

# DISTRIBUTION OF NUTRIENTS IN THREE VARIETIES OF CARDAMOM (ELETTARIA CARDAMOMUM)

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## ABSTRACT

The uptake and concentration of nutrients in different parts of cardamom plants were studied in three important cultivars. Differences were observed in nutrient distribution pattern. In general, cardamom plants were found to accumulate major and secondary nutrients in the order of  $K > N > Ca > Mg > P > Na$  and micronutrients in the order of  $Mn > Fe > Zn > Cu$ .

## INTRODUCTION

The inorganic nutrition of cardamom plants (*Elettaria cardamomum* maton L.) has not so far been studied in detail. Being an important dollar earning spice crop of India, studies regarding the nutritional aspects of this crop are important from the production point of view. The uptake of major nutrients by this crop has been reported<sup>1</sup>. The present study compares the nutrient distribution pattern in three varieties of cardamom.

## MATERIALS AND METHODS

Three varieties viz; Malabar (prostrate), Vazhuka (semierect) and Mysore (erect) being the important ones under cultivation were chosen from the CPCRI, Research Centre, Appangala, Coorg District for the purpose. Leaf blades, petioles, pseudostems, panicles, flowers, capsules and roots were collected separately from 30 bearing plants (10 years old) at random and

composited for each variety. Three such composite samples were taken for each variety. The plants were receiving uniform manurial (75 kg N, 75 kg  $P_2O_5$  and 150 kg  $K_2O$  per ha. per annum) and cultural practices and were growing on same soil. The collected samples were washed in 0.01 N HCl and in distilled and redistilled water successively and dried at 80°C. The powdered samples were analysed for kjoldhal nitrogen, P, K, Na, Ca, Mg, Fe, Cu, Zn and Mn. Excepting N, all other elements were determined in diacid digest, phosphorus by vanado molybdate method and Mg by Versene titration, 2. K and Na using a flame photometer and Ca, Fe, Cu, Zn and Mn by atomic absorption spectrophotometry.

General characteristics of the soil are furnished in table I. Table II presents the nutrient concentrations in various parts of three varieties of cardamom.

## RESULTS AND DISCUSSION

Leaf blades contained the highest concentration of nitrogen followed by flowers and capsules, while the concentration was lower in other parts. In the case of P, flowers seemed to accumulate maximum. The concentration of P in capsules, leaf blades and panicles were similar. Root, pseudostem and petiole contained the least. Highest content of K was again seen in flowers followed by petiole and pseudostem, while K content was similar in other parts. Calcium accumulation was

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the highest in petiole and leaf blades and the least in roots. Not much variation was observed between other parts. The concentration of Mg was the highest in panicles followed by capsules. Roots have again registered the least value while the concentration was almost uniform in other parts. Flowers accumulated Na maximum and the leaf blades the least. Concentration of Fe was found to be the highest in panicles and flowers. A similar trend was seen in the case of Cu too. Zn accumulation was greater in the reproductive parts than in vegetative parts while almost a reverse trend was seen in the case of Mn.

Variety Vazhuka seemed to absorb more phosphorus than the other two varieties. Clear differences in the concentration of the nutrients are seen in petiole, pseudostem, panicle and roots. Not much differences were observed in the case of other nutrients except Mn which was taken up by the variety Malabar in higher quantities compared to Vazhuka and Mysore.

In general, the crop seemed to accumulate the major and secondary nutrients in the order  $K > N > Ca > Mg > P > Na$  and micro nutrients in the order  $Mn > Fe > Zn > Cu$ .

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TABLE I  
CHEMICAL COMPOSITION OF THE SOIL

pH	5.2
K	51.0 (ppm)
Bray P	16.0 (ppm)
Ca	3.2 mc/100 g
Mg	0.5 mg/100 g
Zn	3.0 (ppm) (0.1 N.Hcl Extractable)
Cu	0.5 (ppm) (NH <sub>4</sub> oac)—0.5
Mn	6.0 (ppm) (NH <sub>4</sub> oac pH 7.0)—3.00
Fe	5.0 (ppm) (NH <sub>4</sub> oac pH 3.0)—2.00
N.Kjeldhal %	0.09%
Organic carbon	0.46%

NUTRIENT CONCENTRATION IN DIFFERENT PARTS OF CARDAMOM PLANTS

Variety		Percent					ppm				
		N	P	K	Ca	Mg	Na	Fe	Cu	Zn	Mn
Leaf blade	Malabar	2.55	0.142	2.98	0.54	0.24	127	159	11	24	721
	Vazhuka	2.41	0.170	2.75	0.55	0.28	113	131	11	27	320
	Mysore	2.59	0.170	2.72	0.69	0.25	133	138	10	38	409
	Mean	2.52	0.161	2.82	0.59	0.26	124	143	11	30	483
Petiole	Malabar	0.74	0.090	3.98	0.60	0.30	247	280	11	26	938
	Vazhuka	0.80	0.122	4.22	0.60	0.29	307	246	12	37	262
	Mysore	0.74	0.082	4.00	0.72	0.25	266	231	12	29	826
	Mean	0.76	0.098	4.07	0.64	0.28	276	252	12	31	675
Pseudostem	Malabar	0.50	0.068	3.03	0.30	0.28	220	161	7	54	1190
	Vazhuka	0.45	0.135	3.22	0.33	0.22	200	161	7	38	164
	Mysore	0.55	0.075	4.07	0.37	0.26	187	226	8	46	576
	Mean	0.50	0.093	3.44	0.33	0.25	202	183	7	46	643
Panicle	Malabar	0.85	0.095	3.20	0.30	0.49	433	1827	26	100	929
	Vazhuka	0.73	0.237	3.11	0.40	0.49	627	797	22	81	266
	Mysore	0.73	0.105	3.08	0.37	0.47	360	1352	17	89	126
	Mean	0.77	0.145	3.13	0.37	0.48	470	1323	22	90	440
Flower	Malabar	2.13	0.256	4.40	0.43	0.22	1600	1750	73	140	199
	Vazhuka	2.16	0.260	4.50	0.43	0.23	1500	1335	66	135	240
	Mysore	2.18	0.251	4.65	0.32	0.14	1100	372	78	99	205
	Mean	2.16	0.255	4.52	0.39	0.20	1400	1152	72	121	215
Capsule	Malabar	1.49	0.165	2.78	0.47	0.36	260	727	14	62	452
	Vazhuka	1.41	0.202	3.12	0.44	0.29	270	525	15	75	388
	Mysore	1.38	0.151	2.00	0.47	0.36	200	363	15	68	175
	Mean	1.43	0.173	2.60	0.26	0.34	243	538	15	68	338
Root	Malabar	0.71	0.060	2.12	0.23	0.19	183	—	—	—	—
	Vazhuka	0.86	0.141	2.66	0.28	0.17	180	—	—	—	—
	Mysore	0.84	0.069	3.32	0.25	0.35	173	—	—	—	—
	Mean	0.80	0.090	2.70	0.25	0.23	172	—	—	—	—
General mean		1.28	0.145	3.32	0.43	0.29	412	432	23	64	466