

STOCKOPAM®



AMERICAN SOIL TECHNOLOGIES, INC.
presents

AGRICULTURAL TECHNICAL USE GUIDE
FOR STOCKOPAM®

TABLE OF CONTENTS:**Page 2**

Introduction

Page 3

Product Characteristics

Page 4

Features and Benefits

Page 5

Product Performance

Page 6

Product Performance, Rates and Usage

Page 7

Rates and Usage



For centuries, farmers relied on rainfall to raise a crop. Thanks to the ancient Romans and Egyptians, and the irrigation systems and aqueducts they built, production agriculture took root in otherwise arid and inhospitable climates. With a more reliable food supply, populations grew and great civilizations thrived.

Much like the challenges met by those agricultural engineers of old, today's farmers are faced with meeting mankind's growing demand for food and fiber, on already overburdened aquifers.

With more than 60% of the world's croplands receiving most of its water needs via irrigation, the question remains: How can producers improve the efficiency of their irrigation systems?

American Soil Technologies, Inc., a worldwide leader in the marketing of specialty polymers, offers a formulation of a polymer – Stockopam® – which offers an effective and economical answer to that question.

CONTACT INFORMATION:

To obtain information about Stockopam, or to locate the sales representative nearest you, call American Soil Technologies, Inc., toll-free at 800-798-7645 or 818-899-4686. Check out our Web site at www.americansoiltech.com.

WATER MANAGEMENT AT A CROSSROADS

With the high premium placed on available water stores by local and federal authorities, producers who rely on irrigated water to raise their crops need a tool which delivers better efficiency to their irrigation systems. Stockopam is perfectly

suitable for increasing irrigation efficiencies. When used properly, this product can:

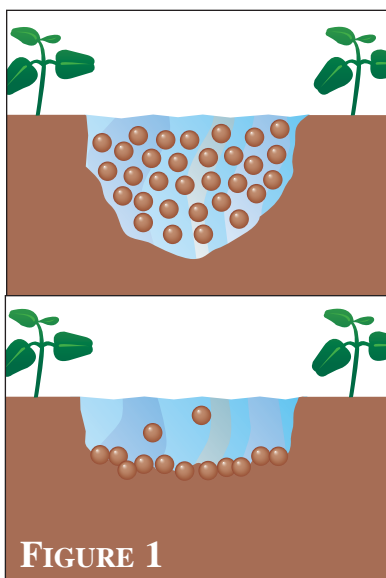
- Reduce soil erosion by 99%;
- Increase lateral wetting up to 25%;
- Increase net water infiltration up to 40%;
- Reduce soil crusting; and,
- Reduce nutrient and pesticide runoff.

What do these benefits mean to producers? Quite simply, Stockopam allows producers to get more bang for their irrigation buck.

For example, after irrigation, water usually settles, or ponds, in the rows. On a Stockopam-treated yield, instead of moving vertically through the upper soil horizon, water begins moving laterally toward the plant rows where it's most beneficial.

In some cases, massive erosion can leave cuts up to 10 inches deep. Reducing these cuts allows water to penetrate the entire root system rather than the bottom 2 to 3 inches alone.

Since Stockopam reduces soil crusting, subsequent waterings become more efficient as water penetration greatly improves in treated fields. And with a huge



reduction in soil erosion, there's less gouging in the middle, soil stays put, and less water is required to satisfy the needs of the crop (see Figure 1).

HOW DOES IT WORK?

Stockopam is a dry granular formulation of linear sodium polyacrylate/polyacrylamide copolymer.

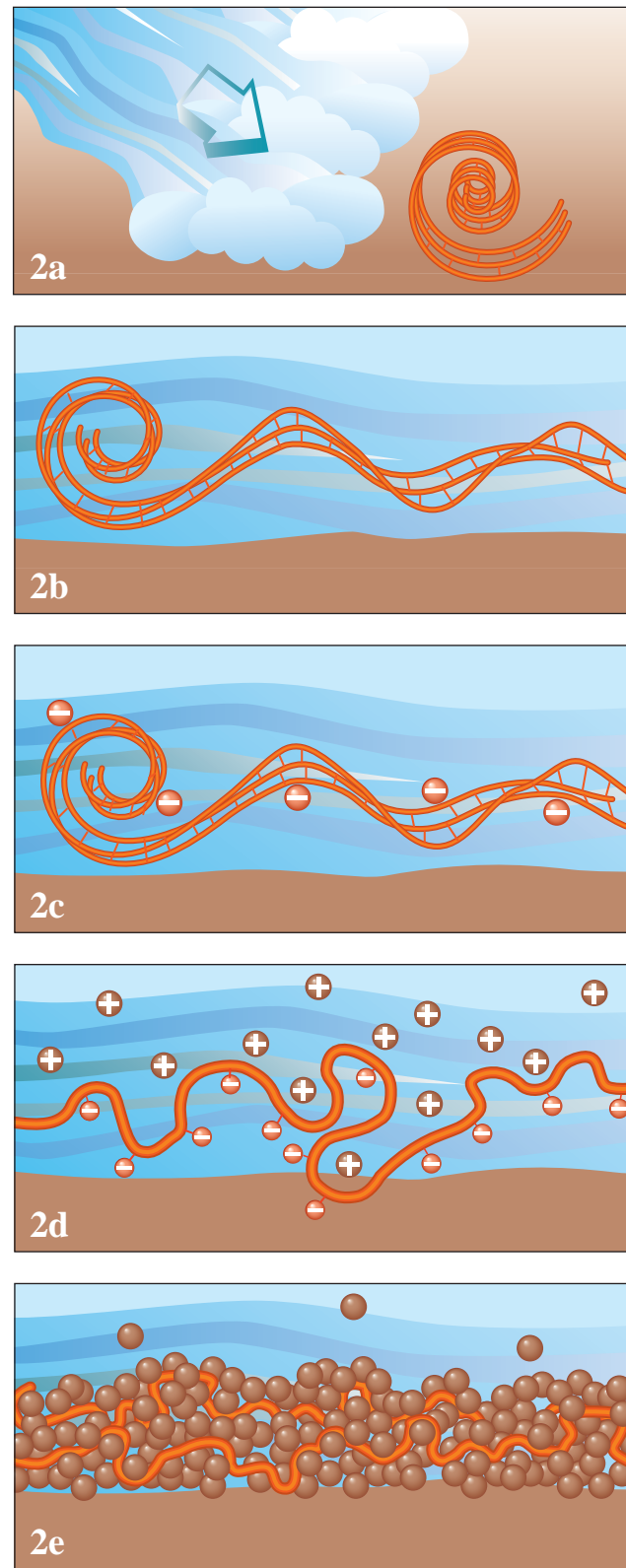
Stockopam has a high molecular weight and is soluble in water (2a). The surface of soil particles suspended in water becomes positively charged by cations that bind to the negatively charged soil particles. This binding action provides a bridge for the dissolved polymer's negatively charged structure (2b) to bind to the soil particles (2c).

This mixture of soil and polymer bind together (agglomeration – 2d). The resulting agglomerations are too large to remain suspended and consequently settle-out (2e) in the irrigation furrow. This effect (poor drainage soils included) of Stockopam can also greatly improve water infiltration in addition to limiting soil erosion.

Test results confirm that Stockopam:

- 1) Limits soil erosion through cohesion;

FIGURE 2



- 2) Reduces soil compaction due to surface roughness from agglomeration; and,
- 3) Significantly reduces soil, fertilizer and pesticide loss resulting from runoff.

Stockopam, while similar in function and efficacy of treatment to emulsion formulations, is specially designed to ensure ease in application in gravity-flow irrigation systems.

REDUCES RUNOFF

Soil nutrient retention also is aided by the negatively charged sites along the polymer structure. Positively charged nutrients (like those found in soil) are electrostatically bound to negatively charged sites (the polymer). This bond is strong enough to slow leaching, thus making these nutrients available for plant uptake.

HANDLING AND STORAGE

Stockopam exhibits a very low degree of toxicity. In case of accidental contact with the skin or eyes, flush with plenty of water. In addition, breathing dust from the dry formulation should be avoided. Be sure to consult the MSDS for each product before using.

HANDLING TIPS FOR STOCKOPAM

- If spilled, simply scoop up the material.
- Keep stored in a **DRY PLACE** and **NEVER ADD WATER** to clean up a spill.
- The wetted form of Stockopam becomes very slippery.
- Mix wet spills with sand or dirt before disposal.
- Store product in original container.
- Do not reuse container, dispose of properly according to state/local regulations.

ENVIRONMENTALLY FRIENDLY

Stockopam breaks down into carbon dioxide, water and ammonia, and is labeled as safe to use on all crops. Crops may be planted, seeded or transplanted immediately before or after application with no negative effects. Stockopam meets all USDA Natural Resources Conservation Service standards. It features a less than 0.05 residual monomer rating, an anionic charge of 30 to 35%, and a molecular weight of 12 to 15 million MW.

FREE UP YOUR MONEY

Clearly, the biggest benefit which Stockopam delivers is the improved efficiency of irrigation systems. Better water penetration and infiltration, less soil movement and erosion,

cleaner tail waters, less pesticide and soil runoff and decreased water usage all add up to better performance and huge savings to growers.

With increased intervals between irrigation cycles, reductions in labor, material handling and electricity alone will pay for your Stockopam use many times over. As a result, this product has the potential to free up your wallet and make your other crop inputs work harder to boost yield and profit potential for you.



During the course of conducting research plots and evaluations from grower research trials, several other key benefits were found which make using Stockopam an even bigger value to producers of food and fiber.



HARVEST AIDS

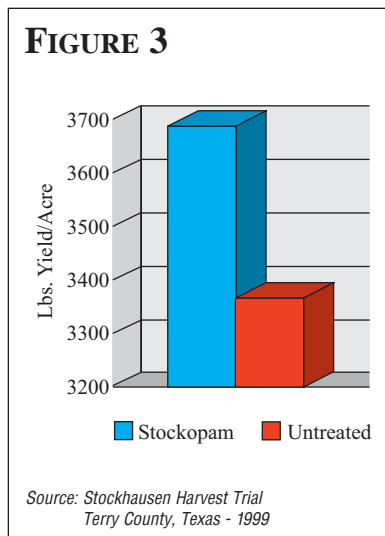
As a harvest aid, Stockopam works to accomplish two things: one, treated soils are more “mellow” and less prone to crusting and; two, mellow soil isn’t as likely to form “clumps” in root crops, which reduces dockage due to foreign material.

Producers of subsoil crops like peanuts and potatoes should be especially interested, since dockage due to foreign material could steal thousands of dollars right off their bottom line.

Stockopam was made into an emulsion formulation and used in a peanut trial conducted in Texas in 1999. The emulsion was applied in the final irrigation before harvest on a 120-acre field of peanuts. The goal of the trial

was to see how the polymer could aid in the harvest and recovery of peanuts. Half the field received a treatment of Stockopam emulsion and the other half didn’t. The results were noteworthy.

By looking at the yield data (see Figure 3) the treated half yielded 315 pounds per acre more than the untreated half, that’s an 8.5% increase. On quota-raised peanuts, that’s an additional \$50 to \$100 per acre bonus. Plus, with the treated soil having considerably fewer clumps containing fewer peanuts, the secondary threat of having to manage volunteer peanuts is significantly reduced. This puts even more money in the grower’s pocket.



SANDY SOILS

Growers who irrigate in sandier soils have significant problems with rapid water



loss and, in pivot irrigated fields, additional problems with “desanding” their center pivots. Since linear polymer-treated soils tend to resist wind and water erosion, sand buildup around pivots is reduced.

As for moisture retention, it appears treated soil keeps moisture in the top two inches of soil longer than in untreated soils. In fact, it kept the top part of the soil wet for a day after the irrigation process was completed.

SALINITY REDUCTION

Below average rainfall and increased pressure on existing water tables has brought about a problem with excess sodium in water tables around the country, particularly in the Southwest. These conditions often force growers to pump ground water past reasonable levels to maintain crop production, which isn’t good for profits or stressed aquifers.

Stockhausen conducted trials in 1999 to determine whether Stockopam applied

as an emulsion formulation could reduce the sodium levels in sandy/sandy loam soils of west Texas. By reducing sodium levels in the top foot of the soil, it's believed that growers will experience less salt-encrusted surface soil (which impacts irrigation efficiency). By keeping sodium below 12 inches, Stockopam will reduce the amount of stress high-sodium soils place on seedling germination, maintaining a nutritional balance for the crop and plant vigor.

Prior to treatment, soil sodium levels were taken 12 inches deep at three different sites. After one treatment – 64 oz. of the emulsion injected directly into the main flow of the water system – additional samples were taken and analyzed. The results speak for themselves (Figure 4). Sodium reductions ranging from 19% to 47% demonstrate vast potential for improved

soil health for producers with high sand, high sodium-type soils.



APPLICATION RATES AND USAGE

With patience and attention to detail, putting the power of Stockopam to work for you is relatively simple.

Stockopam is available in 50 lb. bags and 15 lb. pails. Using a 1 lb./acre rate, apply during the first post-planting irrigation set and every third irrigation thereafter.

Using a dry granular applicator, apply Stockopam at the top, or head of the furrow, making sure that the powder equipment is kept dry. In a field with 30-inch

row spacing and 1/2-mile rows, 1/2-cup is all that's needed for excellent coverage, depending on soil type.

If you prefer, there are two other options:

- 1) Apply product directly to head ditch upstream from the siphon tubes, where ditch turbulence is the greatest.
- 2) Apply as a pre-dissolved stock solution directly into the head ditch.

To ensure optimum performance, contact your dealer or ASTI sales representative for the best delivery option.

Linear polymer emulsions come in either 5-gallon pails, 30-gallon drums or "totes". The liquid emulsion is added to inflows at approximately 10 ppm during the first post-plant irrigation and reapplied as needed throughout the season. If used as a harvest aid, apply during the final irrigation prior to harvest.

Injection of linear polymer into a chemigation system requires strict attention to detail. Following the directions on the product label and consulting with your sales representative are strongly recommended.

**FIGURE 4 - SODIUM TRIALS;
TERRY AND GAINES COUNTIES, TEXAS**

Trial	Untreated Control	Treated Control	Percent Difference
Trial 1	141 ppm	108 ppm	<23%
Trial 2	214 ppm	113 ppm	<47%
Trial 3	175 ppm	142 ppm	<19%

Source: Stockhausen Grower Trials - Summer 1999



Center pivot systems:

For best results, application should be made prior to any other irrigation, and after all layby field operations are completed. Inject the product directly into irrigation water where the flow is most turbulent to attain through mixing. Pay strict attention to product “pre-mixing” directions. Use hoses and injection parts 1/2-inch or larger, with low volume pumps designed for use with polymers. Clear pump and lines thoroughly with crop oil PRIOR TO

AND AFTER INJECTING the product, to remove any water and/or product residues.

American Soil Technologies, Inc., strongly recommends using a 40 to 80 mesh in-line strainer in the suction tube between the product container and the injection pump.

Irrigation stream/ gravity flow systems:

The product can be applied directly to the irrigation stream via direct metering. The product should be metered into the irrigation system between the irrigation pump and any filters, but under no circumstance ahead of the filters. In most cases the application rate will be 10 ppm, but to ensure optimum performance contact your ASTI dealer

or sales representative.

Remove the 3/4-inch plug from the bung and insert a 3/4-inch petcock, then place the container on its side above the water stream and open the vent. Open the petcock slightly until product flows and use a measuring cup to determine flow rate/minute. Adjust the petcock to achieve correct application rate (10 ppm in most cases).



For a stream with a 450-gallon/minute flow, apply 1 oz./minute.

SUMMARY

Other companies have realized the immense promise polymers hold in improving water efficiency and have rushed to the agricultural market with repackaged products. But none of these companies, or their products, can deliver on that promise like Stockhausen polymer product distributors. Why? Experience and integrity.

With laboratories in

the United States and Germany, Stockhausen manufactures more than 100 years of experience in meeting customers needs.

American Soil Technologies, Inc., is a recognized leader in agricultural polymer technologies and is proud to be Stockhausen’s west coast distributor for agricultural polymer products. Stockhausen is not only a basic manufacturer (not

a re-packager or reseller) but its polymers are fully registered for use in agriculture. This means Stockopam is born of sound research, and backed by a company that will stand by its products.

For more information about Stockopam and other agricultural-use products, call toll-free at 800-798-7645, or visit our Web site www.americansoiltech.com.

STOCKOPAM®



AMERICAN SOIL TECHNOLOGIES, INC.

800-798-7645 or 818-899-4686
www.americansoiltech.com

Stockopam® is a registered trademark of Stockhausen, GMBH.
Always read and follow label directions.