APPLICATIONS IN AGRICULTURE

AQUASORBENT™

AGRICULTURE CAN ALSO BECOME AN ART

SAP
SUPER ABSORBENT POLYMER
AQUASORBENT™ is a biodegradable super-absorbent and has been proven of helping agriculture, agro-forestry and forestry for many years. It absorbs up to 300 times its weight water and slowly releases that water in the root zone for demand by plants. AQUASORBENT™ also absorbs water soluble nutrients and fertilizers, preventing their percolation into the water table. AQUASORBENT™ significantly reduces watering cycles to conserve water for growers. It is effectively applied to prevent plant loss caused by water stress and drought in soil where the water holding capacity is low or non-existent. It even works in sand! AQUASORBENT™ is able to hydrate and re-hydrate many times over its lifetime, providing on-going benefit to the plants.

AQUASORBENT™ also helps build better soil. As water is drawn from the hydro-gel SAP particles by plants, the SAP particles reduce in size, allowing oxygen to occupy the void space and create a better soil environment, while stimulating more vigorous root development. SAP also absorbs and holds valuable fertilizers and nutrients, keeping them at the root level and allowing less of them to end up in the water table.

Additional, AQUASORBENT™ are environment-friendly and are sensitive to the aerobic and anaerobic processes of microbiological degradation in soils so as to naturally degrade in CO₂, H₂O and nitrogen compounds.

**APPLICATIONS:**
- Agriculture, horticulture
- Landscaping, lawn and artificial turf
- Arboriculture, Reforestation
- Bare roots dipping and sowing, seedling transportation
- Hydro-seeding
- Soil & fertilizer mixture
- Seed coating, transplanting soilless cultivation and floral decoration
- Soil conditioner
AGRI-SAP is helpful to the growth of lawn and grass, especially in their germination, fast root development, and regular cycle growth. The stored water from raining or irrigation can be easily released for plants, thereby as a function of the absorption-release cycle. They are widely used in grass for parks and gardens and in lawn for golf landscaping.

**Application illustration:**

1. **Seeds plantation or sod transplant**
   - Loose the soil manually or by plowing and get ready for planting with grass.
   - **Evenly Distribute** AGRI-SAP (20-50g /m²) over the surface of the land. The SAP also can be broadcasted or applied with fertilizers. The dosage (gram per square meter) must be adapted according to the climate, soil conditions and water demand by the plant.
   - Work AGRI-SAP into the soil by hand or mechanically with a disk plow or a rototiller.
   - Spread seeds or lay the sod then roll the soil to compact it.
   - Use fertilizers if necessary.
   - Normally water the area of land with seeds or sod at beginning then the frequency of irrigation may be reduced gradually.

2. **Vertical garden**
   With capacity of water absorption & retention, AGRI-SAP functions as substrate for a temporary or durable installation of a vegetable coat intended to mask or cover roof or any surface by creating a true Vertical Garden. Mixed with substrate (3‰~5‰ weight content), AGRI-SAP is able to slowly release water for plants growing. Furthermore, AGRI-SAP helps to create a better soil environment by allowing oxygen to occupy the void space. Additional, AGRI-SAP prevents roof from water-leaking and reduces more than 50% of water’s supply per irrigation.

**Recommendation:**

AGRI-SAP™ AGR0310
**CHEMISTRY TECHNOLOGY**

**AQUASORBENT™**

**Agricultural Biodegradable SAP**

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**PLANTS, BUSHES AND TREES TRANSPLANTATION**

**AQUASORBENT™** SAP can be effectively applied in arboriculture, such as plants, bushes and trees. They helpfully reduce the mortality rate due to transplanting shock and enhance root development and therefore bring more rapid growth and production. The dosage varies from 1 to 3 kg/m³ according to the sand content in the soil.

1. **The illustration for a successful plantation:**
   - The hole for root is recommended as three times as the volume of the root.
   - Mix 1 to 3 kg of **AQUASORBENT™** into filled soil according to the content of sand in soil. The more sand it contains, the more amount of **AQUASORBENT™** is needed.
   - Place the tree in its proper position and fill the hole with treated soil. Make sure that the **AQUASORBENT™** is well distributed along the root. Finally, cover the upper surface with 5 cm. of non-treated soil to avoid the damage by UV action and stagnation of water on the surface.
   - Here specially notice that not to put unmixed dry **AQUASORBENT™** directly to the bottom of the hole. After hydration, the root of plant would be rotted by over water.

2. **More choices for tree plantation:**
   - **Dilly bag**
     - Put **AQUASORBENT™** into dilly bag (length 40-50cm, width 8-15cm) and then hydrate it completely in water.
   - Put gel bag around root of trees and cover soil. This way is quite suitable for conditions of water lack or that water resource is far from tree plantation sites.
   - You can take dilly bag out after water in gel goes inside soil and re-hydrate SAP again for many times. It is cost-saving and high efficiency.

   **Circum Furrow application**
   - Based on the shadow of trees, dig a circum furrow. To big trees, reduce distance to 50% of circum.
   - Hydrate **AQUASORBENT™** in tank then take gel out.
   - Put gels with fertilizers in furrow, then cover the soil.
   - If necessary, irrigate soil.

   **Recommendation:** **AQUASORBENT™**
   - AGR0310 in coarse soil
   - AGR1020 in fine soil

   **ROOT DIPPING AND SOWING**

   The root dipping is a technique that protects plants before plantation against the water stress for long distance transportation. The dressing is prepared as following:
   - Mix 1kg of **AQUASORBENT™** in 200Kg water.
   - Slowly pour **AQUASORBENT™** into stirred water to prevent dump of particles, then let the solution be 15-20 minutes needed by **AQUASORBENT™** to reach its maximum absorption.
   - If necessary, a water-soluble nematocide and/or fungicide should be added to the solution to protect plants against nematode and fungal attacks.
   - Dip the root of plant into solution then take it out carefully. The behavior of Packaging dipped root with textile to prevent dressing against loss during transportation is recommended.

   **Recommendation:** **AQUASORBENT™**
   - AGR0003
AQUASORBENT™ and SOIL CONDITIONER can be effectively applied in hydro-seeding to stabilize new surface of mountain area or slope of roads. With cellulose mulch, NPK, seeds and other necessary nutrients, the mixture is able to maintain a minimum of surface water, which permits rapid sprouting of seedlings even in dry climate.

Another advantage of AQUASORBENT™ is that they prevent cellulose mulch from becoming hardpan during a dry spell. The mulch remains aerated and allows the seeds to sprout quickly.

Application:
Simply Mix the AQUASORBENT™ and SOIL CONDITIONER with seeds, fertilizers, mulch, etc in tank. Then stir 15-30 minutes before spreading.

Hydro-seeding one hectare usually requires following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>10000 liters</td>
</tr>
<tr>
<td>Seeds</td>
<td>200 kg</td>
</tr>
<tr>
<td>Fertilizers</td>
<td>200/300 kg</td>
</tr>
<tr>
<td>Soil conditioner</td>
<td>3/5 kg</td>
</tr>
<tr>
<td>Mulch</td>
<td>400-1200 kg</td>
</tr>
<tr>
<td>AQUASORBENT™</td>
<td>10/20 kg</td>
</tr>
</tbody>
</table>

Notice: Amounts should be adjusted according to soil types, slope of the terrain, plant seeds, climate, etc.

Recommendation:
AQUASORBENT™ AGR0310 Soil Conditioner: Chemole1000

SOIL MIXTURE, FERTILIZERS BLENDING FOR AGRICULTURE

Mixed into substrate, AQUASORBENT™ provides a reduction in water stress. It ensures that cuttings and trans-plants take root better and that seedlings grow faster. Irrigation frequencies are commonly reduced by 50%, which likewise reduces labor costs and the amount of water. It is an ideal solution in substrates for containers, hanging plants, and houseplants.

Blended with compound fertilizers, AQUASORBENT™ is able to absorb and maintain nutrients and then release them gradually, resulting in reducing leaching of nutrients in the soil and increasing yield while at the same time protecting the environment from leaching. Fertilizer manufacturers can add AQUASORBENT™ as water-saving functional agent in compound fertilizers to enhance efficiency.

Application:
1. Gel absorption:
Mix SAP, fertilizer, and nutrient or pesticides to form saturated water gel. Then dry the water gel with abundant nutrients for ready usage.

2. Blending granulation:
Blend SAP and soil conditioner in present fertilizer formula to granulate for compound fertilizer. They are helpful to maintaining water and nutrients and slowly realeasing them.

Dosage: 5-10 kg in one MT substrate such as fertilizer, WT

For more information about applications, please contact our technical experts.

Recommendation: AQUASORBENT™
AGR0003 for fertilizer      AGR0310 for soil blending
**AQUASORBENT™ can be used as seed coating, seed dressing, or soaking. This technique is applied to alfalfa, cereals, cotton, pine trees, eucalyptus, etc. The coating can improve the germination 25% as well as the root development during the first growing phases.**

**Operation illustration:**
Take ratio of AQUASORBENT™: water = 1:100 ~ 1:200 to produce hydrogel (AQUASORBENT™ must be evenly dispersed into the water while stirring water, otherwise AQUASORBENT™ will be bumping to fast-absorbent block). And then put seeds in the gel and make them evenly dispersed in the gel. After 4 ~ 6h setting, take seeds out and dry them by sun or heating air until the surface of seeds has formed a layer of film to get ready for planting. After sowing, it is necessary to irrigate by enough water in the absence of precipitation.

The particle size of AQUASORBENT™ for seed coating should be at least 120 mesh with a lower gel strength, fast absorption rate and high absorption time.

**Recommendation:** AQUASORBENT™ AGR0003

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**SOIL CONDITIONER**

Soil conditioners are complete ranges of agricultural PAM amendments for a better soil protection and higher yields. They are specifically designed to control soil erosion and improve water infiltration. They cover a wide range of high molecular weight, which works effectively to limit soil erosion through cohesion; reduces soil compaction due to surface roughness from agglomeration; and significantly reduces soil, fertilizer and pesticide loss resulting from runoff.

**Function:**
- Stop soil erosion
- Improve water infiltration
- Improve seed emergence and root development
- Reduce nutrients and pesticides runoff

**Application instruction**

<table>
<thead>
<tr>
<th>Products recommended</th>
<th>Application rate</th>
<th>Application Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furrow or flood irrigation</td>
<td>Powder or Tablet</td>
<td>1 to 2 kg/Ha diluted in the irrigation water</td>
</tr>
<tr>
<td>Sprinkler irrigation</td>
<td>Emulsion</td>
<td>3 to 6 l/ha injected into the pipes</td>
</tr>
<tr>
<td>Rainfed crop</td>
<td>Powder</td>
<td>5 to 10 kg/ha applied in dry form</td>
</tr>
</tbody>
</table>
### TECHNICAL DATA SHEET

<table>
<thead>
<tr>
<th>ANALYSIS</th>
<th>Unit</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td></td>
<td>White or light yellow, granular</td>
</tr>
<tr>
<td>Particle sizes:</td>
<td>mm</td>
<td>Fine, powder, granular, SB: 2.0-4.0, MS:1.0-2.0, SS: 0.3-1.0,</td>
</tr>
<tr>
<td>Odor:</td>
<td></td>
<td>Imperceptible</td>
</tr>
<tr>
<td>Moisture:</td>
<td>%</td>
<td>15 Max.</td>
</tr>
<tr>
<td>PH:</td>
<td></td>
<td>7.0-8.0</td>
</tr>
<tr>
<td>Free Acrylamide Content</td>
<td>ppm</td>
<td>500 max</td>
</tr>
<tr>
<td>Bulk density:</td>
<td>g/cm³</td>
<td>0.80~0.85</td>
</tr>
<tr>
<td>Water solubility:</td>
<td></td>
<td>Insoluble</td>
</tr>
<tr>
<td>Toxicity in soil</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Shelf life</td>
<td>years</td>
<td>2</td>
</tr>
<tr>
<td>Degradability in the soil</td>
<td>years</td>
<td>1-5( depending on soil condition)</td>
</tr>
<tr>
<td>Package</td>
<td>kg</td>
<td>25Kg bag, 750Kg sack</td>
</tr>
<tr>
<td>Absorbency</td>
<td>g/g</td>
<td></td>
</tr>
<tr>
<td>deionized water</td>
<td></td>
<td>250-400</td>
</tr>
<tr>
<td>0.9% NaCl</td>
<td></td>
<td>60-100</td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td>150-200</td>
</tr>
</tbody>
</table>

### Biodegradable & environmentally friendly

**AQUASORBENT™** and **SOIL CONDITIONER** are sensitive to the actions of ultraviolet and bacterial biodegradation. So they naturally degrade in the soil in CO₂, H₂O and nitrogen compounds. Thus, they are not only non-toxic but also biodegradable and environmentally friendly.
CHEMOLE® Chemistry Technology Group specializes in technology researching, manufacturing and practical application of Polymers. Based on strong technical competence and experienced market activities, CHEMOLE Group is being globally recognized as manufacturer of polymers and special chemicals. Our products have been extensively applied in oil exploration, paper-making, textile, water treatment, cosmetics, mining, steel, agriculture, personal hygiene, architecture, and special industrial fields.

Chemole Aquasorbent (Tianjin) Co., Ltd. managed by Chemole group, manufacturers many kinds of Super Absorbent Polymer (SAP) which are extensively used in so many fields as Agriculture water-retention, Soil conditioner, Fertilizers mixing, Arboriculture, Lawns and sod, Hydro-seeding, Bare rot dipping, Floral decoration, Cable water-resistance, Personal sanitary usage, and Special fields.

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