EFFECT OF FERTILIZER APPLICATION UPON SUCROSE % CANE

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ABSTRACT
Fertilizer application may have an effect upon Sucrose % cane. In numerous cases, increasing amounts of nitrogen decrease the percentage of sucrose essentially because they increase the percentage of moisture in the cane while the sucrose per cent dry substance remains the same. Increasing amounts of potassium, when they increase the sucrose % cane, take effect essentially by increasing the sucrose % dry substance.

INTRODUCTION
The essential purpose of fertilizer application is to increase production per unit area, but it also has an effect upon quality. For instance, increasing amounts of nitrogen spread on canefields often lead to an appreciable decrease of the sucrose % cane, particularly in humid regions. On potassium deficient soils, spreading potash may lead to an increase in sucrose % cane. If, instead of sucrose % cane, sucrose % dry substance is considered, the results are not the same.

EXPERIMENTAL PROCEDURE
Numerous experiments have been carried out in Reunion in order to determine the response of sugarcane to increasing amounts of fertilizer elements, especially to nitrogen and potassium, following the so-called "response curves" method by varying only one factor. These experiments give, on the one hand the response of sugarcane to the element, on the other hand the influence of the element upon the percentage of sucrose in the cane.

This percentage is determined by the pressure method perfected by Hourau. It is based on refractometric and polarimetric determinations on cane juice obtained by pressing a sample of disintegrated cane under a pressure of 100 kg/cm² by means of a Carver press, and on the weight of the residual cake of bagasse. The percentage of dry matter is determined on a sample of cane, disintegrated by means of a Jeffco cutter-grinder and dried to constant weight in an oven in which it is kept for several days at 50 C. These determinations are made on samples from every plot of the experiment. There are several repetitions for each treatment.

RESULTS
Increasing amounts of nitrogen result in increased moisture % cane in most plants and particularly in the Graminaceae. Figs. 1–3 giving the results obtained in 1971 in the western part of Reunion make the following effects clear:

increasing amounts of nitrogen have a significant (P < 0.5) negative effect upon sucrose % cane;

630
FIGURE 1.

COLIMAÇONS 1971 EXPERIMENT

Sucrose % Cane

Nitrogen (N)
Potassium (K)

FIGURE 2.

% Dry Matter

Nitrogen (N)
Potassium (K)

FIGURE 3.

Sucrose % Dry Matter

Nitrogen (N)
Potassium (K)
they have no effect upon sucrose % dry substance;
there is a highly significant positive correlation between sucrose %
cane and dry substance % cane (for: n = 25, r = 0.74 in 1971,
r = 0.79 in 1972).

When potassium gives a positive result, the moisture % cane is not modi-
ied, but sucrose % dry substance increases appreciably. The results of an
experiment adjacent to the preceding one (Figs. 1–3) show that:
increasing amounts of potassium have a positive effect upon sucrose
% cane;
they have no effect upon dry matter % cane;
there is a highly significant correlation between sucrose % cane and
sucrose % dry matter (for: n = 25, r = 0.78 in 1971, r = 0.86 in
1972).

CONCLUSION

In sugarcane, sucrose % cane may vary in two different ways:
either by a variation of moisture, which is noticed when the amount
of nitrogen fertilizer varies;
or by a variation of sucrose % dry matter, which is noticed when the
amount of potassium fertilizer varies.

REFERENCES

1. Fritz, J. (1971a). Fertilisation de la canne à sucre à la Réunion. Travaux de l’IRAT,

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RESUMEN

La fertilización puede tener un efecto sobre Sacarosa % caña. En
numerosos casos, cantidades crecientes de nitrógeno merman el porciento
de sacarosa en caña esencialmente porque aumentan el porciento de
humedad en la caña mientras la sacarosa porciento sustancia seca permanece
igual. Cantidades crecientes de potasio, cuando aumentan la sacarosa %
caña, toman efecto esencialmente aumentando la sacarosa % sustancia seca.