



Information Sheet

7. NUTRITION

7.17 Guidelines for the interpretation of leaf analyses for sugarcane

The analysis of leaf samples taken from an actively growing sugarcane crop is a valuable method of assessing crop nutritional status.

Value of leaf analysis

- Leaf analysis gives an indication of the current nutritional condition of the crop.
- It indicates the extent to which applied nutrients (in fertilisers, manures or compost) have been taken up by the crop, and whether particular deficiencies or imbalances are limiting crop growth.
- SASRI's Fertiliser Advisory Service (FAS) has developed a set of nitrogen (N) and potassium (K) recommendations to cater specifically for shortages or imbalances indicated by leaf analysis.

When and how should leaf samples be taken?

- Leaf samples should be taken when the crop is actively growing.
- The correct sampling period is related to the geographical area and the age of the crop (see Table 2).
- The third leaf should be selected, the midrib stripped and discarded, and the leaf blade retained. About 40 leaves

should be collected per field and bundled together to form one sample.

- Detailed sampling guidelines are listed in SASRI Information Sheet 7.9 Leaf Sampling.

Interpretation of leaf analysis data

FAS leaf analysis reports include interpretive information for each nutrient in the form of 'threshold' values coupled with 'low', 'satisfactory' or 'high' values for the nutrient in question. This information is provided in Table 1. In the case of N and K, thresholds are dependent on crop age and month of sampling (Tables 2 and 3).

Research shows that N 'drives' the uptake of P, K and S, and possibly other nutrients as well. Consequently, reliable interpretation of sufficiency levels of the latter nutrients is possible only where N concentrations are non-limiting. It should be kept in mind, therefore, that when leaf N levels are below threshold, P, K and S leaf values may not reliably reflect plant-available reserves of these nutrients in the soil.

Table 1. Interpretive criteria used for leaf nutrient content (expressed on a dry matter basis).

Leaf Nutrient		Category					
Element	Unit	Low	Marginal	Threshold	Satisfactory	High	Very High
Nitrogen (N)	%	Dependent on season – see Table 2					
Phosphorus (P) (All varieties except N12)	%	< 0.17	0.17-0.18	0.19	0.19-0.24	0.25-0.40	> 0.40
Phosphorus (P) (N12 ONLY)	%	< 0.14	0.14-0.15	0.16	0.16-0.24	0.25-0.40	> 0.40
Potassium (K)*	%	< 0.94	0.94-1.04	1.05	1.05-1.59	1.60-1.80	> 1.80
Calcium (Ca)	%	< 0.13	0.13-0.14	0.15	0.15-0.39	0.40-0.60	> 0.60
Magnesium (Mg)	%	< 0.06	0.06-0.07	0.08	0.08-0.19	0.20-0.35	> 0.35
Sulphur (S)	%	< 0.10	0.10-0.11	0.12	0.12-0.24	0.25-0.40	> 0.40
Silicon (Si)	%	< 0.50	0.50-0.74	0.75	0.75-2.00	2.01-5.00	> 5.00
Zinc (Zn)	ppm	< 11	11-12	13	13-24	25-75	> 75
Manganese (Mn)	ppm	< 12	12-14	15	15-99	100-150	> 150
Copper (Cu)	ppm	< 2	2	3	3-7	8-12	> 12
Iron (Fe)	ppm	< 50	50-74	75	75-99	100-250	> 250
Boron (B)	ppm		< 2	2	2-10		
Molybdenum (Mo)	ppm		< 0.08	0.08	0.08-1		

* See Table 3

Using leaf analysis for supplementary N and K recommendations

Table 4 shows guidelines for the correction of deficiencies if leaf samples show that N or K is limiting. Normally, fertilisers are recommended only if the current crop is young enough (3 to 7 months old) to benefit from top-dressed fertiliser.

Table 2. Leaf nitrogen (N) thresholds.

Area	Crop age (months)	Month of sampling	N %	
			Plant	Ratoon
Northern Irrigated	3 to 5	Oct-Dec	1.9	1.8
		Jan-Feb	1.8	1.7
		Mar-Apr	1.7	1.6
Coastal Lowlands	4 to 7	Nov-Dec	1.9	1.8
		Jan-Feb	1.8	1.7
		March	1.7	1.6
Midlands	4 to 9	Nov-Dec	1.9	1.8
		Jan-Feb	1.8	1.7

Table 3. Leaf potassium (K) thresholds.

For winter-cut irrigated cane (May to August) use the following correction factors:

Month of sampling	Threshold % (except N14)	Threshold % (N14)
Mid-Oct to Nov	0.85	0.70
Dec to Jan	0.95	0.80
Feb to April	1.05	0.90



The third leaf should be selected, the midrib stripped and discarded, and the leaf blade retained. For detailed leaf sampling guidelines refer to SASRI Information Sheet 7.9.

Table 4. Amounts of N, P and K to be applied to correct deficiencies detected through leaf analysis.

NITROGEN: (Plant or Ratoon)				
N % in leaf	0.4% or more below TV*	0.3-0.4 % below TV	0.2 % below TV to TV	Greater than TV
N required (kg/ha)	100	75	50	0
*TV = Threshold Value from Table 2				
PHOSPHORUS:				
Where P deficiency is detected through leaf analysis, the crop is usually too advanced to benefit from P topdressings. Phosphorus deficiencies should be corrected in the following crop, based on a soil sample.				
POTASSIUM: (Plant or Ratoon)				
K % in leaf	0.2 % or more below TV**	0.1 - 0.2 % below TV	0.1 % below TV to TV	Greater than TV
K required (kg/ha)	150	100	50	0
**TV = Threshold Value from Tables 1 or 3				

Note: Potassium should be applied only in cases where the leaf K deficiency is associated with an adequate N level in the leaf.

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