

## Best Management Practices for soil application of Sulfuric Acid

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Soil amendments, including sulfuric acid should be viewed as an investment, rather than a current expense in agricultural production. By applying the principles of the 4R's, "right product at the right rate, at the right time and right place," plant health, crop yield and uptake of nutrients will improve.

**Right Product** – Use the soil amendment that best suits the crop needs and soil properties. For any sulfur product, including sulfuric acid, indicators includes a high soil pH and medium to high levels of free lime, as calcium carbonate. If a soil test is below 6.0 pH, limestone or dolomite is usually recommended.

Use soil tests to make recommendations on soil amendments and rate of application. Soil tests made within the previous year are preferred. Some laboratories do not do a free lime analysis unless requested. A "fizz test" is an initial field qualifying test, but it should be followed with a laboratory soils analysis. Written summary from the laboratory with recommendations should be requested.

The full benefit of sulfuric acid is available following the first irrigation after application. It may take 3 to 5 years for sulfur to be fully available, depending upon particle size. The conversion rate of sulfur to sulfuric acid is approximately 1:3 based on the sulfur content. When a soil report lists a recommendation for a sulfur application rate, multiple the rate by three to get the sulfuric acid equivalent.

**Right Rate** – The amount to apply should match the amount needed for soil reclamation and crop needs. Too much of a sulfur based soil amendment, including sulfuric acid, may lead to a reduction of soil pH to the point where the soil becomes acidic, or less than pH of 7.0. An exception is blueberries, where a pH of 5.0 is usually desired. When reducing the surface area applied by  $\frac{1}{2}$ , the application rate doubles.

Typical rates of sulfuric acid application are from  $\frac{1}{2}$  to two tons per acre, depending on soil test results and amount of free lime present. It is better to go at a low rate and take soil tests, following at least one irrigation, to determine the effectiveness of the application. Post-application soil tests are recommended and are an indicator the goals have been achieved or if a follow-up application the next season is needed.

Soil conditions may be a result of millions of years of sediment activity. An example is the alluvial fans that filled the Central Valley of California. It may take multiple applications of a soil amendment to bring about change to the desired level for optimum crop production.

**Right Time** – Sulfuric acid is applied to annual crops between crop rotations, when the soil is fallow. Orchard and vineyard applications are made prior to planting or during the winter dormant period.

**Right Place** – Sulfuric acid may be placed solid or in bands on vegetable beds prior to an irrigation and planting. Sulfuric acid may be applied solid or in bands under the drip lines of trees when making orchard applications. Sulfuric acid is typically broadcast solid on open ground.

## **Drift Reduction Plan when applying Sulfuric Acid**

At any given time, something can change. Stop any exposure once you are aware of it. It is better to error on the side of caution. Never be reluctant to take action to protect workers or grower's property. Think about the consequences of your action. The lower the spray pressure, the less the spray drifts. Goal is to keep pressure near 5 PSI.

- Application site is to be visited prior to application by salesman or management
- Use wind speed indicator
- Use wind sock
- Drive around the edges of the field to be treated before starting each day and identify hazards
- Look for cars by houses
- Look for schools, housing
- Look for laundry hanging on clothes lines at adjacent houses
- Prevent dribbles from nozzles from getting on roadways when making turns at the end of the row
- Have a company pickup precede applicator when doing outside row, next to a roadway
- If possible, apply to outside row when wind drift is into the field being treated
- Have grower and/or farm manager phone number available
- Communicate with grower/farm manager and be in agreement on the spray pattern
- Ask grower if harvest crews are expected to arrive while doing the job, or if adjacent fields will be harvested soon

## **Personal Safety when applying Sulfuric Acid**

- Wear required Personal Protective Equipment (PPE)
- Have safety water on site
- Have drinking water on site
- Have MSDS on site
- Have emergency telephone numbers available
- Use a shovel to cover any spills from transfer hoses
- Communicate with the grower
  - Prior to arriving at the job site
  - Notify workers, including farm labor contractors
  - Notify neighbors
  - Notify the grower when the job is completed
- Put padlock on cap on nurse tank when left unattended
- Put label on the nurse tank
- Be sure nurse tank is empty when moving it
- Have extra coveralls available, in case of decontamination and change of clothing is necessary
- If an incident occurs
  - If life threatening, call 911
  - Evacuate upwind
  - Stop application
  - Contact management
  - Decontaminate before transporting affected people