

Short Communication

Nutrient status and soil properties of calcareous soils of young acid lime orchards of Nellore district of Andhra Pradesh

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Acid lime (*Citrus aurantifolia*) is grown in 30,000 ha area under semi-arid regions in Nellore district of Andhra Pradesh. It is more remunerative than sweet orange and cultivation practices are easier and there is a demand from North Indian states, hence sweet orange is being replaced by acid lime in recent years in Nellore district. The productivity of acid lime depends on many factors such as climate, site, varieties, fertilization, irrigation, soil management practices, pests and disease control. Among the factors adequate supply of nutrients seems to be very important factor in regulating cropping and quality of fruits. It requires adequate supply of nutrients not only for development of vegetative structures and flowers but also give regular harvest of high quality fruits. Srivastava and Shyam singh (2001) reported that 20 t/ha Nagpur mandarin orange fruits removed 116-136 N, 5.6-6.8 P₂O₅, and 60.4-62.6 K₂O kg/ha respectively. Inadequate plant nutrition besides un suitable soil causes serious disorder in acid lime and may eventually lead to early decline of the orchard. In order to achieve high yield and quality fruits as well as longevity of orchards, sufficient nutrient content in soil should be maintained to ensure adequate sustained supply of nutrients to trees.

Major acid lime growing tracts located in Nellore

district were covered in the study. Sixteen young acid lime orchards grown under both Alfisols and Vertisols in different villages of the district were selected. Within the village the orchards were selected at random covering the similar range of management practices. Orchards having plants less than eight years age were considered as young orchards. In each orchard four pits were dugged at random and composite surface soil samples were collected at a depth of 0.30 cm from underneath perimeter in order to find out the physico-chemical properties and available nutrient status of soil. The soil samples were analysed following standard procedures and methods adopted for different parameters.

The results on soil pH (Table 1) revealed that soils are slightly alkaline to alkaline in reaction. The lowest being in orchard no.3(7.61) and highest in orchard 11(8.78). The reason could be attributed to be accumulation of bases and corresponding increase in calcium carbonate content (Aariff khan *et. al.*, 2005) The organic carbon content was very low to medium ranged from 0.15 - 0.45 %. The reason might be due to less application of organic manures coupled with semi-arid conditions, the applied organic manures to soils get mineralizes very fast (Durgesh, 1994). Almost all orchards soils had shown lime concretions except one

Table 1: Soil properties (0-30cm) of young acid lime orchards

Orchard No	Soil Type	pH	HCO ₃ (ppm)	CaCO ₃ (%)	O.C (%)
1	Alfisols	8.53	226	10.0	0.19
2	Alfisols	8.58	378	19.6	0.15
3	Alfisols	7.61	232	12.5	0.45
4	Alfisols	7.84	232	13.2	0.34
5	Alfisols	7.88	244	11.7	0.42
6	Alfisols	7.43	110	10.1	0.45
7	Alfisols	8.25	192	12.8	0.33
8	Alfisols	8.13	281	12.2	0.43
9	Alfisols	7.88	287	15.8	0.28
10	Alfisols	8.15	213	14.8	0.32
11	Alfisols	8.78	323	18.5	0.12
12	Alfisols	8.16	244	13.5	0.38
13	Vertisols	8.60	330	20.0	0.28
14	Vertisols	8.42	305	18.8	0.22
15	Vertisols	7.84	186	11.8	0.52
16	Vertisols	8.43	268	17.2	0.25

* Author for corresponsence.

Table 2 : Soil available nutrient status (0-30cm) of young acid lime orchards

Orchard No.	Soil Type	N (-----)	P ₂ O ₅ kg/ha	K ₂ O (-----)	S (ppm)
1	Alfisols	202	26.5	183	14.0
2	Alfisols	175	23.1	210	8.0
3	Alfisols	263	40.5	255	21.4
4	Alfisols	280	28.7	302	25.0
5	Alfisols	329	38.9	242	20.0
6	Alfisols	305	32.1	320	25.0
7	Alfisols	258	31.3	253	19.8
8	Alfisols	229	31.8	290	20.2
9	Alfisols	194	29.6	252	17.7
10	Alfisols	223	24.6	245	13.4
11	Alfisols	157	24.8	197	8.3
12	Alfisols	219	25.9	316	24.2
13	Vertisols	207	21.8	209	9.8
14	Vertisols	207	28.8	271	9.5
15	Vertisols	248	35.9	299	21.9
16	Vertisols	205	29.6	337	12.2

orchard i.e. 6 (10.1%). The highest content was found in orchard 13 as 20.0%. Which could be due to limited leaching in Vertisols and Alfisols. In semi-arid climate calcification is a common pedogenic process in black and red soils (Anitha *et al.*, 1998). There was a wide variation in bicarbonate content in the soils ranged from 110 – 378 ppm. The lowest value being in the orchard 6 and highest in 2. Similar observations were found by Sairam(1992).

The data on available N content was low to medium, which could be attributed to quick decomposition of organic matter as well as low OC content corresponding orchards(Table 2). The P content of different orchard soils ranged between 21.8 – 40.5 kg/ha. The lowest content was recorded in O 13, which might be due to highly calcareous nature of soils. The available K varied from 183 – 337 kg/ha. The orchard 1, registered the lowest content. The reasons might be the low or no application of potassium fertilizers in citrus gardens. Nearly 25% orchard soils were recorded below critical limit i.e. 10 ppm and rest of orchards are far above critical limit. It is due to the regular application of manures and sulphur containing fertilizers (Aariff khan, 2001).

The surveyed orchard soils in Southern region of Andhra Pradesh are slightly alkaline to alkaline reaction, moderate to highly calcareous nature with very low to medium organic carbon content. Regarding available nutrient contents of N, P, K low to medium and sulphur above critical limits in general.

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