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MICRO- AND MACRO-NUTRIENTS IN SIEVE-TUBE SAP OF PALMS

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The translocation and distribution of nutrients, taken in by the roots of plants will usually take place with the transpiration stream. For redistribution from the leaves to other parts of the plants—and this applies also to foliar application—nutrients have to travel with the stream of assimilates in the sieve tubes. The possibility for a nutrient to travel by means of the sieve tubes will determine whether a substance applied to the leaves will reach other parts of the plant or not. In the latter case the substance may be used up or held back in the leaves, or it may not be transferred at all.

Mobility of a substance and transport through the sieve tubes is connected with its presence in the sieve-tube sap. Such sap can be obtained from the inflorescences of palm trees in rather large amounts (TAMMES, 1933).

Analyses of micro-nutrients were carried out under supervision of Dr. W. B. Deys by Mr. O. C. Spoelstra, both from the Institute for

TABLE I

Analysis of sap from *Arenga saccharifera* Labill	In sap γ per ml.	Calculated on dry matter (16–17 % of total solids in sap) γ per gram
Cobalt	0.02	0.12
Copper	2.—	12.—
Iron	4.—	24.—
Molybdenum	0.03	0.18
Manganese	1.—	6.—
Zinc	3.—	18.—

TABLE II

	In palmsap γ per ml.	Calculated on dry matter (16–17 % of total solids in sap) $\varkappa$ per gram
Sucrose	± 15 %	—
Nitrogen	410	2460
Potassium (K)	1200	7200
Phosphor (P)	100	600
Calcium (Ca)	10	60
Magnesium (Mg)	96	576

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Macro-nutrients in palm sap were mentioned in a previous paper by TAMMES (1951).

No comparison was possible with micro-nutrients in palm leaves, as no data were available, but comparison with leaves of other plants indicates that cobalt, copper and molybdenum are present in normal quantities in the sap. However, iron, manganese and zinc seem to be below normal.

For macro-nutrients a comparison is possible with nut water from coconut palms (SALGADO 1954) and leaf analysis (PRÉVOT 1954). Nut water contains about the same amount of potassium but 40 times more calcium.

In foliar analysis of oil-palm leaves a critical level in relation with a deficiency is assumed. With this critical level the following comparison is possible. (drymatter).

TABLE III

	In leaves (Prévot)	In sap	%
Nitrogen	30000	2460	8
Potassium	10000	7200	72
Phosphor	1500	600	40
Calcium	6000	60	1
Magnesium	2400	576	24

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