

QUALITY OF MANGO-GINGER (*CURCUMA AMADA* ROXB.) AS INFLUENCED BY MINERAL NUTRITION

Mango-ginger (*Curcuma amada* Roxb., Zingiberaceae) is a perennial herb cultivated as an annual with rhizomes having characteristic odour of raw mangoes. It is used for preparing pickles, preserves, candies, salads, sauces and chutneys. The rhizome finds extensive use in the indigenous systems of medicine. The quality of mango-ginger is mainly determined by its volatile oil, non-volatile ether extract (NVEE), fibre and starch contents. Not much work has been undertaken relating to quality attributes of this crop. The study was undertaken to find out the effect of mineral nutrition on the quality of mango-ginger.

The field experiment was conducted at the Instructional Farm, College of Agriculture, Vellayani, Trivandrum. The soil of the experimental area was lateritic red loam containing 158.8 kg available N, 16.4 kg available P_2O_5

and 128.6 kg available K_2O ha^{-1} . The experiment was laid out in a 3^3+1 factorial randomized block design with three replications. There were 27 treatment combinations comprising three levels each of nitrogen (15, 30 and 45 kg N ha^{-1}) phosphorus (15, 30 and 45 kg P_2O_5 ha^{-1}) and potassium (30, 60 and 90 kg K_2O ha^{-1}) and absolute control (no fertilizers).

Beds of size 1.2 m x 3 m were taken and rhizomes were planted at spacing of 30 cm x 30 cm in small pits. A uniform dose of 40 t ha^{-1} of cattle manure was applied as basal dose. Fertilizers were applied in the form of urea (46% N), superphosphate (16% P_2O_5) and muriate of potash (60% K_2O). Full dose of P and half dose of K as basal, 2/3 N 30 days after planting (DAP) and 1/3 N plus remaining K at 60 DAP were applied as per the treatments. Mulching was done with green leaves @ 15 t ha^{-1} at planting and repeated at 50

Table 1. Effect of N, P and K on quality of mango-ginger rhizome (values on dry weight basis)

Levels of nutrients	Volatile oil, % v/w	NVEE, %	Fibre, %	Starch, %
Nitrogen (N kg ha^{-1})				
15	0.527	7.11	7.19	34.65
30	0.597	6.93	8.56	34.93
45	0.560	8.62	11.33	34.89
F test	S	S	S	NS
Phosphorus (P_2O_5 kg ha^{-1})				
15	0.499	7.74	8.11	34.90
30	0.589	7.50	8.48	34.68
45	0.596	7.42	10.50	34.89
F test	S	S	S	NS
Potassium (K_2O kg ha^{-1})				
30	0.621	8.29	9.25	35.09
60	0.544	7.57	9.33	34.85
90	0.519	6.70	8.50	34.54
F test	S	S	S	NS
SE	0.005	0.060	0.049	0.38
CD (0.05)	0.014	0.17	0.13	-
Control	0.553	7.5	3.5	30.79
Treatments vs. control	NS	NS	S	S

DAP. Rhizome samples were dried to a constant weight using hot air oven (70-80°C) for chemical analysis. Volatile oil, NVEE and starch content were analyzed (AOAC, 1975) and values expressed as percentage on dry weight basis.

Varying levels of the nutrients (Table 1) significantly influenced the quality of mango-ginger rhizome. The volatile oil content was significantly increased with nitrogen application and 30 kg ha⁻¹ recorded maximum value. There was a progressive increase in volatile oil content with increasing phosphorus levels. Potassium application at higher levels reduced the volatile oil content. Application of 45 kg N ha⁻¹ recorded maximum NVEE. A gradual decline in NVEE with increasing levels of phosphorus and potassium application was noted. The volatile oil and NVEE content of treatment and control were found to be comparable. This may be due the averaging effect of the respective values (higher as well as lower values compared to control) of volatile

oil and NVEE as a result of different levels of nutrient application. Ancy and Jayachandran (1993) did not observe any adverse effect of nutrition on quality of ginger. Ratna *et al.* (1993) also reported similar results in turmeric. The fibre content of rhizomes gradually increased with higher levels of nitrogen and phosphorus application; and 45 kg ha⁻¹ of both N and P recorded maximum values. The fibre content was minimum at the highest dose of K₂O (90 kg ha⁻¹). The NPK treated plants produced significantly higher starch content. In general, the application of mineral nutrients resulted in increase in some quality parameters and decrease in some others. The control plants which received only organic manure @ 40 t ha⁻¹ produced rhizomes with low fibre content indicating the importance of organic manuring.

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