

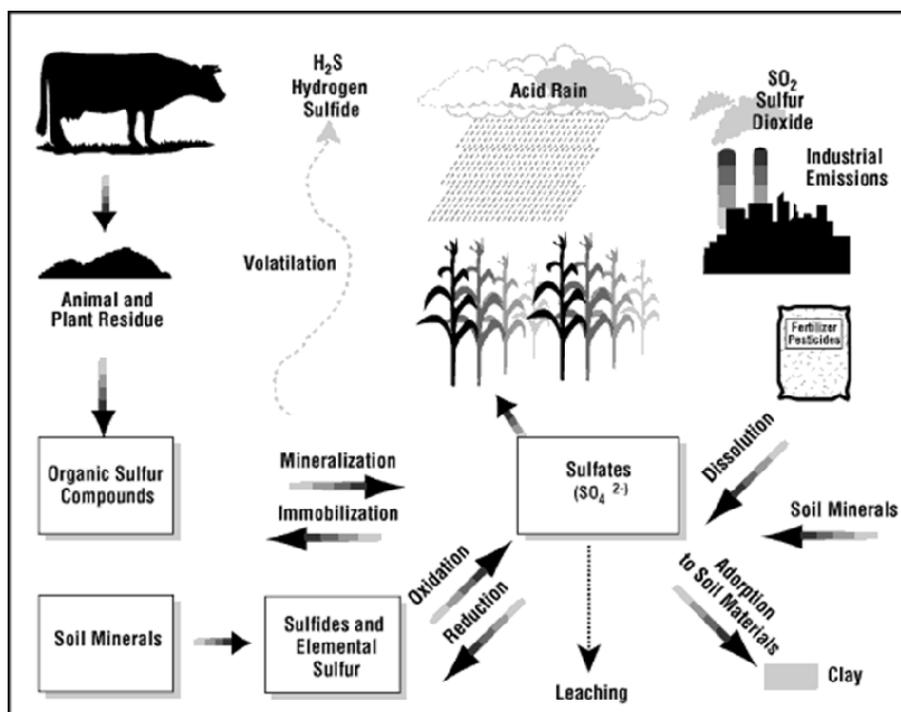


## Sulfur & Plant Nutrition

Due to the amount of attention that sulfur has been getting lately, here is some information that we hope you will find useful.

### The Sulfur Cycle

Sulfur, like other nutrients is found in many different forms. It must be converted into the sulfate ( $\text{SO}_4^{2-}$ ) in order to allow for root uptake and sulfur dioxide ( $\text{SO}_2$ ) to be absorbed through the plant leaves. The illustration below shows us that sulfur can end up the soil in a number of ways. Specifically, industrial emissions, volcanic activity, fertilizer, manure & plant residue. Once the sulfur has reached the soil, microorganisms convert the various forms of sulfur into sulfate and the plant can then utilize it.

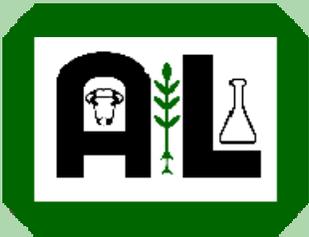


Other than plant uptake sulfur can also be removed from the soil by volatilization, leaching, or can be bound up in the soil making it unavailable to the plant.

### Why is sulfur important?

Sulfur plays a critical role in many plant functions. Approximately 90% of the sulfur in plants is found in the amino acids

Plant Proteins (in the form of enzymes) are then used in to perform other functions within the plant such as; glucose synthesis, carbon dioxide assimilation,  $\text{N}_2$  fixation, etc. Sulfur is also used to help with nodule formation in legumes, and helps the seed to survive in low temperatures.



## Sulfur in Soil

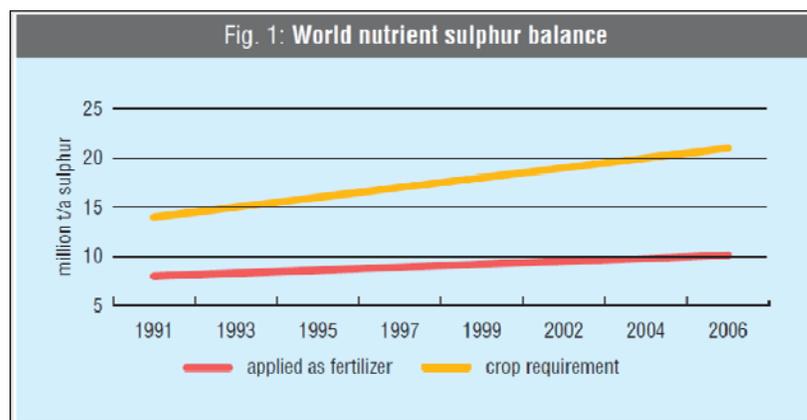
In addition to Sulfur's role in the plant maintaining adequate soil levels is also important for;

- Maintaining a balance with nitrogen. Try to maintain a N:S ratio of 10:1 when applying fertilizer.
- Maintaining proper balance with other nutrients in the soil.
- Acidulation in high pH soils to help the process of facilitated diffusion. This allows the plant to have access to nutrients that might otherwise not be available.
- Formation and decomposition of organic matter. Approximately 90% of available sulfur is contained in organic matter
- Aids with the breakdown of residue.

**The influence of soil type has implications with the availability of applied sulfur. Sands are more prone to leaching but do not require a large quantity of sulfur to see a crop response. Clays will bind sulfur, which leaves it much less prone to leaching, but needs a higher soil test level to get a crop response.**

## Net Sulfur

Over time the amount of sulfur available in soil has been dropping because of the reduction of; sulfur emissions in pollution, sulfur use as for fungicide and pest control, sulfur in chemical fertilizers. Also, ever increasing uptake from high production crops put further strain on sulfur levels in the soil. A 200 bushel crop of corn will take 32 lbs of sulfate from the soil, with 14 lbs being removed in the grain and 18 lbs in the stover. The net result is a significant depletion of sulfur reserves.





## Common Forms of Sulfur Fertilizer

Name	Percent Sulfur	Notes
Elemental Sulfur	90	Highly concentrated, slow release
Ammonium Sulfate	24	Fast release, also contains nitrogen
Calcium Sulfate	18	Fast Release, also contains calcium
Ammonium Thiosulfate	26	Liquid
Potassium Sulfate	17-18	Low salt index, also contains potassium
Potassium Magnesium Sulfate	21-22	Commonly used on sand soil to correct Mg and K issues

## Plant Tissue Analysis

One of the more important factors affecting crop quality and yield is the nutrient status of the plant...or the flow of nutrients to plant tissues during the growing season. Nutrient status is an "unseen" factor in plant growth, except when imbalances become so severe that visual symptoms appear on the plant. The goal of plant tissue analysis is to accurately diagnose problems in time to correct them in the current crop or before the next crop in rotation.

### Here a few tips for collecting samples

1. When collecting plant tissue samples in row crops, be sure to collect the correct portion of the plant and at the correct growth stage so results can be compared to published sufficiency levels.
2. Collect enough plant tissue to represent the area you are investigating and use a clean container to ship the sample in.
3. Never send fresh samples in sealed plastic bags. Never freeze samples. Do not include roots with samples for nutrient analysis.
4. If plant samples have soil, dust, fertilizer, or spray residues on them, they will need a light washing, as follows: With the aid of a plastic colander, spray off the sample with deionised or distilled water. Blot-dry the sample with a clean paper towel. Allow the sample to air-dry and ship as soon as possible in perforated paper bags to allow air movement in transit.



## SAMPLING GUIDELINES FOR FIELD CORN

Plant tissue from corn can be taken at three growth stages:

1. Seedling stage less than 12" high. Sample whole plant from 1/2" above soil surface. Collect 15 plants.
2. Prior to tasseling. Sample the most recently unfurled leaf below the whorl. Collect 15 leaves.
3. Silking. Sample the leaf below the ear. Collect 15 leaves.



## SAMPLING GUIDELINES FOR SOYBEANS

Plant tissue from soybeans can be taken at three growth stages:

1. Prior to flowering.
  2. Early bloom.
  3. Prior to pod set.
- At all three growth stages, sample the most recently fully developed trifoliate leaf. Do not include the petiole. Collect 25 leaves.

## SAMPLING GUIDELINES FOR WHEAT

Plant tissue from wheat can be taken at four growth stages:

1. Early spring: Sample whole plant from 1/2" above soil surface. Collect 25 plants.
2. Bloom: Sample the most recently fully developed leaf with a collar. Collect 50 leaves.
3. Prior to head: Sample the most recently fully developed leaf with a collar. Collect 50 leaves.
4. Head to mature: Sample the flag leaf. Collect 50 leaves.

If you require more information about plant tissue analysis please contact Julie Mollard @ 519 457 2575 or [Jmollard@alcanada.com](mailto:Jmollard@alcanada.com)



# A & L Canada Laboratories

APRIL 2012

## A&L Canada Labs Plant Tissue Photo Contest: Win a trip to a destination of your choice!



In order to promote the plant tissue analysis and disease diagnostics we thought it would be a good idea to have a photo competition. Here are the details

### Prize Details

- The prize is a 1-2 night stay at the resort of your choice up to a maximum of \$750.00
- We will cover the cost of the accommodations or resort package.
- We do not cover food, travel, or entertainment unless it is included in the resort package.



### Competition Details

- The competition runs until September 1<sup>st</sup>.
- It is open to farmers and crop consultants.
- Take a picture of a deficient plant and submit it with the corresponding plant tissue sample.
- After you receive the results of the plant tissue test go to [www.alcanada.com/photo](http://www.alcanada.com/photo)
- Fill out the submission page and include your picture and a copy of your tissue analysis.
- The draw will take place at the outdoor farm

**Congratulations to last year's winners Wendy Palen and Nichele Steenbeek we hope that you enjoy your trip!**

### Plant Monitoring Program (PMP)

If you are not familiar with our PMP program it is an excellent tool to track your crop's progress through the growing season. This allows you to catch and correct problems before they cause too much damage. We have added our Plant Monitoring Program (PMP) to the databweb as well. This means that if you are already enrolled you can generate new submissions from the databweb.

**If you are interested in learning more about the PMP process, please call Julie Mollard @ 519.457.2575 x 223 and she can get you set up!**