



# Understanding the Plant Tissue Report

Healthy plants contain predictable concentrations of the elements (nutrients) required for normal growth and development. Plants need primary nutrients (N, P, K) in greatest quantities, secondary nutrients (Ca, Mg, S) in lesser quantities and micronutrients (Fe, Mn, Zn, Cu, B, Mo, Cl) in very small amounts. Plants get all these nutrients from fertilizer and/or the soil. Three other elements that plants need—hydrogen, oxygen and carbon—come from water and the atmosphere.

Standard plant analysis measures concentrations of 11 essential elements (N, P, K, Ca, Mg, S, Fe, Mn, Zn, Cu, B). Additional tests can be requested to measure Cl, Mo and/or NO<sub>3</sub>-N (petioles only). Concentrations of primary and secondary nutrients are reported as percentages; micronutrient concentrations are reported in parts per million (ppm). The plant analysis report also presents results as index values that make it easy to interpret results in terms of plant health and productivity. The concentration for each element is converted into an index value (0–124), which falls into one of five interpretative categories (Figure 1).

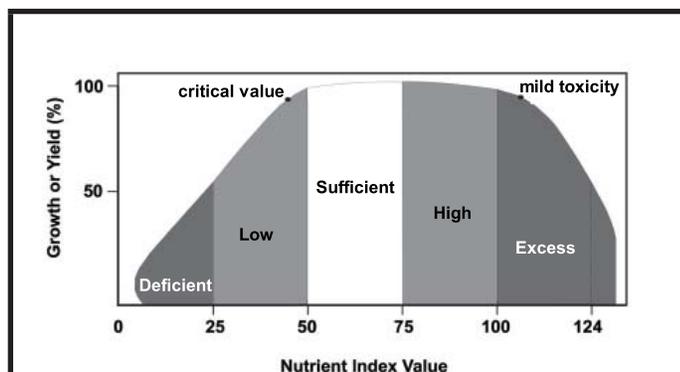
An index of 50–74 indicates that the nutrient concentration is sufficient for optimum growth and yield. Low (25–49) and deficient (0–24) index values indicate that the nutrient concentration is below the desired level and may be contributing to reduced growth, yield and/or quality. In such cases, supplying that nutrient to the crop at the optimum time and under optimum environmental conditions will result in an increase in growth and/or yield (Table 1).

Values in the high range (75–99) are not normally detrimental to growth or yield but, under some circumstances, may negatively impact crop quality. When values are in the excess (100+) range, growth problems may result due to nutrient imbalances or, in the case of micronutrients, toxic reactions. Values above 75 may indicate overfertilization and poor allocation of resources.

The critical value indicates the point at which a nutrient shortage causes a 5 to 10% loss in yield or growth; the point of mild toxicity indicates the same degree of loss due to nutrient excess. As the index decreases below the critical value or increases above the mild toxicity point, growth or yield will continue to decrease proportionately. The N:S, N:K and Fe:Mn ratios listed on the report indicate degree of balance among some essential elements.

## Report Abbreviations

N	Nitrogen
P	Phosphorus
K	Potassium
Ca	Calcium
Mg	Magnesium
S	Sulfur
Fe	Iron
Mn	Manganese
Zn	Zinc
Cu	Copper
B	Boron
Mo	Molybdenum
Cl	Chloride
Na	Sodium
Ni	Nickel
Cd	Cadmium
Pb	Lead
NO <sub>3</sub> -N	Nitrate N



**Figure 1. Nutrient index interpretation scale**

**Table 1. Response to nutrient applications \***

Index	Interpretation	Crop Response
0–24	Deficient	High
25–49	Low	Medium
50–74	Sufficient	Low
75–99	High	None
100–124	Excess	None

\* Fertilizer history, environmental conditions, stress factors and growth stage will affect ultimate response.