TECH NOTE SERIES

SAP
SUPER ABSORBENT POLYMER

INTRODUCTION

GROSAFE SAP is a high performance, super absorbent, polymer based, water retainer scientifically formulated using an innovative cross-linked co-polymer of potassium polyacrylate. GROSAFE SAP super absorbent polymer has a range of applications but is primarily used as a highly effective water retainer for soils and substrates in agriculture and horticulture. It is nontoxic and safe to the environment.

Water Retaining Agent

As a super absorbent polymer (SAP), potassium polyacrylate can increase moisture availability to plants.

It mixes with soil to increase the soil's capacity for holding water (in the form of a water gel which is active in the soil for 2-3 years) and making it available to plants. This improved soil readily releases moisture, along with water-soluble nutrients, to plant roots on demand. The specific retention of potassium polyacrylate is weaker than the roots of most plants.

It can be used in seed coating, growing seedlings, planting crops, topdressing of crops, planting/transplanting trees, flower storage and transport etc.

Pack sizes: 25kg

Mechanism

SAP works in a similar manner to a sponge under the soil surface. It is composed of a set of polymeric chains, which are linked together chemically to become a water-insoluble, net-like matrix that gently attracts and holds hydrogen molecules. The immense size and weight of its molecular structure allows each SAP granule to absorb over 500 times its original weight in purified water (150 times when incorporated in soil).

It does not 'bind' water tightly. The SAP granules release just the right amount of water in response to a plant's root suction. There is no waterlogging or other ill effects caused by 'free' water filling air cavities in the soil.

SAP maximizes plant growth by reducing plant stress. It also absorbs and releases soil nutrients, water-soluble fertilizer and chemicals in the same manner as water, creating a healthy microenvironment in the plant root zone. The result is faster germination, quicker emergence of seeds, consistent growth and higher, better-quality yields of edibles with less water and fewer inputs.

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As a soil amendment, SAP can improve the soil water holding capacity.

Prevention of Nutrient Leaching

It is well acknowledged by the science fraternity that nutrients applied as surface fertilisers or fertigation have the capacity to leach from the root zone of the crop, becoming unavailable to the target plants and causing contamination of ground water and aquifers. Nitrogen is particularly susceptible to leaching but all soluble nutrients behave in this manner to some degree.

Depending on the soil type and organic matter content large amounts of fertiliser are leached when dissolved in soil moisture (rain or irrigation) creating serious environmental issues and financial loss.

SAP has the capacity to intervene in the leaching process and absorb nutrients in solution, releasing them on demand by the plant roots, creating an efficient relationship between applied fertiliser, soil moisture and plant demand.

PRODUCT DETAILS

SAP is a highly efficient polymer based water retainer that, when incorporated into a soil or a substrate, will absorb and retain large quantities of water and nutrients. Unlike most products that become hydrated, SAP can easily release absorbed water and nutrients, thereby allowing crops to access the water and nutrients available at will, as a function of the absorption and release cycles.

Features of Grosafe SAP

- Absorbs water up to 500 times its own weight in deionised water (150 times in soil).
- Non-toxic.
- Bags of 25 kg, 30 bags per pallet, total 750 kg.
- 5 year shelf-life.
- 0.5 mm to 3.15 mm size distribution.

Benefits of Grosafe SAP

- High performance super absorbent polymer based water retainer.
- Increases the water holding capacity of soils for 2-3years (up to 5 yrs maximum).
- Reduces water loss. Irrigation frequency may be reduced by 50%.
- Limits losses of water and nutrient due to unwanted leaching.
- Reduces evaporation of water from the soil.
- Improves the physical properties of compacted soils through improved aeration.
- Accelerates plant and crop growth. Water and nutrients are continuously available in the root zone for optimal water and nutrient absorption.
- Protects the environment against drought and groundwater pollution by controlling the release of fertilisers.

How it Works

The high performance polymer used in SAP consists of a set of polymeric chains that are parallel to each other and regularly linked to each other by cross-linking agents, thus forming a network.

When water comes into contact with one of these polymeric chains, it is drawn into the molecule by osmosis.

Water rapidly migrates into the interior of the super absorbent polymer network where it is stored. As the soil or substrate dries out, the polymer then releases up to 95% of the absorbed water back into the soil.

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Arborculture
SAP is highly effective in the planting of trees, shrubs and saplings. It makes it possible to reduce the mortality rate of each crop due to transplanting shock and to enhance root development to accelerate growth and production.

Lawns and Pasture
Water retainers are simple to use throughout the growth cycle of lawns and pasture. They ensure effective germination, faster root development and regular and even growth of lawns. The rooting of sod is also accelerated.

SAP is widely used in landscaping for golf courses and grass in recreational parks and gardens.

Hydroseeding
SAP is commonly used in hydroseeding to stabilise newly graded soils. Mixed with or without cellulose mulch, it makes it possible to maintain a minimum of surface water, which permits rapid sprouting of seedlings even in dry areas. The vegetation cover develops uniformly and rapidly over the whole treated surface. There are no dry spots without grass.

Additionally SAP prevents cellulose mulch from becoming hardpan during a dry spell. The mulch remains aerated and allows the seeds to sprout quickly. SAP also makes it possible to reduce the amount of mulch required.

Soil Mixes
When mixed into a substrate, SAP acts as a super absorbent water retainer to provide a reduction in water stress. It ensures that plant cuttings and transplants take root better and that seedlings grow faster.

Irrigation frequencies are also extended to save water. It is an ideal solution in substrates for containers, hanging plants and house plants.

Watering frequencies are commonly reduced by 30% to 50%, which reduces labour costs and the amount of water used.

Mixing with Fertilisers
To reduce leaching of nutrients added to agricultural soils, SAP may be mixed dry into fertiliser preparations.

The behaviour of plants fertilized with this mixture makes it possible to maintain or even increase yield while at the same time protecting the environment from leaching. Manufacturers' test results also show better root development of the plants.

Fertiliser savings of 15 - 30% can be achieved.

Floral Decoration
SAP is commonly used for colouring the water in glass containers. SAP absorbent polymer in granules is allowed to expand in coloured solutions. The hydrogel created is placed in glass containers in which cut flowers may be placed.

Bare Root Dipping
SAP absorbent polymer can be used for root dipping in order to prevent the desiccation of the roots of seedlings during transplanting or transport over a long distance.

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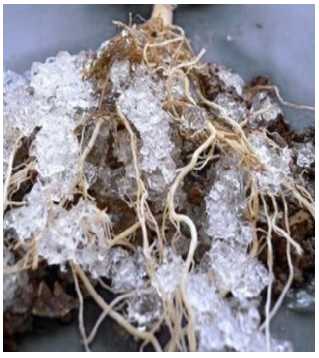
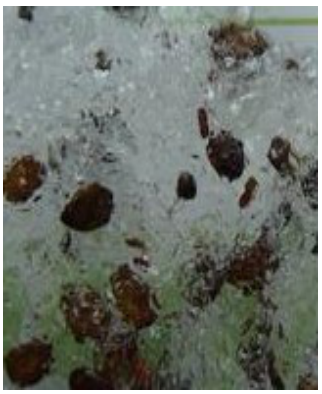
PRODUCT SPECIFICATIONS

PROPERTIES	SPECIFICATION
solid content (%)	85 - 90
appearance of density	0.85
specific gravity	1.10g/cm3
pH	6 - 8.5
appearance	light brown
maximum water absorbency	deionized water: 300 - 500 in soil:150
water supply capacity (15 times atmospheric pressure)	95%
cation exchange capacity	4.6 meq/g
toxicity in soil	none
packaging	25kg Kraft bags with inner
storage temperature	0 - 35°C
shelf life	5 years
activity in soil	maximum 5 years
dosage	substrate: 1 - 2g/L soil: 10 - 15g/m2





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USE RATES

USE SITUATION	USE RATE	COMMENTS
PLANTING	20 - 30g planting hole	Sprinkle SAP over backfilling soil. Backfill ensuring even SAP distribution from the base of planting hole to just below the surface.
SOIL INCORPORATION	100 - 150kg/ha	SAP can be broadcast at the rate of 100 – 150 kg/ha on ground prepared for seeding or transplanting of vegetables and arable crops. Following broadcasting SAP should be incorporated through the soil profile to the estimated root depth of the crop to be sown or planted.
LAWNS & PASTURE	100 - 150kg/ha 10 - 15g/m2	SAP is recommended for use when establishing lawns and pasture by incorporating in the seed bed prior to sowing. This ensures effective germination, faster root development and regular, even growth of lawns and pasture.
MIXING WITH FERTILISER	100 - 150kg/ha	SAP can be premixed with fertiliser and added to the fertiliser hopper and soil incorporated at the time of planting pasture, arable broad hectare or row crops at an effective rate of 100 – 150 kg/ha. When incorporated with fertiliser soil moisture is retained and nutrient leaching reduced. Plants fertilised with this mix demonstrate improved yields, at the same time protecting the environment from nutrient leaching. Manufactures trials show better root development of plants and fertiliser savings of 15% - 30% can be achieved.
UNDERSOWING	100 - 150kg/ha	SAP can be undersown into existing pasture or sward of any horticultural crop (vineyards, orchards) using a calibrated undersowing drill. SAP should be undersown to a depth of 100 – 150 mm in late winter/early spring when soil conditions are moist and drill coulter penetration is enhanced. The rate for undersowing is 100 – 150 kg/ha.
HYDROSEEDING	20 - 30g/m2	SAP can be used in hydroseeding to stabilise newly graded soils. Mixed with or without cellulose mulch, it makes it possible to maintain a minimum of surface water permitting rapid germination of seedlings, even in dry areas. The vegetation cover develops rapidly and uniformly over the whole treated surface. There are no dry spots without grass.
SOIL MIXES	150g/m3	When mixed with a substrate SAP acts as a super absorbent water retainer providing a reduction in water stress. It ensures that plant cuttings and transplants take root better and that seedlings grow faster. Irrigation frequencies can be reduced by 30% - 50%, saving time and water. SAP is an ideal addition to substrates for containers, hanging baskets and house plants.

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