



Short Note

Effect of Organic Sources of Nutrients on Growth and Yield of Turmeric (*Curcuma longa* L.)

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A field experiment was conducted at Agricultural Research Station, Bhavanisagar, Tamil Nadu Agricultural University, during June 2010 – March 2011 to study the effect of organic sources of nutrients (wellgro soil, wellgro pellets, wellgro grains and farm yard manure) and recommended dose of fertilizer (150:60:100) on growth and yield of turmeric. The results revealed that the application of 100 % RDF along with 40 % total weight of chemical fertilizer as wellgro soil (350 kg ha⁻¹) recorded higher growth parameters, yield attributes and rhizome yield (26,076 kg ha⁻¹) followed by application of 75 % RDF along with 40 % of total weight of chemical fertilizer as wellgro pellets (260 kg ha⁻¹).

Key words: Turmeric, wellgro formulations, growth parameters, yield attributes and yield.

Turmeric (*Curcuma longa* L.) is a perennial rhizomatous herb and regarded as an important spice of Asian cuisine. Turmeric demands more mineral nutrients and it generally responds to increased soil fertility and quantity of fertilizers applied (organic and inorganic) (Selvarajan and Chezhiyan, 2001). The recent energy crisis and the hike in the prices of the inorganic fertilizers necessitate the integrated use of organic source of nutrients with fertilizers. Wellgro organic manure is a unique form, a blend of neem and non-timber forest produce, free from harmful chemicals and a rich source of nutrients. This organic based farm input addresses soil fertility and crop nutrition in line with the concept of integrated nutrient management. With these ideas, this experiment was carried out to find out the effect of organic sources of nutrients on growth parameters, yield attributes and rhizome yield of turmeric.

Materials and methods

A field experiment was conducted during June 2010 – March 2011 at Agricultural Research Station, Bhavanisagar, Tamil Nadu. The soil of the experimental field was red sandy loam in texture having slightly acidic pH (6.27) with medium soluble salts (0.75 dSm⁻¹), medium in organic carbon content (0.5 per cent), low in available N (205 kg ha⁻¹), medium in available P (15.7 kg ha⁻¹) and high in available K (376 kg ha⁻¹). The field experiment was laid out in Randomized Block Design with three replications. The experiment consisted of 15 treatments comprising of wellgro formulations T₁:100 % RDF, T₂:100 % RDF + 20% Wellgro Soil, T₃:100 % RDF + 40 % Wellgro Soil, T₄:75 % RDF + 20 % Wellgro Soil,

T₅:75 % RDF + 40 % Wellgro Soil, T₆:100 % RDF + 20% Wellgro Pellets, T₇:100 % RDF + 40 % Wellgro Pellets, T₈:75 % RDF + 20 % Wellgro Pellets, T₉:75 % RDF + 40 % Wellgro Pellets, T₁₀:100 % RDF + 20% Wellgro Grains, T₁₁:100 % RDF + 40 % Wellgro Grains, T₁₂:75 % RDF + 20 % Wellgro Grains, T₁₃:75 % RDF + 40 % Wellgro Grains. Recommended dose of N, P and K was applied at 150 kg, 60 kg and 100 kg ha⁻¹. The entire phosphorus was applied as basal and N, K and wellgro formulations were applied in six equal splits at 0, 30, 60, 90, 120 and 150 DAP. Planting was done with a spacing of 45 x 15 cm. Farm yard manure was applied at 12.5 t/ha for treatment T₁₄ (100 % RDF + FYM) and T₁₅ (75 % RDF + FYM). Quantity of wellgro formulations required for experiment was worked out and given in Table 1. Nutrient content of wellgro products and farm yard manure were furnished in Table 2.

Results and Discussion

The growth characters of turmeric viz., days for rhizome sprouting, leaf area index, and dry matter production were significantly influenced by application of wellgro organic manures. Application of 100 % RDF along with 40 % wellgro soil recorded significantly lesser number of days for rhizome sprouting. Application of 100 % RDF + 40 % wellgro soil registered significantly higher LAI at 180 DAP and found on par with 75% RDF + 40 % wellgro pellets. Application of recommended dose of fertilizers along with 40 % wellgro soil recorded higher dry matter accumulation at 180 DAP. This was due to higher underground rhizome mass. The higher uptake of nutrients could have led to maximum dry matter accumulation. The results of the present

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Table 1. Quantity of wellgro formulations applied (kg/ha)

Treatment	Wellgro Formulations (kg/ha)		Wellgro (g/Plot) (1plot – 48 m ²)
	20 %	40 %	
T ₁ - 100 % RDF	-	-	-
T ₂ - 100 % RDF + 20% Wellgro Soil	175 kg	-	840g
T ₃ - 100 % RDF + 40 % Wellgro Soil	-	350 kg	1680g
T ₄ - 75 % RDF + 20 % Wellgro Soil	132.5 kg	-	636g
T ₅ - 75 % RDF + 40 % Wellgro Soil	-	260 kg	1248g
T ₆ - 100 % RDF + 20% Wellgro Pellets	175 kg	-	840g
T ₇ - 100 % RDF + 40 % Wellgro Pellets	-	350 kg	1680g
T ₈ - 75 % RDF + 20 % Wellgro Pellets	132.5 kg	-	636g
T ₉ - 75 % RDF + 40 % Wellgro Pellets	-	260 kg	1248g
T ₁₀ - 100 % RDF + 20% Wellgro Grains	175 kg	-	840g
T ₁₁ - 100 % RDF + 40 % Wellgro Grains	-	350 kg	1680g
T ₁₂ - 75 % RDF + 20 % Wellgro Grains	132.5 kg	-	636g
T ₁₃ - 75 % RDF + 40 % Wellgro Grains	-	260 kg	1248g
T ₁₄ - 100 % RDF + FYM (12.5t/ha)	-	-	-
T ₁₅ - 75 % RDF + FYM (12.5t/ha)	-	-	-

investigation is in conformity with findings of Sadanandan and Hamza (1998) in ginger.

Table 2. Nutrient content of wellgro products and farm yard manure

Character	Wellgro soil	Wellgro pellets	Wellgro grains	Farm yard manure
Total nitrogen (%)	2.24	1.77	2.52	0.48
Total phosphorus (%)	0.52	0.35	0.43	0.24
Total potassium (%)	1.30	2.70	1.70	0.57
Organic carbon (%)	39.50	31.7	34.8	0.81

Yield attributes viz., girth (cm), weight (g) and fresh weight (g) of rhizome were positively

Table 3. Effect of organic sources of nutrients on growth and yield of turmeric

Treatments	Days to rhizome sprouting	Leaf Area Index at 180 DAP	Dry matter production (kg/ha) at 180 DAP	Girth of rhizomes (cm)		Weight of rhizomes (g)		Fresh weight of rhizome (g/plant) at harvest	Economic yield (kg/ha)
				Mother	Primary	Mother	Primary		
T ₁ - 100 % RDF	27.03	8.19	6493	13.75	6.28	57.89	22.59	620	17257
T ₂ - 100 % RDF + 20% Wellgro Soil	25.31	10.55	8997	16.02	8.62	75.66	30.67	675	20174
T ₃ - 100 % RDF + 40 % Wellgro Soil	18.02	12.30	10316	17.54	9.83	107.82	36.78	955	26076
T ₄ - 75 % RDF + 20 % Wellgro Soil	24.20	10.15	8251	15.82	8.79	74.64	28.82	670	21042
T ₅ - 75 % RDF + 40 % Wellgro Soil	20.86	10.61	8780	16.55	9.08	66.11	30.64	855	22618
T ₆ - 100 % RDF + 20% Wellgro Pellets	22.25	9.15	7952	15.70	8.51	70.93	30.20	710	21423
T ₇ - 100 % RDF + 40 % Wellgro Pellets	21.92	9.45	8570	15.68	8.78	91.15	35.88	660	20313
T ₈ - 75 % RDF + 20 % Wellgro Pellets	25.42	10.29	7730	15.65	8.99	73.50	29.65	845	19139
T ₉ - 75 % RDF + 40 % Wellgro Pellets	20.19	10.10	9671	17.03	8.68	101.49	34.92	885	23583
T ₁₀ - 100 % RDF + 20% Wellgro Grains	24.16	9.04	7304	15.10	8.48	84.54	29.03	690	20798
T ₁₁ - 100 % RDF + 40 % Wellgro Grains	20.62	11.17	8187	16.07	9.10	99.07	32.04	850	21007
T ₁₂ - 75 % RDF + 20 % Wellgro Grains	24.96	9.35	7825	14.2	8.34	73.97	28.12	685	21527
T ₁₃ - 75 % RDF + 40 % Wellgro Grains	21.45	10.08	7738	14.66	7.82	70.55	30.53	710	19271
T ₁₄ - 100 % RDF + FYM (12.5t/ha)	21.51	10.65	7897	15.76	8.69	79.39	32.21	795	21875
T ₁₅ - 75 % RDF + FYM (12.5t/ha)	21.94	10.40	7822	15.00	7.28	67.97	30.28	750	21077
SEd	0.45	0.40	218	0.26	0.23	3.00	0.73	20	473
CD(P=0.05)	0.92	0.81	448	0.52	0.46	6.14	1.50	42	970

Cost of wellgro soil, pellets and grains – Rs. 6 / kg

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influenced by the application of wellgro formulations (Table 3). Application of 100 % RDF + 40 % wellgro soil recorded wider and heavier mother and primary rhizome at harvest stage. Increase in girth and weight of rhizome was due to slow release of nutrients from wellgro soil resulting in greater uptake of nutrients. This is in concurrence with earlier findings of Rana and Rattan (1994). More fresh weight of rhizome was registered with application of 100 % RDF + 40 % wellgro soil.

Application of 100 % RDF along with 40 % wellgro soil recorded higher rhizome yield (26076 kg ha⁻¹). Lower yield was recorded with 100 % RDF application. Increase in rhizome yield was 51.1 % over 100 % RDF. The supremacy of wellgro soil was due to greater movement and availability of phosphorus and micronutrients to plants. This could have favoured the increase in yield of rhizomes. The results of the present study is in corroboration with Thanuja (2002) in black pepper.

Conclusion

The results of the present study indicated that application of 100 % RDF along with 40 % wellgro soil (organic manure from ITC, Guntur) higher growth and yield attributes and a rhizome yield of turmeric.

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