

# Corn Stalk Nitrate Analysis

Corn stalk nitrate analysis is an excellent way to gain valuable information to make nitrogen (N) management decisions for the following year.

## Why Test?

Nitrogen management is one of the most difficult decisions in corn production because of the many factors that influence nitrogen (N) behavior. By testing the nitrate content in cornstalks in the fall each year, you can gain perspective on how your N management program is performing. Strong yields and dark green plants are good indicators of adequate nitrogen, but they cannot reveal if too much N has been applied.

## Research Summary

University studies in Iowa and Indiana revealed the nitrogen status of a corn crop can be assessed by measuring the nitrate concentrations in the lower portion of cornstalks at the end of the growing season. Nitrogen deficiency is apparent and excess application of nitrogen to the crop will show up as a high concentration of nitrate in the stalk.

## Collection

One to three weeks after black layer has formed on 80 percent of the kernels of most ears, collect eight-inch segments of stalks (between six and 14 inches above the soil, see Figure 1) from 15 healthy plants within an area no larger than ten acres. Areas of differing soil types or management practices should be sampled separately. Avoid damaged stalks and remove leaf sheaths.

Place the collected stalk segments in a paper bag (avoid using a plastic bag). Label the paper bag to match the sample submission form(s). Samples should be sent as soon as possible to your nearest AgSource Laboratories location.

If there is a delay in shipping of one or more days, then refrigerate the samples. Do not freeze.

## Interpretation

At VAS Laboratories, samples are dried, ground and analyzed for nitrate concentration in parts per million (ppm). Remember, the corn stalk nitrate analysis tells you how you did, not what you need to do. Therefore, the results are very helpful in reviewing your soil fertility program and will help you with planning for N management in upcoming years.

Results fit into one of three categories as described below:

### Deficient: (0 – 700 ppm)

The corn crop could have yielded higher with additional N. Some common causes of inadequate N uptake include low fertilizer or manure application rates too early before the growing season, improperly functioning application equipment, or heavy rainfall during the growing season. Additionally, low pH, poor weed control or soil compaction can limit the crop's ability to take up nitrogen.

### Adequate: (700 – 2,000 ppm)

This is the ideal range you want your field's results to consistently fall in to. It means your N management plan is working and you're maximizing profits.

### Excess: (Over 2,000 ppm)

More N was applied than was needed for corn growth. Evaluate all nitrogen sources and make sure excess is not being applied as fertilizer and/or manure.

This may represent an economic loss, and the potential loss of nitrogen into the environment. Carefully evaluate the cause of the excess nitrogen. What is the previous crop history of the field? Was there a legume crop preceding this one? Was there nitrogen carryover from a manure application in the past? Keep in mind, too, that drought stress at the end of the season will often result in an accumulation of nitrate in the corn stalk.

## Conclusion

Utilizing this information will help you optimize the use of nitrogen for better returns as you adjust your nutrient management plan and limit nitrogen losses to the environment.

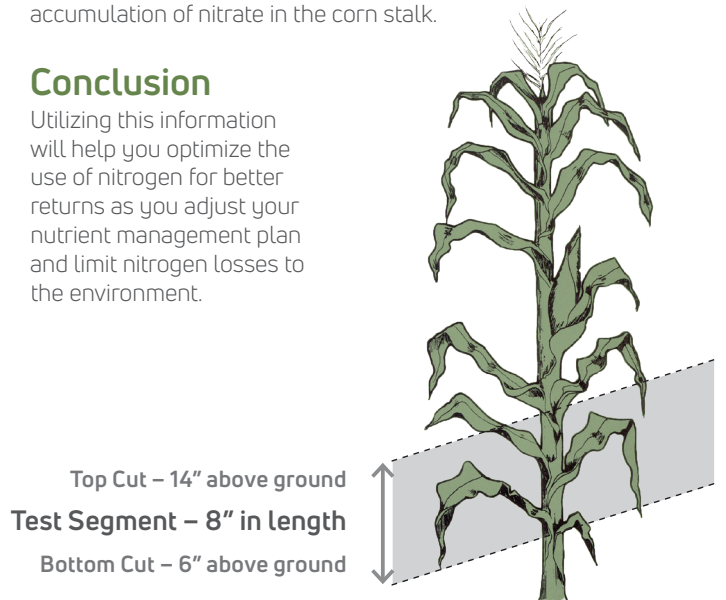


Figure 1