TESSENDERLO Kerley

POTATOES

The potato (*Solanum tuberosum*) is an annual herbaceous plant from the Solanaceae family which produces tubers that are rich in starch. Potatoes are primarily used for human and animal nutrition as well as the production of starch for industrial applications. Potato production is concentrated in the northern hemisphere, particularly in Asia, which represents one-half of the world's acreage and potato production. Meanwhile, Europe produces 30% of the world's potatoes. Surprisingly, Latin America, which is where the potato originated, nowadays accounts for just 5% of total production. A good fertilization program for potatoes must satisfy the nutritional needs of the crop throughout the growing season, including during periods of rapid growth. Ensuring a balanced fertilization helps in terms of realizing better quality production as an under-supply of nitrogen (N) will reduce the weight of the tubers, whereas an excess of nitrogen will deform them. A lack of phosphorus (P) limits tuber reproduction and consequently reduces the number of tubers. Finally, potassium (K) is very important for potatoes. It is required in greater quantities than all of the other elements. Fertilization programs will differ depending on the use of the crop.

TABLE OF CONTENTS

SEED POTATOES 4
WARE POTATOES 4
FRESH POTATOES 4
PROCESSING POTATOES 5
POTATOES FOR INDUSTRIAL APPLICATIONS 5
THE POTATO GROWTH CYCLE 6
FERTILIZATION OBJECTIVES 8
NUTRITIONAL REQUIREMENTS OF POTATOES 8
ABSORPTION OF NUTRIENTS 11

PRODUCTS

TESSENDERLO KERLEY FERTILIZERS 13
GRANUPOTASSE® 14
K-LEAF® 15
P-SURE® 16
THIO-SUL® 17
KTS® 18
CATS® 19

FERTILIZATION PROGRAM

BREAKDOWN OF FERTILIZATION FOR POTATOES 21
TESSENDERLO KERLEY FERTILIZATION PROGRAM 21
GUIDELINES 22

SEED POTATOES

For seed potatoes, producers are looking for small to medium-sized tubers. Consequently, yields per hectare will be lower than those for ware or industrial potatoes. The principal objective of the fertilization program is to maximize the number of tubers in the desired size range and the germination potential in order to ensure a good yield for the farmer. Consequently, fertilizer products that increase the proportion of large size tubers should be used with caution.

WARE POTATOES

Ware potatoes are potatoes that are destined for human consumption. This is in contrast to seed potatoes or potatoes for industrial uses, the value of which primarily relates to the amount of starch that can be extracted from them. Ware potatoes can be further subdivided into two categories: fresh potatoes and processing potatoes.

FRESH POTATOES

Potatoes for the fresh market are those that are consumed without any processing taking place. Fertilization is aimed at maximizing both yield and quality. Larger potatoes with a uniform shape are generally preferred and a blemish-free skin is also important for the consumer. Higher dry matter content is also preferred as this helps to improve the resistance of the potatoes to both storage and transport.

Potatoes for boiling or frying are firm-fleshed varieties that have good consistency and do not darken when cooked. Meanwhile, chipping potatoes (for French fries) are potatoes that have a high dry matter content and absorb little oil. Finally, baking potato varieties guarantee a successful whole baking (jacket potatoes). These can also be used for mashed potatoes, soups, casseroles, and other dishes.

Products	Size (mm)	Dry matter (%)	Reducing sugars (%)	Others
Steamed potatoes, salads and fried potatoes	30 - 55	17 - 21 (18 - 20)	-	No blackening after cooking
French fries and hash browns	50 - 75	19 - 23 (20 - 22)	< 0.4 - 0.6	
Mashed and baked potatoes	35 - 75		-	

As regards reducing sugars, when it comes to consumption on the fresh market, the maximum threshold for making French fries or hash browns is in the range of 0.4- 0.6% of the fresh weight. The sugar content can be higher for other uses although too much sugar (a situation that can be observed after storage at low temperatures) gives a sweet taste to potatoes that is generally not appreciated by the consumer if it is too intense.

PROCESSING POTATOES

Processing potatoes are those that undergo some form of transformation or processing before reaching the consumer. One of the main items in this category is frozen potatoes, which includes French fries or chips and crisps. Dehydrated potato flakes are used in retail mashed potato products and as ingredients in snacks. Potato flour, which is another dehydrated product, is used by the food industry as a binding agent. Dry matter content is an important criterion for processing potatoes since higher dry matter helps in terms of reducing the processing costs. The choice of fertilization will also have an impact on the characteristics of the potato for cooking. Potatoes in which oil retention is reduced are preferred as they offer a healthier product for the consumer.

The dry matter content also affects the processing quality: a high content (20- 25%) increases the industrial yield of finished products (flakes, crisps, and French fries), whilst also improving the crispness of French fries and reducing the oil retention of fried products. Higher levels of dry matter also improve the consistency of both purees from potato flakes as well as French fries.

Products	Size (mm)	Shape	Dry matter (%)	Reducing sugars (%)	Others
French fries	> 50	Oblong to elongated	20 - 25 (21 - 23)	< 0.4 - 0.6 (< 0.25)	No blackening after cooking
Flakes	> 35	-	20-25	< 0.6	Easy breakdown and no blackening after cooking
Crisps	35 - 60	Short oblong to round	20 - 25 (23 - 25)	< 0.2 - 0.3 (< 0.1)	-
Sterilized potatoes	< 40 according to products	-	17 - 21 (18 - 20)	< 0.6	No blackening after cooking

For most processed products, the content of reducing sugars should be low to moderate:

- Less than 0.2 - 0.3% (optimum < 0.1%) of the fresh weight for processing into crisps
- Less than 0.4 - 0.6% for processing into frozen French fries, flakes and sterilized potatoes (optimum < 0.25%)

POTATOES FOR INDUSTRIAL APPLICATIONS

Potato starch is widely used for industrial applications such as pharmaceuticals, paper and glue. Potato starch is 100% biodegradable and it can be used as a substitute for polystyrene and certain other plastics. A key fertilization objective is obviously to maximize the percentage of starch content in the tubers as well as the yield per hectare. Tuber size and shape are less important factors than they are for ware potatoes.

For the starch industry, the most important criteria are the high starch content (although this is limited to approximately 23%), and a moderate size and weight. Other factors that are also taken into account include the protein content and coagulatable fraction, the glycoalkaloids content, the soluble sugar content, and the starch properties (viscosity).

GERMINATION | VEGETATIVE GRO

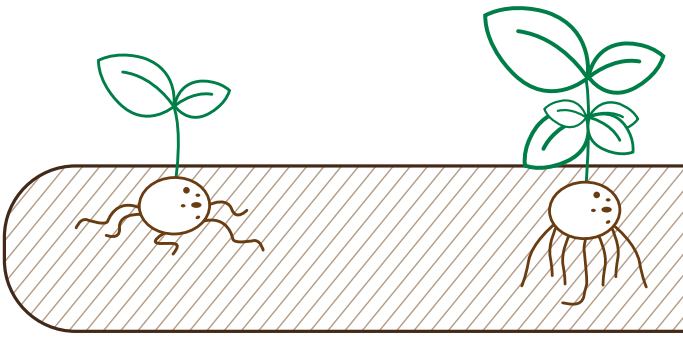
THE POTATO GROWTH CYCLE

One of the key elements for the fertilization of potatoes is to take into account the differences that exist between the different potato varieties that are grown. The objectives will differ between seed, ware, fresh, processing potatoes, and potatoes for industrial applications.

Fertilizer doses and application timings will have to be adjusted according to the requirements of each variety. The requirements for nitrogen, phosphorus, potash, sulfur, calcium and magnesium are unique to each variety and these principles should be applied after taking soil analyses into account. This is also necessary in order to adapt fertilizer inputs to the nutrients that are already present in the soil.

stem emergence

BBCH 0



GERMINATION VEGETATIVE GRO

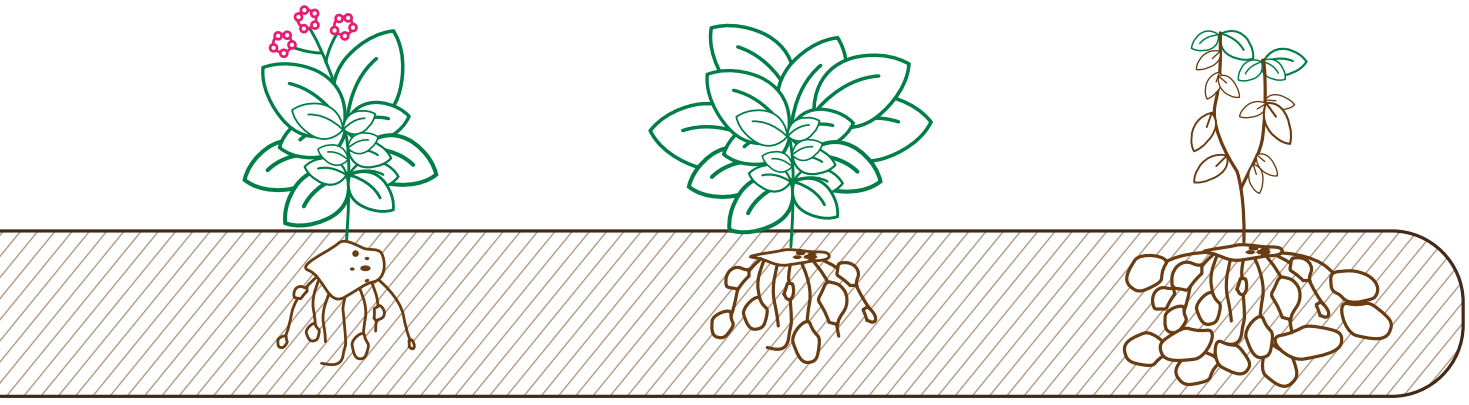
OWTH | TUBER INITIATION | TUBER ENLARGEMENT | MATURITY

start of flowering — BBCH 60

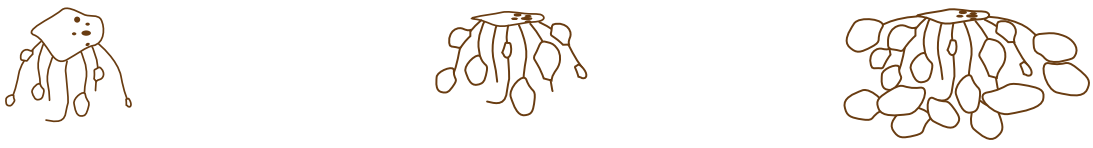
end of flowering — BBCH 70

haulm destruction — BBCH 80

harvest — BBCH 90



OWTH TUBER INITIATION TUBER ENLARGEMENT MATURITY



FERTILIZATION OBJECTIVES

The management of fertilization in the potato crop must meet the main expectations of the producers:

- To enable the best yield with quantitative objectives of biomass production and the production of the calibers required
- To guarantee the quality criteria required by the sector, in terms of dry matter, starch content, as well as reducing sugar content and weight under water

Each nutrient has a well-defined role in regard to pursuing these goals. To this end, their different ratios in fertilization are key factors in the production of quality potatoes. The forms of fertilizer used are also a very important factor in terms of realizing a satisfactory harvest.

NUTRITIONAL REQUIREMENTS OF POTATOES

1. Nitrogen (N)

Regarding the potato, a slight lack of nitrogen is much less damaging than an excess level of nitrogen. Nitrogen fertilization input can be calculated using the balance method. An excess level of nitrogen will result in an overdevelopment of the vegetation and this could potentially delay tuber initiation. For nitrogen fertilization it is preferable to favor a fractionation in 2 or 3 applications in order to avoid the excesses that are associated with a single application (leaching and excessive incorporation). A more gradual entry of nitrogen also reduces the risk of *Alternaria*.

2. Phosphorus (P)

Phosphorus must be delivered in a localized manner as this will favor a rapid development of the root system. Orthophosphate forms that are immediately assimilable are preferred. For the polyphosphate forms, the chemical properties of the soil (pH and cation contents) will be decisive either for the transformation of phosphorus into assimilable forms or, on the contrary, for the blocking of the phosphorus, in particular by iron, aluminum or calcium.

Apart from stimulating root development, phosphorus is also a key element when it comes to improving the firmness of the potato and reducing damage to the crop.

3. Potassium (K)

Potassium (K) is of great importance for potatoes and it is required in greater quantities than all of the other elements. The form of potassium fertilizer has a direct impact on the quality of the crop. Potatoes are chloride-sensitive and the use of chloride fertilizers may affect germination and can also perturb plant transpiration, in turn affecting growth. Therefore, better results for potatoes are obtained by using chloride-free potash sources.

Potassium plays a key role in the absorption of cations. One of its main roles involves the translocation of carbohydrates and proteins to the reserve organs. It is essential for the transfer of assimilates towards the tubers.

Potassium is the key nutrient when it comes to maintaining cell turgor and stomatal regulation.

Potassium is also a key element in terms of helping to improve the resistance of plants against frost and drought and against diseases. This is because it is an activator of several enzymatic systems.

Potassium improves the resistance to damage and reduces the sensitivity to enzymatic browning and blackening after cooking. On the other hand, potassium lowers the content of reducing sugars in the tubers.

The form of the potassium fertilizer plays a significant role in the quality of the harvested potato. For example, potassium chloride and potassium nitrate tend to increase the water content and reduce the dry matter and starch content as compared to potassium sulfate. The differences in the absorption of chloride with respect to sulfate also modify the retention of water. In addition, sulfur and potassium reinforce the emission of adventitious roots in order to promote growth.

Potassium chloride and nitrate fertilizers can suffer leaching, particularly when they are applied prior to planting of the crop (in some cases this can occur up to two months before planting). It is important to understand the cation exchange capacity (CEC) of the soil in order to supply the correct quantities and ratios of nutrients. Furthermore, chloride competes with nitrates and promotes the development of soft tissue. In the field, one can expect issues relating to salinity as well as the sensitivity of the potato to chloride.

4. Sulfur (S)

Nowadays, sulfur deficiencies are increasingly observed due to the significant reduction of the atmospheric deposition of sulfur.

Sulfur can be provided in the sulfate or thiosulfate forms. Sulfur tends to induce a higher weight under water of potatoes (Potato Underwater Weight - PUW) as compared to the chloride form.

Sulfur should not be neglected for varieties with often limited PUW and when growing for the production of potato chips, which requires a higher weight underwater.

5. Calcium (Ca)

In the potato crop, calcium plays a key role in terms of the shelf life and resistance to impact during harvesting. This effect of calcium also benefits the skin resistance, which results in considerably reduced levels of skin defects.

For fresh potatoes, the quality and appearance of the skin (epidermis) is one of the most important factors. This is in addition to the caliber and variety.

Calcium also improves resistance to biotic and abiotic stress and it helps to contribute to the reduction of IBS ("Internal Brown Spot"), which is also known as "brown heart".

In order to optimize yield and quality, calcium must be readily available in the soil near the stolons and tubers. CaTs®, which contains immediately available calcium, offers the best source of calcium fertilization without nitrate and chloride.

6. Magnesium (Mg)

A supply of magnesium is often beneficial in poorly supplied soils or in the case of significant potassium uptake. Magnesium must be accompanied by zinc, manganese and boron, which lose their availability with basic pH. In some cases, foliar inputs from the beginning of the growth are justified.

These four elements are involved in the development of the leaf mass and they have a subsequent impact on the quality of the tuberization. They must be available from the beginning of growth in order to fully play their role.

For non-mobile elements (Mn, Zn, S, B), care should be taken to ensure that they are available from the first days of leaf growth. This is because translocation within the plant is severely limited.

It is important to maintain a K/Mg ratio of approximately 3/1 in the soil.

NUTRITIONAL REQUIREMENTS OF POTATOES							
	TOTAL	GERMINATION	VEGETATIVE GROWTH	TUBER INITIATION	TUBER ENLARGEMENT	MATURITY	POST HARVEST
	kg/ha	%					
N	110-220	10	40	20	30	0	0
P_2O_5	40-110	20	30	20	30	0	0
K_2O	150-350	10	40	20	25	5	0
SO_3	10-30	25	25	25	25	0	0
CaO	5-25	25	40	15	20	0	0
MgO	20-30	10	35	25	30	0	0

The quantities exported in N, K_2O, CaO and MgO are either equal to or greater than those exported by tubers. Therefore, soil replenishment is very important for these elements.

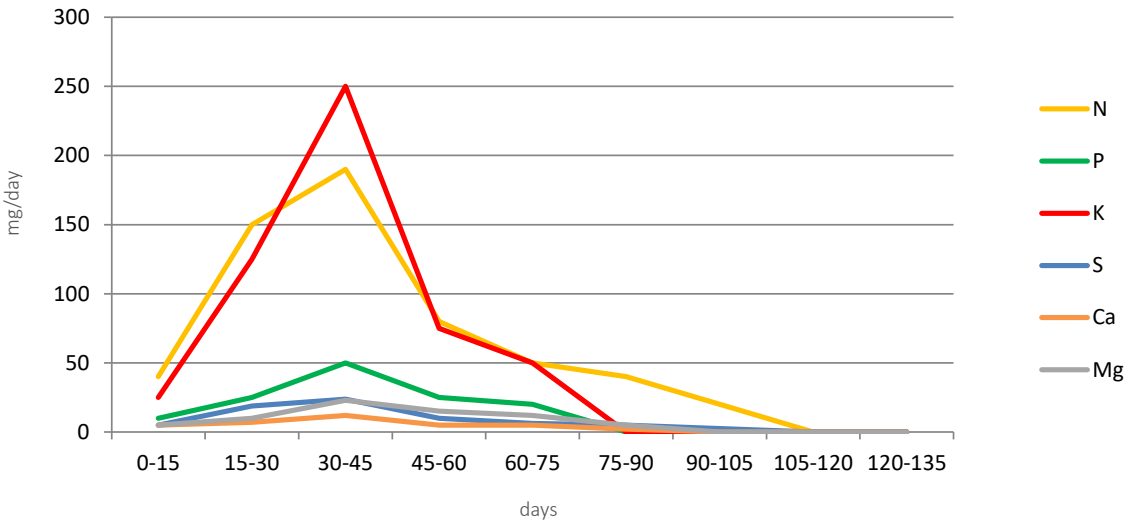
ABSORPTION OF NUTRIENTS

The curves that are presented show the difference between assimilation by the plant as a whole (leaves, stems and roots) and assimilation by the tubers that will be harvested.

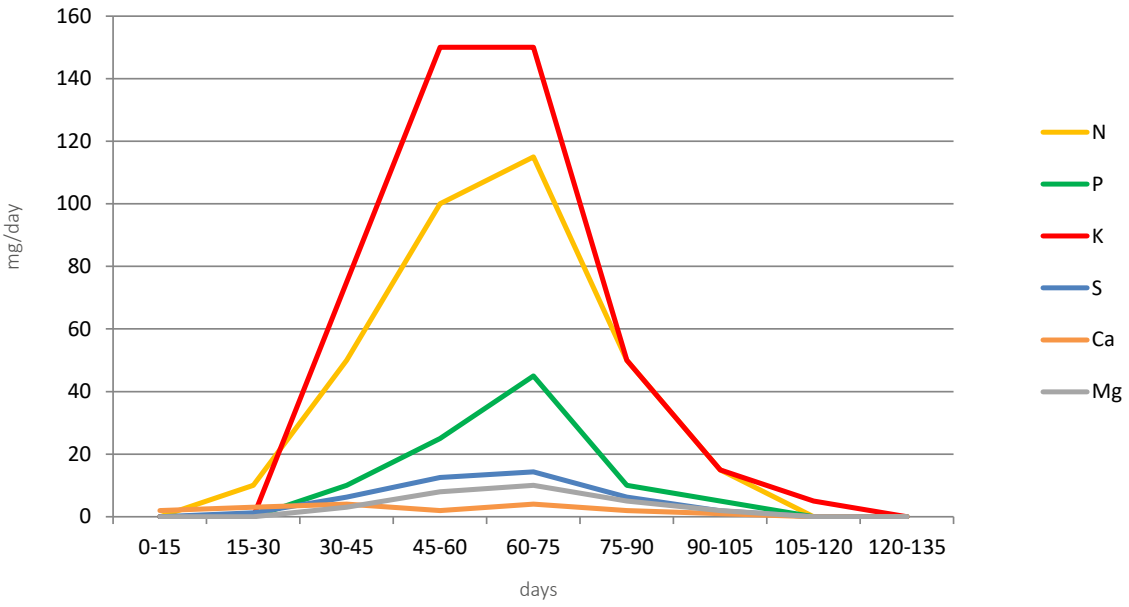
The elements N, P, K, S, Ca and Mg provided by soil and by fertilization should be available over time and present in the right quantities.

The absorption of nutrients by the potato will depend on the climatic constraints and the availability of each of the elements. In this context, Tessenderlo Kerley International fertilizers are precise and effective tools that make it possible not only to satisfy crop needs, but also improve the soil nutrient resources.

Whole plant

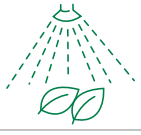
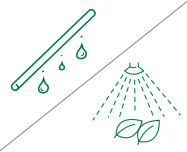
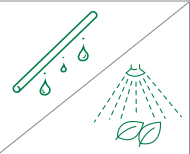
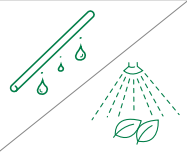
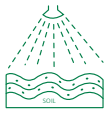


Tubers



PRODUCTS

TESSENDERLO KERLEY FERTILIZERS

PRODUCTS	PRE-PLANTING/ GERMINATION	VEGETATIVE GROWTH	TUBER INITIATION	TUBER ENLARGEMENT	MATURITY	POST HARVEST
GranuPotasse						
K-Leaf						
P-Sure						
Thio-Sul						
KTS						
CaTs						

Legend:

Foliar application 

Soil application granules 

Soil application liquids 

Fertigation 

Top dressing 

Starter 

NUTRIENT CONVERSION FACTORS*		
TO CONVERT	TO	DIVIDE BY
CaO	Ca	1.40
MgO	Mg	1.66
K_2O	K	1.20
P_2O_5	P	2.29
SO_3	S	2.50
SO_4	S	3.00

* To convert elemental units to oxide units multiply by the same factors

GRANUPOTASSE

Characteristics and advantages

- GranuPotasse is a cost-effective source of potassium and sulfur, and it is chloride and nitrate free.
- GranuPotasse provides a high concentration of these important crop nutrients.
- GranuPotasse is virtually dust-free.
- GranuPotasse has a consistent granulometry that ensures uniform application, with a spreading range of up to 28 meters.
- GranuPotasse is suitable for both pre-emergence and post-emergence application during early stages of crop growth.
- GranuPotasse has excellent stability, which makes it ideal for producing a wide variety of NPK blends.
- Available in 25 kg bags or big bags (600 kg, 1,000 kg or 1,200 kg).

Specifications

Potassium sulfate	
- K_2O (w/w)	Min. 50%
- Cl (w/w)	Max. 2.5%
- S (w/w)	18%

Typical properties

- Appearance/color	Light grey to beige granules
- Bulk density (struck/loose)	1.40 kg/l / 1.27 kg/l
- Angle of repose	33°
- Sieve analysis	97% between 1.6 mm and 5 mm
- K_2O (w/w)	50.2%
- Cl (w/w)	2.3%
- SO_3 (w/w)	45%
- H_2O (w/w)	0.2%
- Chemical formula	K_2SO_4

APPLICATION	DOSE PER APPLICATION	GROWTH STAGE	COMMENT
Soil	50 to 500 kg/ha	Before planting or during growth early post emergence	

K-LEAF

Characteristics and advantages

- The highly soluble potash booster is suitable for foliar applications using regular spray volumes.
- K-Leaf is well suited for foliar application at higher potash rates per hectare.
- K-Leaf dissolves three times as fast as regular water soluble SOP, leaving no residues.
- The acidification effect may in some cases have a beneficial impact on absorption of tank mix partners.
- K-Leaf is a cost-effective source of potassium and sulfur and is chloride and nitrate free.
- Available in 20 kg bags.
- K-Leaf can be applied at higher rates than certain other foliar potassium fertilizers.
- K-Leaf has now been verified as compliant for use in organic agriculture according to EC Regulation no. 834/2007.

Specifications

Potassium sulfate	
- K_2O (w/w)	Min. 51.5%
- Cl (w/w)	Max. 0.5%
- S (w/w)	18.7%

Typical properties

- Appearance/color	Fine white powder
- Bulk density (struck/loose)	1.53 kg/l / 1.25 kg/l
- Angle of repose	35°
- pH (1% solution)	2.9
- Residues (5% solution)*	0.03%
- Solubility at 25°C	120 g/l pure water
- Dissolved after 1 min with stirring	90%
- K_2O (w/w)	52%
- Cl (w/w)	0.2%
- SO_3 (w/w)	47%
- H_2O (w/w)	0.07%
- Chemical formula	K_2SO_4

* After stirring for 10 minutes at 25°C

APPLICATION	DOSE PER APPLICATION	GROWTH STAGE	COMMENT
Foliar	8 to 16 kg/ha	BBCH 70 to 89	4% spray concentration, 3 or 4 applications spaced 10-14 days apart

P-SURE

Characteristics and advantages

- P-Sure is 100% liquid.
- P-Sure has a high concentration of nutrients.
- P-Sure provides the sentential nutrients phosphorous and nitrogen.
- P-Sure has 50% P in the orthophosphate form that is immediately available for plants.
- P-Sure has 50% P as a long chain polyphosphate available for plants over a period covering a few days to a few weeks.
- Combines effectively with KTS to give a highly efficient NPKS starter fertilizer.

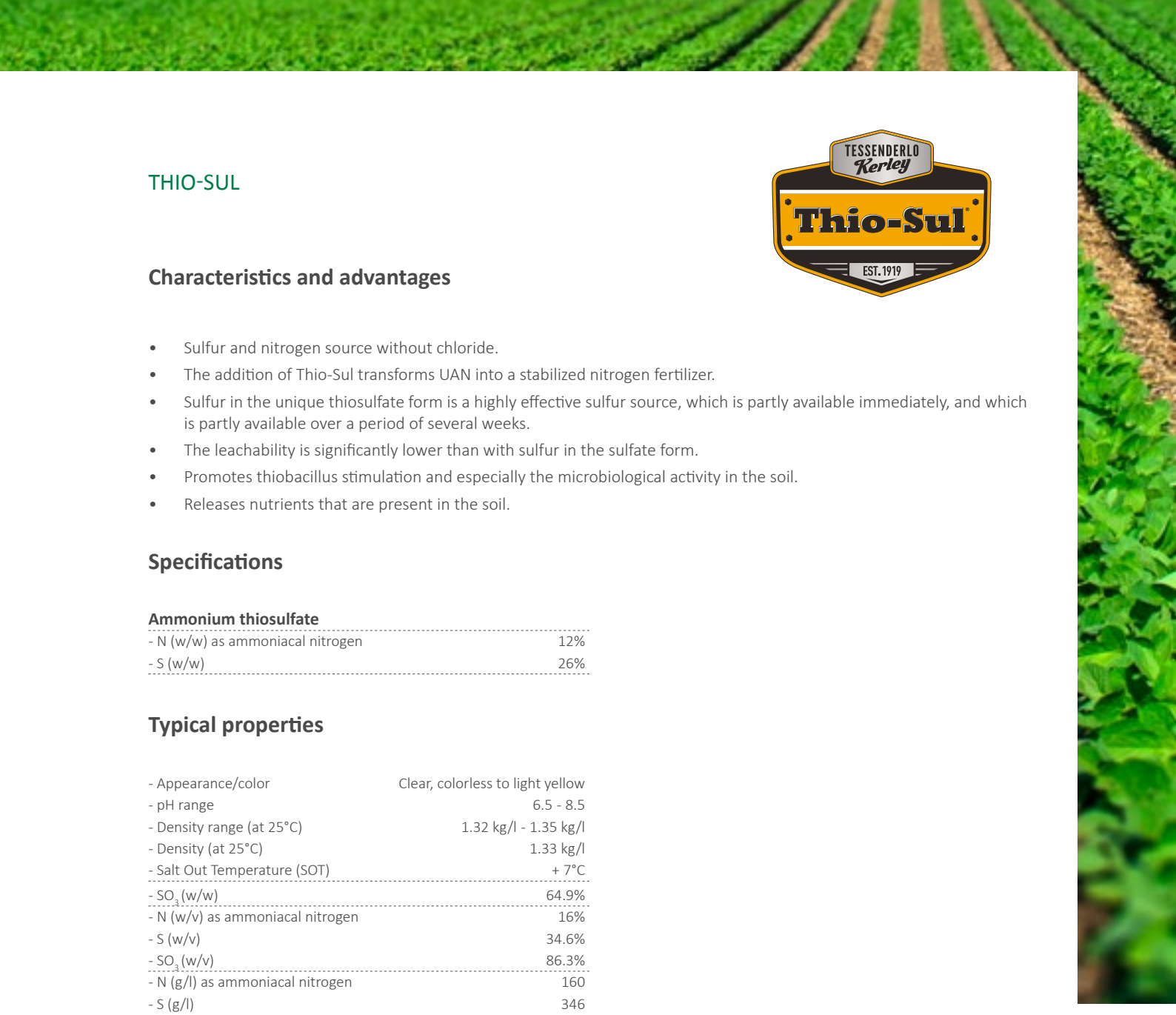
Specifications

Ammonium polyphosphate	
- N (w/w) as ammoniacal nitrogen	11%
- P_2O_5 (w/w)	37%

Typical properties

- Appearance/color	Clear, green or colorless
- pH range	6 - 7
- Density range (at 25°C)	1.41 kg/l - 1.47 kg/l
- Density (at 25°C)	1.44 kg/l
- Salt Out Temperature (SOT)	- 20°C
- N (w/v) as ammoniacal nitrogen	15.8%
- P_2O_5 (w/v)	53.3%
- N (g/l) as ammoniacal nitrogen	158
- P_2O_5 (g/l)	533

APPLICATION	DOSE PER APPLICATION	GROWTH STAGE	COMMENT
P-Sure (when combined with UAN)	30 to 100 l/ha	During growth	According to soil types
Starter injection	50 to 150 l/ha	At planting	1 application 5 cm aside and 5 cm below the planting line
Foliar	5 to 10 l/ha	Tuber initiation	3 applications spaced 10 days apart



THIO-SUL

Characteristics and advantages

- Sulfur and nitrogen source without chloride.
- The addition of Thio-Sul transforms UAN into a stabilized nitrogen fertilizer.
- Sulfur in the unique thiosulfate form is a highly effective sulfur source, which is partly available immediately, and which is partly available over a period of several weeks.
- The leachability is significantly lower than with sulfur in the sulfate form.
- Promotes thiobacillus stimulation and especially the microbiological activity in the soil.
- Releases nutrients that are present in the soil.

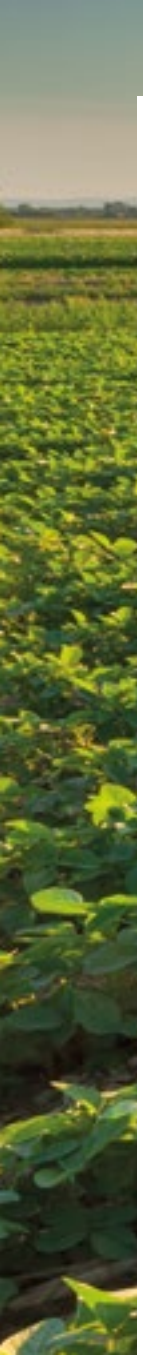
Specifications

Ammonium thiosulfate	
- N (w/w) as ammoniacal nitrogen	12%
- S (w/w)	26%

Typical properties

- Appearance/color	Clear, colorless to light yellow
- pH range	6.5 - 8.5
- Density range (at 25°C)	1.32 kg/l - 1.35 kg/l
- Density (at 25°C)	1.33 kg/l
- Salt Out Temperature (SOT)	+ 7°C
- SO_3 (w/w)	64.9%
- N (w/v) as ammoniacal nitrogen	16%
- S (w/v)	34.6%
- SO_3 (w/v)	86.3%
- N (g/l) as ammoniacal nitrogen	160
- S (g/l)	346
- SO_3 (g/l)	863
- Chemical formula	$(NH_4)_2S_2O_3$

APPLICATION	DOSE PER APPLICATION	GROWTH STAGE	COMMENT
Thio-Sul (when combined with UAN)	15 to 20% Thio-Sul® ratio	During growth	With each UAN application
Soil	10 to 150 l/ha	Before planting or during growth	Avoid product contact with the leaves
Fertigation	5 to 15 l/ha	BBCH 30 to 89	7 to 10 days between applications
Top dressing	5 to 10 l/ha	BBCH 70 to 89	3 to 6 applications spaced 14 days apart



KTS

Characteristics and advantages

- The concentrated liquid form is ideal for applications in low water volumes and for large areas.
- Active thiosulfate technology enhances the uptake of phosphorus and micronutrients present in the soil or from fertilization.
- The neutral pH level is ideally adapted to tank mixtures with acid or base sensitive materials.
- KTS contains the two key crop nutrients potassium and sulfur, and it is chloride and nitrate free.
- Available in bulk and in 1,000 l containers.
- Can also be applied to the soil as a starter fertilizer (with P-Sure®) and in overhead pivots and sprinklers.
- The thiosulfate form of potassium is taken up rapidly by the leaves.

Specifications

Potassium thiosulfate	
- K_2O (w/w)	25%
- S (w/w)	17%
- pH range	6.8 - 8.5
- Density range (at 25°C)	1.45 - 1.49

Typical properties

- Appearance/color	Clear and colorless
- Density (at 25°C)	1.47 kg/l
- Salt Out Temperature (SOT)	- 10°C
- SO_3 (w/w)	42.4%
- K_2O (w/v)	36.8%
- S (w/v)	25%
- SO_3 (w/v)	62.4%
- K_2O (g/l)	368
- S (g/l)	250
- SO_3 (g/l)	624
- Chemical formula	$K_2S_2O_3$

APPLICATION	DOSE PER APPLICATION	GROWTH STAGE	COMMENT
Soil	10 to 30 l/ha	Before planting or during growth	According to soil types
Starter injection	10 to 50 l/ha	At planting	1 application 5 cm aside and 5 cm below the planting line
Fertigation	5 to 15 l/ha	BBCH 30 to 89	7 to 10 days between applications
Foliar	5 to 10 l/ha	BBCH 70 to 89	3 applications spaced 14 days apart

CATS

Characteristics and advantages

- CaTs is a neutral to basic, chloride and nitrate free, clear solution.
- CaTs may be applied by drip, sprinkler, or flood irrigation.
- It may be blended with other fertilizers or applied as a foliar treatment on selected crops.
- When used as a foliar fertilizer, CaTs should first be diluted with water before application.
- Blends of CaTs should not be acidified below a pH of 6.0.
- CaTs may be used as a fertilizer for the correction of calcium deficiency.
- CaTs is an effective water soluble source of calcium and thiosulfate sulfur which assists in the correction of these nutrient deficiencies in crops.
- CaTs may be used to improve water infiltration and assists in terms of leaching of harmful soil salts.
- CaTs is compatible with most fertilizer solutions.
- CaTs is not compatible with phosphate, sulfate and ammonium thiosulfate fertilizers.

Specifications

Calcium thiosulfate	
- Ca (w/w)	6%
- S (w/w)	10%
- pH range	6.5 - 8.8
- Density range (at 25°C)	1.22 - 1.26

Typical properties

- Appearance/color	Clear and colorless
- Density (at 25°C)	1.25 kg/l
- Salt Out Temperature (SOT)	0°C
- CaO (w/w)	8.4%
- SO_3 (w/w)	25%
- Ca (w/v)	7.5%
- S (w/v)	12.5%
- CaO (w/v)	10.5%
- SO_3 (w/v)	31.2%
- Ca (g/l)	75
- S (g/l)	125
- CaO (g/l)	105
- SO_3 (g/l)	312
- Chemical formula	CaS_2O_3

APPLICATION	DOSE PER APPLICATION	GROWTH STAGE	COMMENT
Soil	100 to 350 l/ha	Before planting to BBCH 09	1 to 2 applications and avoid contact with leaves
Fertigation	30 to 50 l/ha	BBCH 10 to 89	4 to 5 applications during the season
Foliar	5 to 10 l/ha	BBCH 70 to 89	2 or 3 applications spaced 10-14 days apart

FERTILIZATION PROGRAM

BREAKDOWN OF FERTILIZATION FOR POTATOES (EXPORT)

TYPE	YIELD	N	P_2O_5	K_2O	SO_3	CaO	MgO
	(t/ha)	kg/ha					
Seed Potatoes	30	110-130	40-70	150-200	10-15	5-10	20
Ware Potatoes - Main Season	50	180-220	60-90	300-400	20-30	15-25	30
Fresh Potatoes - Early Season	30	130-220	40-70	200-250	15-20	10-15	20
Processing Potatoes	50	180-200	60-90	250-300	15-20	10-15	30
Potatoes for Industrial Applications	60	180-220	80-110	250-350	15-25	10-20	30

TESSENDERLO KERLEY FERTILIZATION PROGRAM FOR PROCESSING POTATOES (50 T/HA YIELD)

	PRE-PLANTING GERMINATION	VEGETATIVE GROWTH	TUBER INITIATION	TUBER ENLARGEMENT	MATURITY	POST HARVEST
LIQUIDS						
Thio-Sul (l/ha) (when used in combination with UAN)*	10 l/ha	40 l/ha	20 l/ha	30 l/ha	0	50 l/ha
KTS (l/ha)	30 l/ha starter	3 x 15 l/ha fertigation	3 x 15 l/ha fertigation	3 x 10 l/ha foliar	0	0
CaTs (l/ha)	75 l/ha (at pre-planting)	0	3 x 15 l/ha fertigation	0	0	50 l/ha
P-Sure (l/ha)	70 l/ha starter	0	70 l/ha with UAN	0	0	0
WATER SOLUBLES						
K-Leaf (kg/ha)	0	0	1 x 12 kg/ha foliar	3 x 10 kg/ha foliar	0	0
SOLIDS						
GranuPotasse (kg/ha)	200 kg/ha (at pre-planting)	150 kg/ha	0	0	0	0

* blend with UAN at 15 to 20%

Fertilization program is for illustrative purposes. Many different products are available for use in fertilization and fertilizer choice will depend a many different factors. Always consult our qualified agronomist.

GUIDELINES

General

- Do not apply products to crops which are sensitive to the effects of sulfur.
- Use the correct type of spray nozzles that are recommended for foliar applications.
- Contact a representative of Tessenderlo Kerley International if you require any additional information.
- The purpose of this brochure is to provide information about fertilizer products and to make suggestions regarding their use in potatoes. The exact quantities of nutrients required by the crop will depend on local growing conditions including, but not limited to, soil type and nutrient content, climate conditions; crop variety, target yield, etc.
- Use of tissue and soil analysis to determine crop and soil nutrient status is recommended.
- Tessenderlo Kerley International recommends that you seek advice on your specific fertilization program from a qualified agronomist.

Liquids

- Do not apply products to soils that have a very low pH level.
- Do not apply products when the temperature exceeds 30°C. Ensure you apply products (preferably) early in the morning or in the evening. When mixing with other products, it is recommended to conduct a small-scale trial in order to check the compatibility of the mixture before operating on a larger scale and spraying.

Water solubles

- Continuous agitation or stirring will speed up dissolution.
- The time required to dissolve the product, however, will also depend on the quality and temperature of the spraying water. Poor quality water may affect solubility.
- To get the best results from the products:

1. Fill the tank with water to at least two-thirds of its capacity.
2. Add the product taking care not to exceed the maximum recommended concentration.
3. Maintain stirring or agitation throughout the entire operation.
4. Fill the remainder of the tank with water.
5. Check that the product has dissolved completely before using the solution.
6. The use of filters is recommended, as generally advised for most solid fertilizers when used in solution.

- Do not apply products when temperature exceeds 30°C - apply products preferably early in the morning or in the evening.
- Do not mix sulfates with materials containing calcium.
- When mixing with other products it is recommended to conduct a small-scale trial to check the compatibility of the mixture before operating on a larger scale.
- Store products in dry conditions, avoiding extreme heat or cold.

Always respect and comply with local legislation and regulation regarding the use of fertilizer products.

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

MagThio® Thio-Sul®

SoluPotasse® Solucros®

HIGH QUALITY SOLID/SOLUBLES

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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