

EFFECT OF LIMING ON THE YIELD AND QUALITY OF CASSAVA IN LATERITE SOIL

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In Kerala, cassava is grown mainly on laterite soils which are characterised by low soil reaction, high sesquioxide content and high fixation of phosphorus. Being a rapidly growing plant yielding carbohydrate, cassava has high nutrient requirements, especially potash and calcium. According to Nijholt (1935), the nutrient removal of cassava per acre is N 111 lb, P_2O_5 93 lb, CaO 194 lb and MgO 63 lb.

Critical soil survey indicates that majority of cassava growing soils of Kerala are deficient in lime. Thus, there appears to be a great scope for improving the soil nutrient status and increasing the yield of cassava by judicious application of lime in combination with NPK. Hence, the present study was undertaken to determine the effect of liming materials on the tuber yield and quality of cassava in a typical laterite soil of Kerala.

Material and Methods

The effect of two commonly used liming materials i. e. calcium and magnesium carbonates on the yield and quality of cassava was studied in a randomized block design with four replications at the Central Tuber Crops Research Institute Farm, Sreekaryam, Trivandrum, during 1966-67 and 1967-68. The factors studied included calcium carbonate (1000 kg CaO/ha), magnesium carbonate (100 kg MgO/ha) and NPK (50:50:100 kg/ha) applied individually and in combinations along with a 'no manure' control. The plot size was 4.5 m X 3.6 m and the setts were planted with a spacing of 90 cm either way. The plant material used was H-97 evolved at C. T. C. R. I., Trivandrum. The soil type was laterite which had a pH of 4.55 initially. Soil samples were drawn at three different stages i. e. third month, sixth month and at the time of harvest, to study the changes in pH due to the application of different liming materials. At the time of harvest, tuber samples from each plot were analysed for starch and hydrocyanic acid contents by A.O.A.C. methods.

Results and Discussion

Table 1 shows that the application of calcium carbonate and magnesium carbonate resulted in an increase of pH of the soil. The pH of the soil was

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Table I

Effect of liming with different materials on soil reaction *

	Control	CaCO ₃	MgCO ₃	CaCO ₃ + MgCO ₃	NPK	NPK + CaCO ₃	NPK + MgCO ₃	NPK + CaCO ₃ + MgCO ₃
Initial pH	4.55	4.50	4.55	4.50	4.50	4.55	4.55	4.50
pH at 3rd month	4.50	4.65	4.90	5.30	4.50	5.00	5.00	5.50
pH at 6th month	4.50	5.75	5.80	6.00	4.45	5.40	5.50	6.50
pH at harvest (10th month)	4.55	5.75	5.80	6.05	4.45	5.40	5.50	6.50

Table 2

Effect of liming with different materials on the yield and quality of cassava tubers *

Treatments	Yield of tubers tonnes/ha	Starch (% on wet basis)	HCN (mg/kg of tubers)
Control	16.7	28.7	130.0
CaCO ₃	20.2	29.3	92.8
MgCO ₃	18.5	28.6	101.0
CaCO ₃ + MgCO ₃	19.5	28.7	121.0
NPK	23.1	29.0	140.0
NPK + CaCO ₃	25.2	30.8	117.0
NPK + MgCO ₃	23.4	29.6	129.0
NPK + CaCO ₃ + MgCO ₃	23.5	29.8	136.0

C. D. at 5% level = 5.29

* Average values of two experiments conducted during 1966-67 and 1967-68.

raised to 5.00 from 4.55 in the third month and to 5.50 in the sixth month in plots receiving magnesium carbonate. In plots where both calcium and magnesium were applied along with NPK, the rise in pH was marked, it being 6.50 in the 6th month; after the sixth month there was no remarkable increase. From Table 2 it may be seen that the maximum starch content of 30.8 percent in tubers was recorded in plots receiving NPK + Ca and the minimum of 28.7 percent in the control plot. This may be due to increased uptake of phosphorus from soil as observed by Beeson (1924), Smith *et al* (1948) and Malvolta *et al* (1955). It was also noted that the cyanogenetic glucoside content in the tubers was lowest (92.8 mg/kg) in plots receiving calcium carbonate alone and highest (140 mg/kg) in NPK treated plots. The HCN content was reduced from 140 mg/kg to 117 mg/kg when calcium was added with NPK, which may be attributed to the specific effect of calcium ion.

The yield data shows that the effect of fertilizers on the yield was statistically significant, indicating clearly that cassava yields from soils of poor fertility status can be increased to a great extent by the balanced use of NPK.

Summary

In field experiments conducted to study the effect of liming materials on the yield and quality of cassava tubers in laterite soil (of Trivandrum, Kerala) an increase of soil pH from 4.55 to 6.50 was recorded with the application of calcium and magnesium carbonates. The starch content of tubers increased from 29.0 to 30.8 percent while the hydrocyanic acid content decreased from 140 mg/kg to 117 mg/kg when calcium carbonate was added with NPK.

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