Polymer-coated** potassium nitrate prills provide controlled release nutrition throughout the growth season.

- **Potassium nitrate is an excellent source of potassium.** Potassium is the major cation in the plant, electrically balancing most of the negatively charged mineral anions and organic carboxylates. Therefore, the potassium in potassium nitrate is essential for plant development and normal functioning of tissues. The potassium cation (K^+) takes a crucial part in many metabolic processes in the cell, serves as an osmoregulator and participates in several processes that take care of the water management of plants.

- **Potassium nitrate provides easily available nitrogen.** Nitrate is the most available form of nitrogen for plant uptake.
2. Potassium nitrate for stronger and healthier plants

- **Potassium nitrate is virtually free of chloride.** When the chloride concentration in the soil solution increases, plants take up chloride on the account of essential anionic nutrients, especially nitrate. This, of course, hinders plant growth. When chloride quantities go higher, toxic effects are caused, that may lead to loss of yields and may even cause plant death. Potassium nitrate is virtually free of detrimental chloride, and the nitrate in potassium nitrate counteracts the chloride's harmful effect.

- **Potassium nitrate is non-toxic to roots.** Unlike ammonium, the nitrate-nitrogen in potassium nitrate does not destroy plant roots at elevated soil temperatures.

- **Potassium nitrate improves tolerance towards frost.** The potassium in potassium nitrate helps to build thicker cell walls, and increases the concentration of electrolytes inside the cell, thus increasing the plant’s frost resistance.

- **Potassium nitrate increases the resistance of the plant towards diseases.** The potassium in potassium nitrate eliminates the accumulation of short-chained carbohydrates and non-protein nitrogen, which may serve as substrates for invading bacteria, fungi, nematodes and viruses.

- **Potassium nitrate enhances drought tolerance.** Potassium nitrate encourages establishment and branching of a root system that better absorbs water from the soil.

3. Potassium nitrate for better yields
Adequate supply of potassium helps to obtain both the highest yields and the best quality. Hence, potassium fertilisation results in a higher value product and more return on investment for the grower.

The potassium in potassium nitrate has a positive impact on the following quality parameters:

- Fruit size: larger dimensions and increased uniformity.
- Fruit appearance: better colour and minimized colour blemishes or unusual markings of mechanical injuries or any sign of disease.
- Nutritional value: higher content of protein, oil, vitamin C, etc.
- Organoleptic features: enhanced flavour and aroma.
- Longer shelf life.
- Adequate processing quality for industry.

4. Potassium nitrate combats salinity

The nitrate in potassium nitrate enables the plant to minimize chloride uptake, whenever this deleterious anion is present in the soil solution or in the irrigation water. In a similar manner, the potassium in potassium nitrate counteracts the harmful effects of sodium. Therefore, potassium
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Nitrate is highly recommended for salt-sensitive crops, and when using irrigation water of poor quality.

5. Potassium nitrate improves the water use efficiency of crops and saves water

- The nitrate in potassium nitrate improves the plant's water management. Nitrate-fed plants utilize water about 100% more efficiently than ammonium-fed plants. This difference becomes even more significant when potassium concentration in the soil solution is low.
- The potassium in potassium nitrate prevents water losses. Being responsible for opening and closing of stomata, the potassium minimizes plant transpiration and reduces its water requirements. Moreover, adequate potassium nutrition of the plant enhances its water sourcing efficiency from the soil.
- Potassium nitrate prevents salinity build-up. Potassium nitrate eliminates the need for additional irrigation to remove salts from the soil.

6. Potassium nitrate improves soil properties
- The nitrate in potassium nitrate increases the pH of the root surface. Uptake of nitrate by the roots causes a release of hydroxyl anions (OH⁻), creating a slightly alkaline environment in the root zone, which improves acidic soil properties.

- Potassium nitrate enhances availability of phosphorous and micronutrients. The nitrate in potassium nitrate enhances the formation of organic acids (carboxylates) and their exudation into the growing media. This, in turn, facilitates the release of phosphate and micronutrients from soil particles to the soil solution.

7. Potassium nitrate is easy to handle and to apply

- **Potassium nitrate is highly soluble in water.** Potassium nitrate dissolves in water quickly and completely, which makes it ideal for application by fertigation and for foliar application. As water temperature rises, the solubility of potassium nitrate increases.

- **Potassium nitrate is non-hygroscopic.** It can be stored either in bags or in bulk without absorbing moisture that may cause caking and handling difficulties.

- **Potassium nitrate is compatible with other fertilisers.** It will not create insoluble precipitates that could clog drippers or nozzles, so it can be safely used to produce tank mixes and fertiliser solutions of various compositions.

- **Potassium nitrate is non-volatile.** Unlike ammonium, the nitrate in potassium nitrate is
non-volatile, so there is no need to work it into the soil when it is applied by top dressing or side dressing.

Reference: