

# INTERACTION OF SOIL GROUPS ON THE NUTRIENT EXHAUST BY COCONUT

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## ABSTRACT

Results of investigation carried out to study the effect of soil groups on the nutrient content of various components of coconut fruit are reported in this paper. Potash was found to be removed most, followed by nitrogen, calcium, magnesium and phosphorus. Soil types were found to influence the nutrient exhaust by nuts. On comparison, palms growing on coastal alluvium removed 70 kg  $K_2O$  ha<sup>-1</sup> whereas the average value for red sandy loam and laterite was 53 kg  $K_2O$  ha<sup>-1</sup>.

## INTRODUCTION

Cooke (1950) reported that from one hectare of coconut garden (148 palms) with a mean productivity of 25 nuts per tree, 29.1, 9.0, 26.9, 14.6 and 22.4 kg of N,  $P_2O_5$ ,  $K_2O$ , CaO and MgO respectively were exhausted annually. Pillai and Davis (1963), computed the annual exhaust from one hectare of 173 palms in sandy loam soil at 65.6, 29.7, 84.5, 47.4 and 20.3 kg of N,  $P_2O_5$ , CaO and MgO respectively taking into account the nuts, fallen leaves spathes, and the annual stem growth.

In India, coconut is grown on almost all types of soils ranging from pure littoral sand, red sandy loam, laterite, alluvial clays to peaty dark 'kari' soils.

The present study was envisaged to understand the influence of soil groups on the nutrient exhaust by coconut, mainly in the form of nuts.

## MATERIAL AND METHODS

Two West Coast Tall palms, each from the low yield group (30 nuts and below per tree per year) and high yield group above 30 nuts/tree/year, were selected at random from the coastal

sand, red sandy loam and lateritic soils at C.P.C.R.I. Kasaragod. Two mature nuts from each tree harvested in the summer (January to May), and monsoon (June to August) seasons, were taken at random for this study. Physical characters, such as weight and volume of the unhusked nut, volume of nut water, and weight of copra, were recorded for calculating the total nutrient removal. The experiment was carried out for 2 years (1969 and 1970).

The different components of the nuts such as coconut water copra, shell and husk were analysed for N,P,K,Ca and Mg, according to Piper (1966). The oil content in copra was estimated by soxhlet extraction.

#### RESULTS AND DISCUSSION

The removal of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, CaO and MgO by the different components of the nuts from the coastal sand, red sandy loam and laterite soils are given in Table 1, The average yield of the palms,

Table 1. Nutrient removal by coconut (Kg ha<sup>-1</sup>)

Soil group	Part	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	CaO	MgO
Coastal sand (alluvium)	Coconut water	0.34	0.19	2.28	0.36	0.13
	Copra (Meat)	12.48	4.11	8.14	1.45	1.56
	Husk	7.66	3.20	57.12	10.62	4.33
	Shell	1.30	0.75	3.18	2.34	0.71
	Total	21.78	8.25	70.72	14.77	6.73
Red sandy loam	Coconut water	0.33	0.10	1.97	0.44	0.07
	Copra (Meat)	13.14	2.23	5.71	2.53	0.50
	Husk	6.46	2.96	43.73	3.59	2.68
	Shell	1.16	0.42	3.71	0.93	0.53
	Total	21.09	5.71	55.12	7.49	3.78
Laterite	Coconut water	0.26	0.06	2.44	0.24	0.08
	Copra (Meat)	11.62	3.96	12.35	2.47	3.49
	Husk	4.10	1.62	34.71	2.59	2.23
	Shell	1.18	0.38	2.71	1.44	0.48
	Total	17.16	6.02	52.21	6.74	6.28

from coastal sand, red sandy loam and laterite soil groups at C.P.C.R.I. farm was 38.0, 50.2 and 36.7 respectively.

Potash was found to be the dominant nutrient removed, followed by nitrogen. The nitrogen removal (in the nuts) from the coastal sand and red sandy loam is 21.78 and 21.09 kg/ha respectively. Pillai and Davis (1963) reported the annual removal for sandy soil as 24.0 kgN/ha. However, the nitrogen removed in the nuts in the laterite soil was only 17.16 kg/ha which was lower than that in other two soil groups.

The removal of  $P_2O_5$ ,  $K_2O$ ,  $CaO$  and  $MgO$  was the highest by the palms growing on coastal sand, being 8.28, 70.72, 14.77 and 6.73 kg/ha respectively, followed by red sandy loam. The removal of  $K_2O$  and  $CaO$  was lowest in the laterite soil (52.21 and 6.77 kg/ha respectively).

Though the coastal sand is deficient in almost all the nutrients, the nutrient removal is highest by the palms growing in these soils. This may be due to the readily available forms of nutrients with easy access for plant roots. Moreover, absorption of nutrients from the underground seepage water (Menon and Pandalai, 1960) by the foraging coconut roots was also reported. The study has indicated the effect of soil groups on the nutrient removal pattern in coconut.

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