APPLICATION GUIDE

HIGH GRADE WATER SOLUBLE SOP FOR FERTIGATION

TESSENDERLO
Kerley

Potassium is an essential element in all plants and in certain crops, such as potatoes it is the most important of the three primary nutrients, i.e. nitrogen, phosphorus and potassium (N, P, K).

While potassium is not directly incorporated into the tissue of the plant, its presence is vital for many important physiological and biochemical functions:

- Potassium is essential for the **development of proteins, enzymes and vitamins,** as well as for **plant photosynthesis**
- It plays a key role in **transport functions** within the plant
- Potassium controls **plant transpiration**, improving the efficiency of water use and hence reducing drought stress
- It is also involved in a range of other **important metabolic** functions

SOLUPOTASSE

- **A nitrogen-free source of potassium**
  Evidence suggests that an excessive supply of nitrate when fruit is forming can be detrimental to quality. SoluPotasse® enables growers to develop fertilization programs that exactly match crop requirements.

- **Virtually chloride-free**
  Chloride makes a significant contribution to soil salinity and an excess can be detrimental to the quality of many cash crops with poor chloride tolerance.

- **Extremely low salt index**
  Salinity can destroy agricultural land by seriously reducing soil and water quality. Of the three most common potash fertilizers - potassium nitrate (NOP), potassium chloride (MOP) and potassium sulfate (SOP) - SoluPotasse has by far the lowest salt index and is the best product to use in areas at risk from salinity.

- **Improves the yield and quality of fruit and vegetables**
  The use of SoluPotasse provides high quality produce with outstanding flavor. In many cases, size and consistency, as well as yield, are improved. Increased pigment content gives better color and appearance. Higher levels of sugar and juice, combined with a reduced acidity, provide better flavor and aroma.

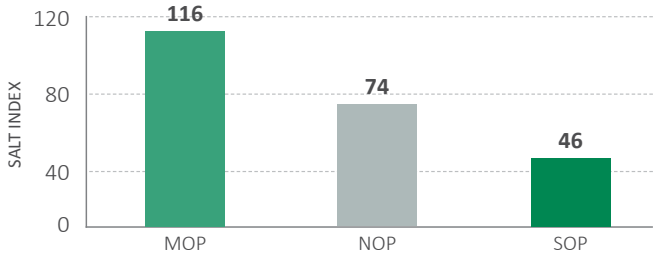
- **Enhances nutritional value**
  SoluPotasse has a positive effect on the plant's production of vitamins, starch, and sugar. These are the basic factors for high nutritional value.

- **Provides durability and resistance**
  The use of SoluPotasse ensures firmer fruit and vegetables with a better resistance to bruising. It can also increase the suitability of fruit and vegetables for canning or processing.

- **Consistent performance across a range of soil types**
  In alkaline and salt-affected soils, SoluPotasse helps to lower the pH level at the root surface, improving the availability of phosphorus, iron and most other micronutrients. Meanwhile, in acidic soils (mainly light or sandy), SoluPotasse reduces cation leaching and is considerably less prone to leaching than other potash fertilizers.

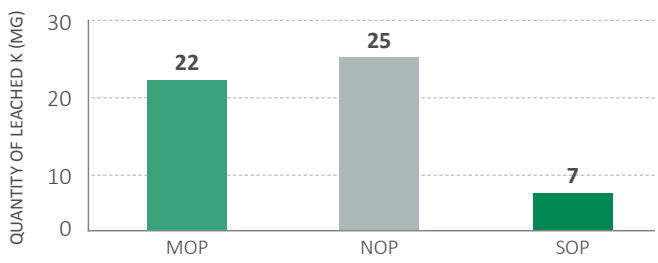
- **Contains the important secondary nutrient sulfur**
  Delivered in the sulfate form, which is easily taken up by the plant, sulfur is an important constituent of amino acids and proteins, and it is also required for photosynthesis.

SALT INDEX OF MAIN POTASH FERTILIZERS



Base index: 100 = sodium nitrate

LEACHING OF POTASSIUM SOURCES IN SANDY SOIL



Source : University of Florida, USA

CHARACTERISTICS

Specifications

SoluPotasse combines the essential nutrients potassium and sulfur in an optimal form that is **readily available to plants.**

A 51.5% K_2O (42% K) and 47% SO_3 (18.7% S) content enables SoluPotasse to supply a very **high concentration of nutrients.** SoluPotasse is **virtually chloride-free** with a typical Cl content of only 0.6%.

Potassium sulfate		Method of analysis
- K_2O (w/w)	Min. 51%	Potentiometric
- Cl (w/w)	Max. 1%	Potentiometric
- S (w/w)	18.7%	X-Ray fluorescence

Typical properties

SoluPotasse is a fine white powder, which **dissolves rapidly in water to give an acidic solution.**

At a low pH, the availability to the plant of phosphorus, iron and most other micronutrients is improved and the **risk of clogging in drippers is minimized.**

- Appearance/color	Fine white powder
- Bulk density (struck/loose)	1.46 kg/l / 1.21 kg/l
- Angle of repose	40°
- pH (1% solution)	2.9
- Residues (5% solution)*	0.03%
- Solubility at 25°C	120 g/l pure water
- Dissolved after 3 mins with stirring	90%
- K_2O (w/w)	51.5%
- K (w/w)	42.8%
- Cl (w/w)	0.6%
- SO_3 (w/w)	47%
- H_2O (w/w)	0.02%
- Chemical formula	K_2SO_4

* After stirring for 10 minutes at 25°C

Typical particle size distribution

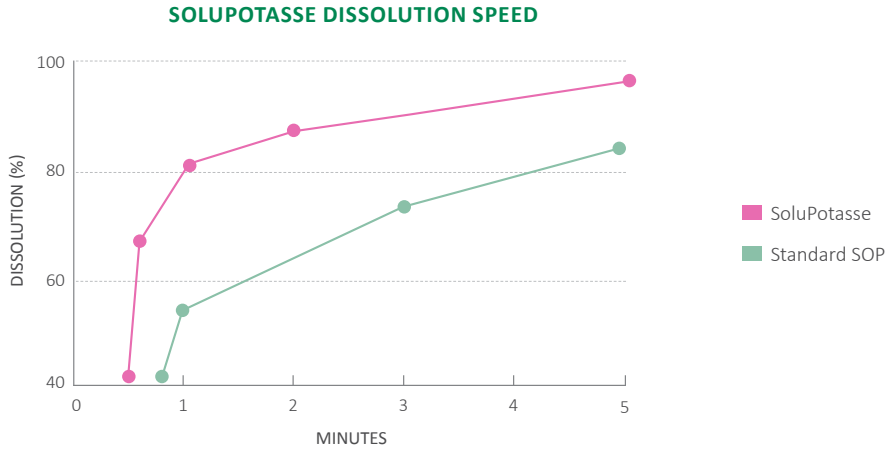
Particle size	**Sieve analysis**
> 0.300 mm	20%
> 0.125 mm	60% - 70%
< 0.125 mm	30% - 40%

Conversion factors

K_2O to K: multiply by 0.8301
SO_3 to S: multiply by 0.4

DISSOLUTION SPEED

SoluPotasse **dissolves rapidly and completely** to give a clear solution with no residue.



At 25°C (77°F), it normally only takes a few minutes for SoluPotasse to dissolve at a concentration of 100 g/l, which is the highest recommended practical dose. Continuous stirring and the use of warm water will speed up dissolution of the product.

However, the **time** required to dissolve the product completely will **depend on the stirring technique as well as on the quality and temperature of the irrigation water**. Poor quality and cold irrigation water may also affect its solubility.

Compatibility

SoluPotasse is compatible with most other soluble fertilizers within normal concentration ranges, except with those containing calcium, which causes precipitation of calcium sulfate ($CaSO_4$). SoluPotasse is also compatible with most pesticides and fungicides.

However, it is recommended that SoluPotasse is dissolved first, before the addition of other fertilizers, especially those containing magnesium.

TYPICAL SOLUPOTASSE FERTIGATION PROGRAMS

SoluPotasse has been specifically developed for use in fertigation and the product has all of the necessary characteristics to make it ideal for this application.

Calculations for specific solution concentrations are provided below. A typical scenario is that a nutrient solution of 80 mg K per liter requires a stock solution of 3.78 kg SoluPotasse per 100 liters of water, injected at a rate of 0.5%.

For scenarios that are not described in the table, the following formulae can be used in order to calculate the relevant solution concentrations:

- **Nutrient solution** (K ppm or K mg/l) = 42.3 x concentration of stock solution (kg SoluPotasse per 100 l water) x % injection rate
- **Stock solution** (kg SoluPotasse per 100 l water) = 0.0236 x concentration of nutrient solution (ppm K or mg K/l) / % injection rate

Calculation of solution concentrations

NUTRIENT SOLUTION (K ppm or K mg/l)	STOCK SOLUTION (kg SoluPotasse per 100 liters water) AT INJECTION RATE OF:		
	1%	0.8%	**0.5%**
20	0.47	0.59	0.94
40	0.94	1.18	1.89
80	1.89	2.36	3.78
120	2.83	3.54	5.66
160	3.78	4.72	7.55
200	4.72	5.90	9.44
240	5.67	7.08	N/A
280	6.61	8.26	N/A
320	7.55	9.44	N/A
360	8.50	N/A*	N/A
400	9.44	N/A	N/A

***N/A** - higher SoluPotasse concentrations are not recommended

Fruit and vegetables

The following recommendations are given for selected fruit and vegetables in open fields or in greenhouses with soil culture:

CROP	BASAL DRESSING*		SOLUPOTASSE FERTIGATION PROGRAM (DAILY APPLICATION RATES)			
	K_2O (kg/ha)	SOP (kg/ha)	CROP GROWTH STAGE	K (kg/ha)	K_2O (kg/ha)	SOLUPOTASSE (kg/ha)
Artichoke						
- planting year	100	200	Up to 50 days	0.5	0.6	1.2
			From 51 days to head formation	1.0	1.2	2.4
			From head growth to end of harvest	1.0	1.2	2.4
- second and third year			Up to 50 days	0.6	0.7	1.4
			From 51 days to head formation	1.2	1.4	2.8
			From head growth to end of harvest	1.0	1.2	2.4
Bean	80	160	Up to flowering	0.6	0.7	1.4
			During flowering	0.8	0.9	1.8
			From end of flowering to end of harvest	1.6	2.0	4.0
Cabbage	100	200	From 30 to 70 days after planting	1.0	1.2	2.4
Cauliflower	100	200	From 30 to 60 days after planting	1.0	1.2	2.4
			From 61 days to end of harvest	1.4	1.6	3.2
Cucumber	200	400	Up to 30 days	0.4	0.5	1.0
			From 31 to 150 days	2.5	3.0	6.0
			From 151 days to end of harvest	1.2	1.5	3.0
Eggplant	100	200	Up to 80 days	1.4	1.7	3.4
			From 81 to 120 days	1.7	2.1	4.2
			From 121 days to harvest	1.0	1.2	2.4
Bell pepper	150	300	From emergence to flowering	0.8	1.0	2.0
			From flowering to end of fruit setting	1.6	2.0	4.0
			To end of harvest	2.0	2.5	5.0
Lettuce	100	200	Up to 15 days	0.4	0.5	1.0
			From 16 to 30 days	2.0	2.5	5.0
			From 31 days to end of harvest	2.4	3.0	6.0
Melon & Watermelon	100	200	Up to flowering	1.2	1.5	3.0
			From flowering to end of fruit setting	1.6	2.0	4.0
			To end of harvest	1.8	3.0	6.0
Potato	120	240	Up to tuber initiation	1.3	1.5	3.0
			After tuber initiation	3.0	3.5	7.0
Strawberry	150	300				
- planting year			From end of flowering to end of harvest	0.8	1.0	2.0
- second year			To end of harvest	0.8	1.0	2.0
Tomato (processing)	150	300	From 21 to 100 days	1.7	2.0	4.0
Tomato (fresh)	150	300	Up to 45 days	1.7	2.0	4.0
			From 46 to 90 days	2.5	3.0	6.0
			From 91 days to end of harvest	3.3	4.0	8.0

*Applied as K50Potasse® or GranuPotasse®
1 kg of SOP contains 500 g of K_2O which is equivalent to 415 g of K
1 kg of K is equivalent to 2.41 kg of SOP or 1.205 kg of K_2O

Tobacco, flowers and sugar cane

CROP	BASAL DRESSING*		SOLUPOTASSE FERTIGATION PROGRAM (DAILY APPLICATION RATES)			
	K_2O (kg/ha)	SOP (kg/ha)	CROP GROWTH STAGE	K (kg/ha)	K_2O (kg/ha)	SOLUPOTASSE (kg/ha)
Tobacco	100	200	Up to 30 days after transplanting	1.0	1.2	2.4
			From 30 to 70 days	1.5	1.7	3.4
Flowers	-	-	Any	0.7	0.8	1.6
Sugar cane	-	-	Any	0.5	0.55	1.1

*Applied as K50Potasse® or GranuPotasse®
1 kg of SOP contains 500 g of K_2O which is equivalent to 415 g of K
1 kg of K is equivalent to 2.41 kg of SOP or 1.205 kg of K_2O

SoluPotasse does not contain any nitrogen. This enables it to supply efficient quantities of potassium while maintaining a high K/N ratio, which is of special importance before harvesting vegetables or during fruit growth. The K/N ratio must also be adapted to soils or substrates used in glasshouses or polythene tunnels.

Fruit trees

The fertilization of fruit trees is very often based on the nutrient content of leaves. Therefore, leaf analysis is an indispensable tool to determine the requirements of fruit trees. The figures opposite indicate the range of optimal K content for various fruit types.

The frequency of SoluPotasse application depends on the soil type. For instance, light textured soils demand smaller, more frequent doses compared to heavier soils with a high fixation capacity.

Typical fertigation programs are provided on the next page. The quantities indicated are subject to further splits depending on local conditions.

OPTIMAL K CONTENT IN LEAVES (% IN DRY MATTER)	
Apple, pear	1.1 - 2.0
Stone fruits	1.5 - 3.0
Citrus	1.0 - 1.7
Mango	0.3 - 1.2
Grape: petiole	1.2 - 5.0
: leaf blade	0.6 - 1.5
Pistachio	1.8 - 2.2
Kiwi	> 0.8
Banana	3.0 - 5.0

SOLUPOTASSE FERTIGATION PROGRAM (KG/HA SOLUPOTASSE PER MONTH)						
MONTH	1	2	3	4	5	TOTAL
CROP GROWTH STAGE	← FLOWERING →					
	← FRUIT SET →			FRUIT GROWTH →		HARVEST →
			← FLUSH →			
Apple	35	65	90	60	-	250
Stone fruits	55	105	145	95	-	400
Citrus	70	70	90	130	90	450
Mango	60	75	85	100	80	400
Grape (table)	80	220	120	80	-	500
Grape (wine)	60	50	35	25	-	170
Olive	20	20	20	50	40	150
Avocado	30	40	50	70	50	240

Kiwi fruit

SOLUPOTASSE FERTIGATION PROGRAM (KG/HA SOLUPOTASSE PER MONTH)						
MONTH	1	2	3	4	5	TOTAL
CROP GROWTH STAGE	← LEAF EMERGE →		GROWTH →			
			← FRUIT SET →	FRUIT GROWTH →		HARVEST →
Kiwi	80	100	120	120	80	500

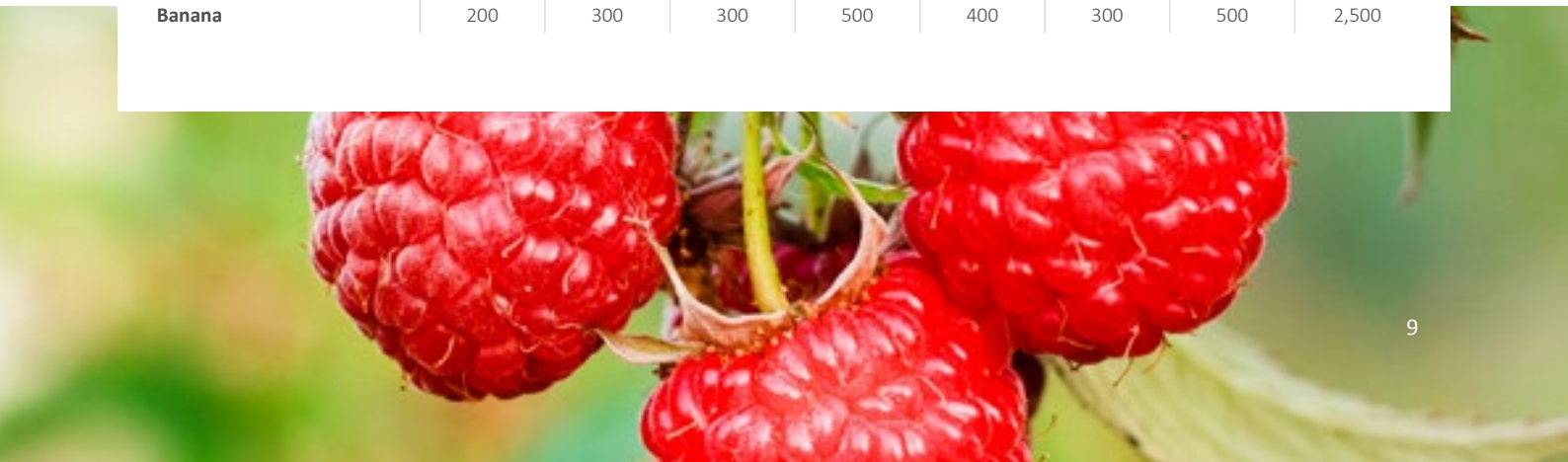
Pineapples

SOLUPOTASSE FERTIGATION PROGRAM (KG/HA SOLUPOTASSE PER MONTH DURING EACH PERIOD INDICATED)						
MONTHS AFTER PLANTING	PRE-PLANTING	2 - 5	6 - 10	11 - 14	15 - 18	TOTAL
Pineapple	240*	20	80	30	60	1,080

*Applied as K50Potasse® or GranuPotasse®
1 kg of SOP contains 500 g of K_2O which is equivalent to 415 g of K
1 kg of K is equivalent to 2.41 kg of SOP or 1.205 kg of K_2O

Bananas

SOLUPOTASSE FERTIGATION PROGRAM (KG/HA SOLUPOTASSE PER PERIOD INDICATED)								
WEEKS AFTER PLANTING	6 - 11	12 - 17	18 - 23	24 - 29	30 - 35	36 - 41	42 - 47	TOTAL
CROP GROWTH STAGE	← SUCKERS →	SMALL →		MEDIUM →		SHOOTING →		HARVEST →
Banana	200	300	300	500	400	300	500	2,500



SULFATE OF POTASH FROM TESSENDERLO KERLEY INTERNATIONAL

	K-LEAF®	SOLUPOTASSE	GRANUPOTASSE®	K50 POTASSE
TYPICAL TECHNICAL CHARACTERISTICS				
Average K_2O (K)	52.0% (43%)	51.5% (42.8%)	50.2% (41.7%)	50.4% (41.8%)
Average SO_3 (S)	47.0% (18.7%)	47.0% (18.7%)	45.0% (18%)	44.3% (17.7%)
Average Cl	0.2%	0.6%	2.3%	2.1%
Sieve analysis	99% < 0.125 mm	80% < 0.30 mm	97% between 1.60 and 5 mm	97% < 1.65 mm (Tyler 10)
Bulk density	1.53 (struck) 1.25 (loose)	1.46 (struck) 1.21 (loose)	1.40 (struck) 1.27 (loose)	1.54 (struck) 1.09 (loose)
TO PRODUCE				
High value compounds				√
High value blends			√	
High value soluble mixes	√	√		
FOR APPLICATION				
Basal dressing			√	√
On the line or per plant			√	√
Greenhouse, hydroponic system		√		
Open field fertigation (drip, sprinkler, central pivot)		√		
Foliar feeding	√			

DIRECTIONS FOR USE OF SOLUPOTASSE

In order to get the best results from SoluPotasse in fertigation programs, the below guidelines should be followed:

- Fill the tank with water to at least two-thirds of its capacity. With highly alkaline water (pH > 8), it is recommended to first acidify the stock solution before adding SoluPotasse.
- Add SoluPotasse, taking care not to exceed the maximum recommended dosage of 10 kg/100 liters of water (100 g/liter). Maintain stirring throughout the entire operation.
- Complete filling the tank with water.
- Check that SoluPotasse has dissolved completely before injecting it into the irrigation system.
- In common with most solid fertilizers used in irrigation systems, the use of filters is recommended.
- It is highly recommended to conduct a small scale trial in order to check the compatibility of the mixture before large scale operation and injection into the irrigation system.
- Always refer to instructions for use and precautions stated on the bag when using the product.

SUSTAINABLE CROP NUTRITION FOR AGRICULTURE

For over 100 years Tessenderlo Kerley International has demonstrated its commitment to nurturing crop life through innovation, research and the development of novel fertilizers for a more sustainable agriculture. Our diverse product portfolio addresses the challenges of modern agriculture by delivering essential nutrients in forms that protect soil health and optimize nutrient use efficiency.

We provide an extensive range of both liquid and solid/soluble fertilizers

KTS® CaTs®

HIGH-PERFORMANCE LIQUIDS

SoluPotasse® Solucros®

HIGH QUALITY SOLID/SOLUBLES

MagThio® Thio-Sul®

K-Leaf® GranuPotasse®

Our experts are familiar with your region and crops.
Their support includes:

- Agronomic advice
- Providing technical information
- Carrying out field studies that are specific to your issues
- Providing application and storage tips

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