



SOYBEAN TISSUE TESTING FACT SHEET

This is one in a series of fact sheets from the Mississippi Soybean Promotion Board and the soybean checkoff. Each sheet presents a brief overview of a topic important to Mississippi soybean production. More information on each topic can be accessed through the link at the bottom of the sheet. To see other fact sheets, click [here](#).

Proper soil sampling and testing for nutrient status is the most reliable way to determine the soil's ability to provide needed nutrients to a growing crop. However, tissue testing is a tool that can be used to assess nutrient deficiencies observed in plants in a field to determine if these deficiencies may be limiting crop growth and yield.

A soil test indicates which nutrients are available in the soil for crop use, whereas tissue analysis shows what nutrients the plant has actually obtained from the soil.

Results from tissue testing at an agreed upon plant stage cannot be used to correct nutrient deficiencies during the current growing season. Rather, they can be used in planning future nutrient applications to soil, or to validate the current fertility program in place for a specific crop and field. Thus, tissue testing should be used in conjunction with soil tests. Foliar fertilization to remedy an in-season deficiency is not recommended, especially since leaves do not readily absorb foliar-applied nutrients in an amount that will remedy most deficiencies.

The relatively poor relationships between Phosphorus (P) and potassium (K) tissue concentrations and soybean yield indicate that tissue testing for these two elements is not a reliable way to predict the magnitude of yield response that can be expected. Tissue tests can be used to assess in-season sufficiency of P and K in soybeans, but tissue testing is not better than soil testing as a diagnostic tool. Thus, tissue testing should be used to complement but not substitute for soil testing as the primary method for making fertilization decisions for a soybean crop.

Recommendations to producers for foliar application of nutrients are usually based on tissue analysis. However, there is inadequate information to define the exact nutrient concentration that is needed to effect an economical yield response from foliar fertilization. There is not a single tissue nutrient concentration that can be used to define nutrient sufficiency or deficiency for the duration of the growing season. Thus, foliar application of nutrients based on tissue analyses is not recommended.

A peak leaf K concentration of 1.9% in fully expanded leaves from one of the top three nodes of a soybean plant has been deemed sufficient in soybeans. Leaf K concentration increases linearly up to about R3, and then declines. Arkansas research has determined that the upper and lower leaf-K concentration boundaries are 1.26-1.76 % at R3, 1.06-1.50% at R4, 0.87-1.31% at R5, 0.67-1.11% at R5.5, and 0.47-0.91% at R6. The K concentration pattern of soybean petioles follows that of leaves, but their K concentration is about twice that of leaves.

Plant samples that are collected for nutrient analysis should be collected from plant parts that are documented to exhibit critical nutrient concentrations, and they should be collected from areas in a field that have been used for soil sampling.

Potassium concentration in mature soybean seed can be used to assess K deficiency effects on seed yield. Research has determined that critical seed-K concentration is about 1.7%; i.e., seed-K values above 1.7% are considered sufficient and indicate there will be no yield response to K fertilizer application. Values below this critical level likely will be associated with a lower yield that is related to low K soil fertility.

Click [here](#) for a detailed discussion about this topic, [here](#) for estimates of soil and soybean tissue sufficiency levels for essential nutrients, and [here](#) for a detailed discussion of foliar fertilization.

*Composed by Larry G. Heatherly, Updated Aug. 2020,
larryheatherly@bellsouth.net;*