Amway

Presents

APSA-80

Demonstrations

Peat Moss Demonstration

Improving Water Infiltration and Relieving Compaction by Reducing Surface Tension and Lowering the Contact Angle of Water

Materials Needed:

- APSA-80
- 3 small flat shallow flat pans (3–5 in. dia)
- 3 2½ in. dia. Jiify Pot biodegradeable cups
  Ferry Morse Seed or Mckenzie Seed Co.
- Pipet - dropper
- Tap Water

Demo Directions

1.) Pour ¼ cup of ambient water into each small pan

2.) Add 2–3 drops of APSA-80 to one of the pans and mix

3.) Place one Jiffy Pot into the APSA solution and one into water only

Note – 24 hour preparation required

Make up an APSA-80 solution by mixing 1/8 teaspoon of APSA-80 with one cup of water. Completely immerse one peat moss cup in the APSA solution allowing it to thoroughly wet out. Then set the cup on paper toweling and let dry for 24 hours. You can make several, they do last and you can reuse them.

Results

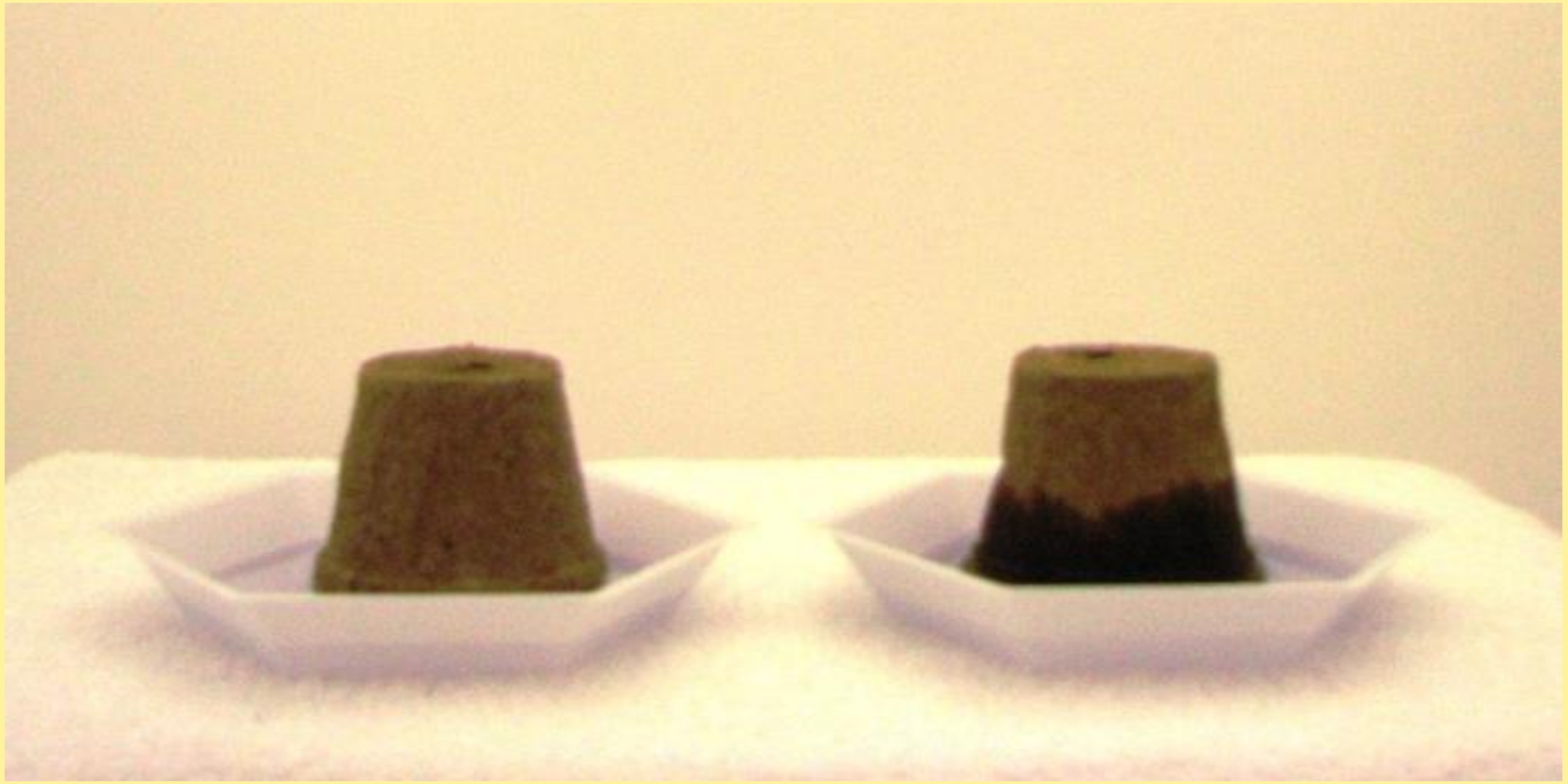
The immediate result will be the APSA-80 treated water will begin to migrate up the side of the Jiffy Pot. The Jiffy Pot in water will only begin to slightly wet out the bottom of the cup. At 3-5 minutes there should be a really good contrast of wetting.

The Jiffy pot is composed of tightly compressed or highly compacted sphagnum peat moss and is similar to soil in that soil and organic material can also become highly compacted and not allow water to be readily absorbed. The demonstration suggests that the water alone with higher surface tension and a larger contact angle could not penetrate or infiltrate the hydrophobic sphagnum peat moss and in the field this could result in slower infiltration or run-off.

Now focus your attention on the pretreated cup by placing it into the 3rd pan of water. Once the cup begins to wet out, explain that the pretreated cup would be similar to your soil in the field that has been sprayed with APSA-80. The contact of APSA-80 surfactant molecule to the soil facilitates the infiltration of rain and irrigation water.

Sphagnum Peat Moss

Demonstration @ Three Minutes



Water Only **APSA-80 Solution**

Wax Paper Demo

Breaking Down the Waxy Plant Leaf Cuticle

By Reducing the Surface Tension & Contact Angle of Water

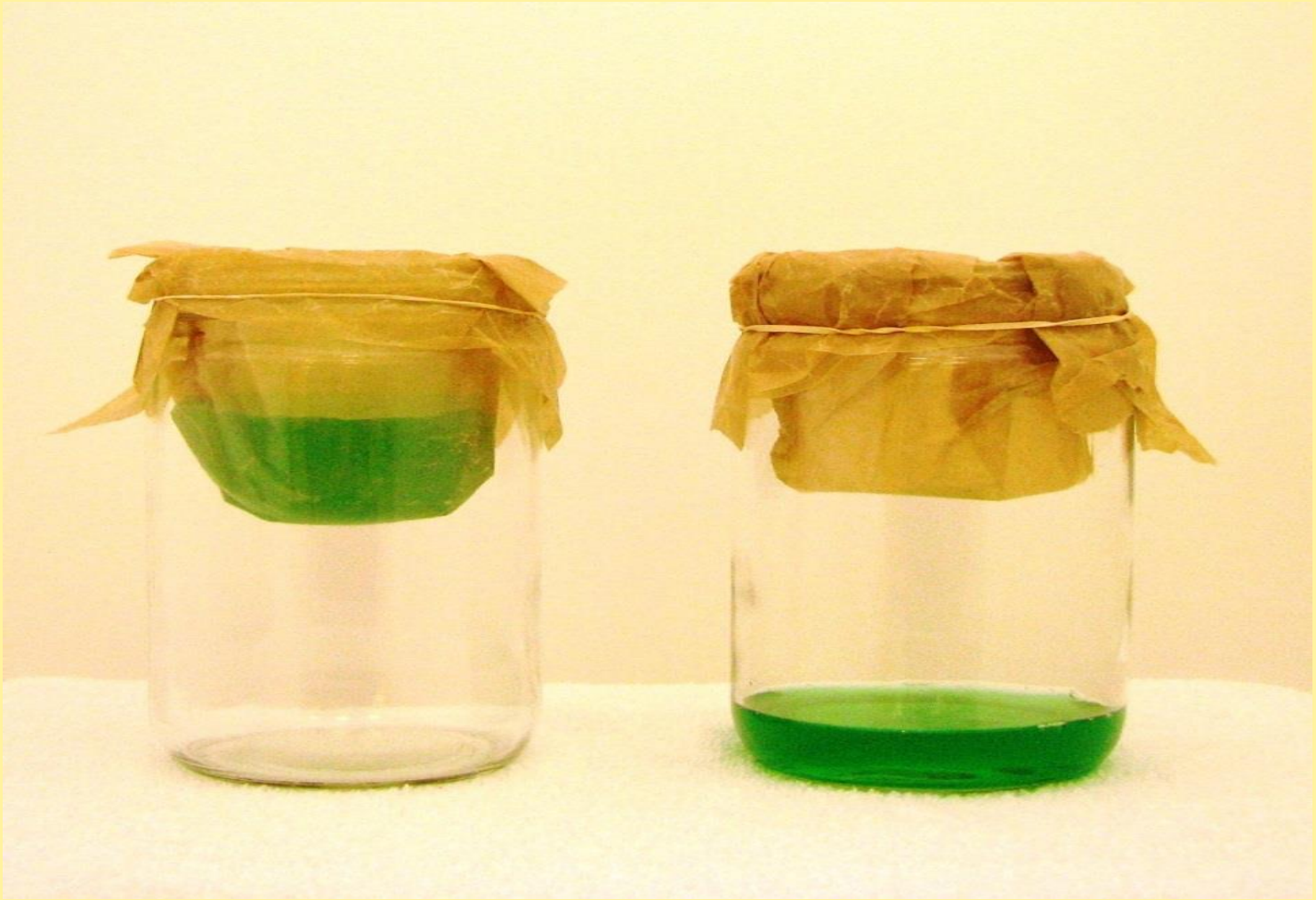
Materials Needed:

- **APSA-80**
- 2 32 oz. wide mouth jars
- Wax Paper
- Green Food Color (optional – used only as a tracer)
- Tap Water
- Pipet

Directions:

1. Form a 12 x 12 inch sheet of wax paper around a 10 oz. drinking glass and lower into the jar using a rubber band to secure the upper portion of the wax paper formed around the jar lip.
2. Wax paper has only one side waxed. Make sure the wax paper with the waxed side is the side that is making contact with the water or APSA solution.
3. Pour ¼ cup of colored ambient water into each formed cups
4. Add 2–3 drops of APSA-80 to one of the formed cups

WAX PAPER DEMO



Water

APSA-80 Solution

Conclusion

In order for most postemergent herbicides and many insecticides/fungicides to work, the active ingredient and the water carrier must penetrate the waxy leaf cuticle or barrier. Once inside the leaf, the active can be translocated to the site at which it is biologically active and kill the weed, insect or microbe. The wax coating on the wax paper simulates the leaf cuticle or insect exoskeleton.

Results:

The immediate result will be that the APSA-80 treated water with lowered surface tension will begin to migrate thru the waxy barrier of the wax paper. Pesticide sprays with APSA-80 penetrates the waxy leaf cuticles making the herbicide in the tank mix work better. The demo may take a minute or two to develop, but after several minutes the results will be quite obvious.

The take away is simple, adding APSA-80 to postemergent herbicide tank mix lowers water surface tension and reduces contact angle allowing the herbicide to penetrate the waxy plant leaf barrier which is necessary for effective weed control.

Soil Composition

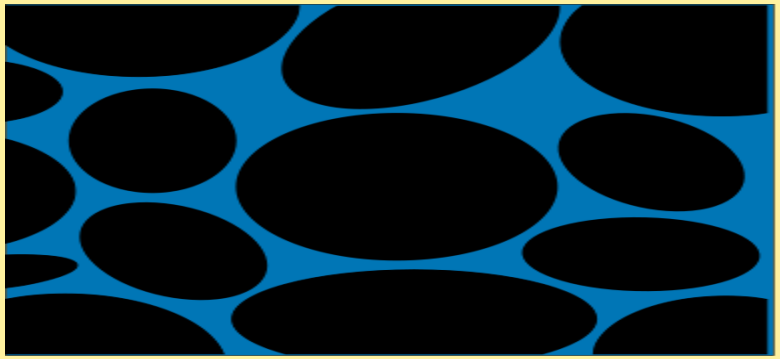
- Typically, a good quality soil is composed of about 45% mineral content; sand, clay and silt, about 25% water, 25% air and about 5% organic material.

- The structure of the soil forms a system of pores or pore spaces that surround the solid particles where air and water mix.

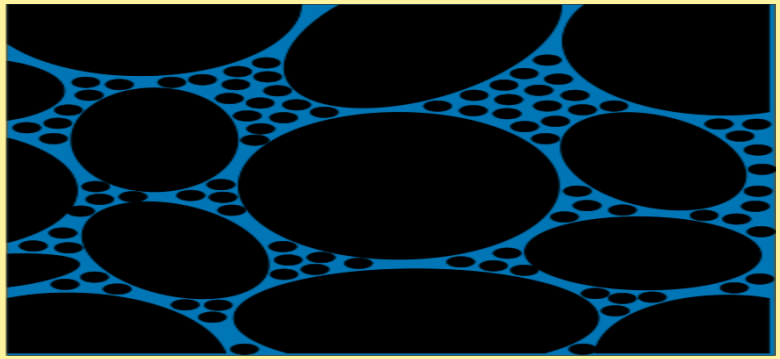
Soil Porosity

Soil is composed of particles that when compacted form two types of pores, Macro and Micro pores. Macropores are the larger pores that allow for gravitational or downward flow of water and Micropores are the capillaries between soil particles that require capillary flow or sideways, upwards and even downward flow that is resistant to gravitational flow

Macropores



Micropores



Surface Tension

- Surface tension of a liquid (water) is the measure of the cohesive properties of that liquid as it relates to the resistance of that liquid to evenly spread over a surface or diffuse into a space.
- Typical surface tension of water is about 72 dynes/cm2, after treatment with APSA-80, the surface tension has been reduced to approximately 30 dynes/cm2.

Contact Angle is Measure of Surface Spread Ability

Contact Angle

- The Soil Water Contact Angle is a measure of the water repellency of the soil.
- Soil Particles coated with organic matter become more water repellant.
- Water can not penetrate capillaries between these particles and can’t hydrate the soil particle surfaces.
- APSA-80 lowers the soil water contact angle which increases soil sorptivity.

Soil Sorptivity

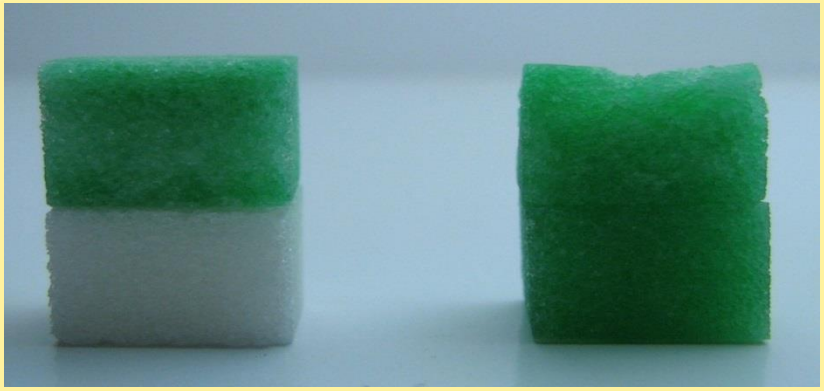
- Soil Sorptivity is the measure of the capacity of the soil to absorb water by capillary action.

- Capillary action, or capillarity, is the ability of a liquid to flow into narrow spaces without the assistance of, and in opposition to external forces like gravity.

Something Sweet

- Sugar cubes are composed of compressed sugar and contain both macrco and micro pores. In this sense they are similar to soil particles with one exception, they are water soluble crystals and will wet very quickly and begin to dissolve.

Porosity Demo



APSA-80 **Untreated**

- **Ten drops of APSA-80 treated water were applied to the top of the first set of cubes. The treated water is slower to wet out the top cube, becoming completely dispersed and retained within the top sugar cube, never migrating into the second cube.**
- **The same amount of untreated water was applied to the top cube of the second set of cubes. Here, the water quickly flowed downward through the first cube and continued into the second cube.**

Demo Summary

What Happened Without APSA-80?

- Water with higher surface tension and a larger contact angle did not enter as many of the micropores.

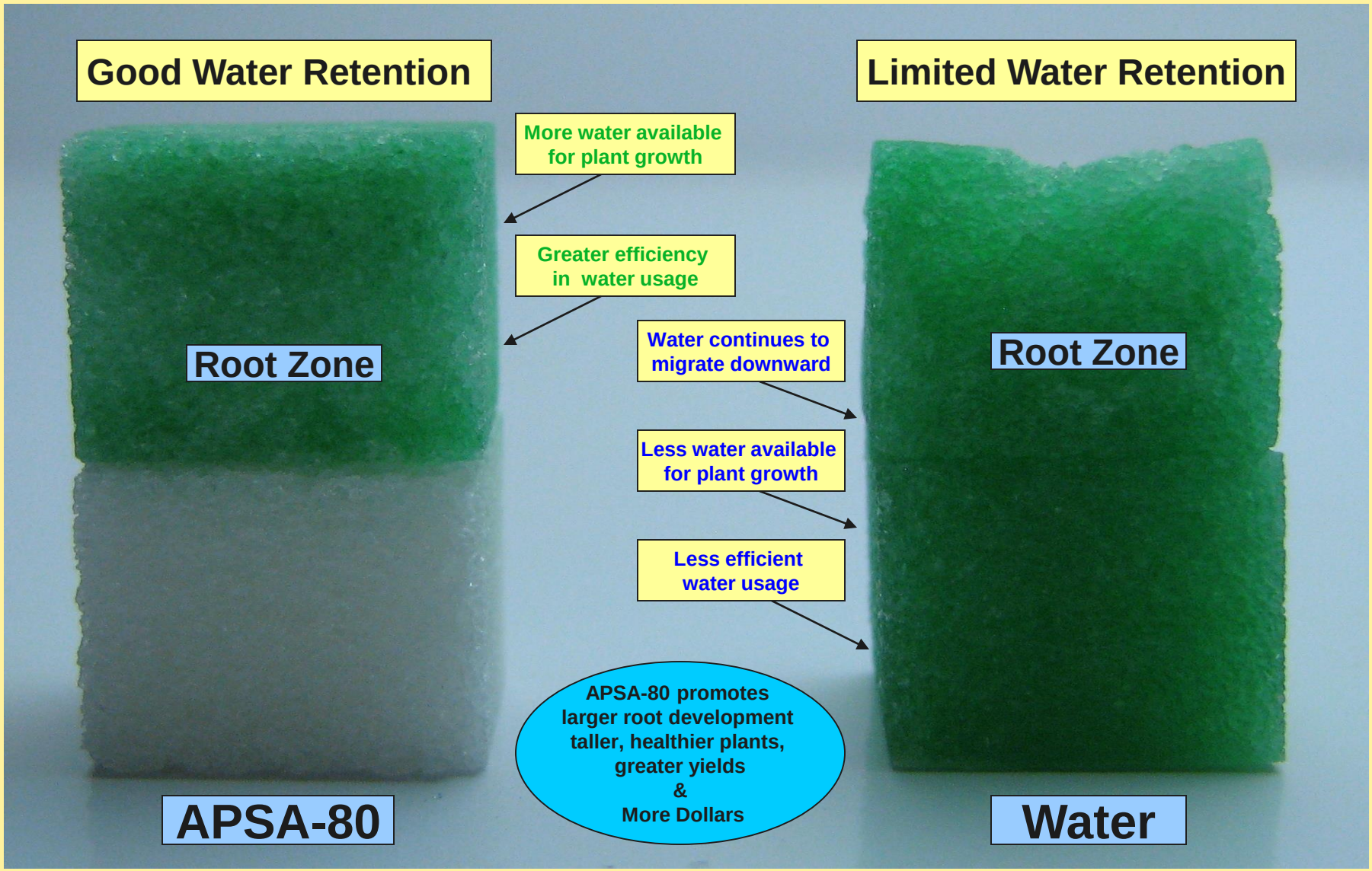
- Water was subjected to greater gravitational flow and downward movement in the sugar cube or soil profile and eventually exiting the root zone.

Demo Summary

What happened with APSA-80?

- Even in a water soluble substrate, APSA-80 treated water with lower surface tension and a smaller contact angle was able to enter more capillary spaces and hydrate more particle surfaces.
- More water was retained in the top sugar cube. Less water is subject to downward gravitational flow.
- With APSA-80 the sugar cube (and soil) has more water holding capacity.

Completed Demo



APSA-80 Porosity Demo

Items Needed:

- Sugar Cubes (Domino Brand)
- Green Food Coloring (McCormick Brand)
- Pipette or Dropper
- Tap Water and an APSA-80 Solution at 0.15%
  (1/8th teaspoon of APSA-80 / 1 cup of water)

Procedure:

1.) Begin the demonstration by stacking 4 – 6 columns of sugar cubes in a row, two cubes per column.

Note! Each sugar cube has a polished side. Place the polished side of the top cube at the top and the polished side of the bottom cube at the bottom.

2.) Add several drops of green food coloring to both the APSA-80 solution and the tap water.

3.) Start the demo by adding 9 – 10 drops of tap water to half of the stacked cubes and 9 – 10 drops of APSA-80 solution to the other half of stacked cubes.

Note! Pipette sizes can vary. Experiment with the number of drops needed to ensure that you do not over saturate the APSA-80 Cubes.

Demo takes about 3 – 5 minutes to fully develop.

Demo Results:

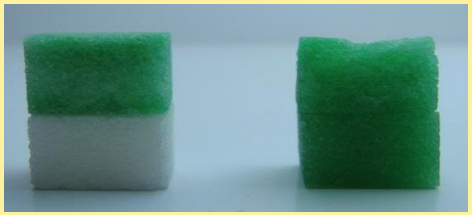
Compressed cubes of sugar consist of both mirco and macro pores. In this sense, they are similar to soil particles with one exception, they are water soluble and will wet out very quickly and begin to dissolve.

APSA-80 Treated Water

Even in a water soluble substrate, the APSA-80 treated water with lower surface tension is able to wet out more of the particle surfaces by thoroughly entering the micropores, thus retaining the moisture in the top sugar cube.

Water

Without APSA-80, the water has much higher surface tension and does not enter as many of the micropores. The water without APSA-80 was subjected to greater downward gravitational flow and eventually exited the root zone. The water treated with APSA-80 has a greater water holding capacity in the sugar cube or soil.



Cardboard Demo

Reducing the Surface Tension & Lowering the Contact Angle of Water

Materials needed:

- APSA-80
- Cardboard Pieces
- Tap Water
- Spray Bottle
- Pipet – Eye Dropper

Directions:

1. Cut several 8 x 10 inch pieces of cardboard. Common cardboard boxes or shippers work great. Remember! Use caution if using a utility knife to make cuts.
2. Prepare a 0.2% APSA-80 solution. (add approximately ¼ teaspoon of APSA to 1 cup of tap water)
3. Using the pipet much like a pen, do a controlled dispensing of the APSA solution writing APSA-80 or your preferred statement on the cardboard
4. Allow at least a couple hours to dry. Make several for future use because they last and can be reused.
5. Using a spray bottle of tap water, spritz over the cardboard piece and reveal the APSA statement.

Conclusions:

The demo reveals essentially what is happening in the field, the water is being absorbed by the cardboard where the APSA-80 solution has been applied. In the field, when APSA-80 is spray applied to the topsoil, it bonds to the soil particles and when it rains, it pulls the moisture in and you benefit from faster infiltration, you have less run off and reduce moisture loss from the wind and sun. The end product is: “You get the most out of your water”.