

2. *Collect the right amount of plant material.* At the seedling stage, 30 individual plants is an adequate sample. As the crop develops and leaves enlarge, take enough MRMLs to represent field conditions accurately.

For a predictive sample, collect MRMLs from at least 8–12 areas and submit them as one sample. Collect a separate sample for each different soil type or growing condition in a field.

3. *Place the appropriate plant sample in a paper bag or envelope* (provided by the Agronomic Division). Plastic containers should not be used because heat build-up causes plant tissue to decompose and may affect results.

4. *When submitting samples for diagnosis of growth or appearance problems, also submit matching soil samples from the problem area.* Soil analysis combined with plant analysis provides a more complete picture of nutrient-related problems.

5. *Complete [Plant Sample Information form AD-4](#).* For most accurate recommendations, describe plant appearance, fertilizer history and environmental conditions on the form.

6. *Send tissue samples and any matching problem soil samples to the address given on this brochure.* Enclose the appropriate processing fee for each sample.

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Production Tools for Tobacco Growers: Solution & Plant Analyses



The Agronomic Division services provide tobacco growers with information a) to optimize the nutritional status of their crop, b) to monitor and safeguard environmental quality, and c) to manage fertilizer usage economically. Many growers already use soil testing, nematode assay, and field services to their advantage. Fewer growers, however, make full use of the benefits of solution and plant tissue analyses.

Solution analysis: why to use it

Solution analysis provides information on several parameters important to uniform seedling growth—such as alkalinity, pH, electrical conductivity (soluble salts), sodium absorption ratio, and nutrient concentrations (N, P, K, Ca, Mg, S, Fe, Mn, Cu, Zn, B, Na, Cl). In addition, agronomists give recommendations for corrective action when necessary.

Solution samples: how to collect them

January is the time for growers to analyze the source water that they plan to use in tobacco transplant float beds. Growers who identify potential problems early can take corrective action before filling beds and adding fertilizers. After fertilizer is mixed into the float bed, growers should also test the nutrient solution to verify the concentrations of nutrients present.

To collect and submit a solution sample, follow these procedures:

1. *Collect 8 ounces of solution in a clean plastic bottle.* Small soda bottles are about the right size. Growers who use them, however, should remove or block out any original product labeling.

Make sure the sample represents the total solution. For example, for a source water sample, let the tap run for a few minutes before collecting it. For a nutrient solution sample, mix the fertilizer thoroughly and combine samples from several areas to make one composite sample.

2. *Complete [Solution Sample Information form AD-7](#).* Select the appropriate solution code from the bottom of the form. “ST” is the code for float bed source water. “NT” is the code for a nutrient solution (one that contains fertilizer).

3. *Send samples to the address given on this brochure. Enclose the appropriate processing fee for each sample.*

Solution analysis: other considerations

N.C. Cooperative Extension recommends the following nutrient concentrations for tobacco float beds within seven days of seeding: 100–150 ppm nitrogen and potassium, 35–50 ppm phosphorus and 1–2 ppm boron. To avoid overfertilization, it is important to know the nutrient content of your media. Check the label on the bag or contact the manufacturer for this information.

Some media are pre-mixed with fertilizers; others have practically no nutrients. If the media supplies all essential nutrients, growers should reduce or eliminate fertilizer in the float bed water. Doing so can prevent problems with soluble salts and nutrient toxicities as well as reduce production costs.

Plant tissue analysis: why to use it

Tissue analysis is always a useful problem-solving tool, but it is also a good predictive tool. By submitting samples on a regular basis, growers can monitor the nutritional status of the crop. They can identify problems early and take appropriate steps to correct them.

Tissue analysis provides feedback on the efficacy of a fertilizer program and may indicate the existence of nutrient deficiencies before they are visually apparent. Deficiencies identified early are easier to correct. Also, analysis of the harvest leaf is an excellent way to tell if the nitrogen concentration is within the ideal range for optimum curing.

Plant analysis reports list concentrations of 11 elements essential for plant growth (N, P, K, Ca, Mg, S, Fe, Mn, Zn, Cu, B) plus sodium.

Table 1. Plant nutrient indices

Index	Letter Code	Description
<25	D	deficient
25–49	L	low
50–74	none	sufficient
75–99	H	high
100 +	E	excessive

In addition, interpretive indexes and letter codes make the status of a nutrient easy to understand (Table 1).

Plant tissue samples: how to collect them

Tissue samples can be collected at the seedling stage, after transplanting to the field, at bloom, and again at harvest. To collect and submit a plant tissue sample, follow these procedures:

1. *In most cases, the appropriate part of the plant to collect is the most recent mature leaf (MRML).* This is the 3rd to 5th leaf back from the growing point (Figure 1). Only when the leaves are small—such as during seedling stage—is it appropriate to submit the whole above-ground plant for analysis.



Figure 1. Most recently mature tobacco leaves