



Integrated Nutrient Management Strategies for Enhancing Yield and Economic Return of Baby Corn (*Zea mays* L.) Production under South Gujarat Conditions

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A field experiment was conducted during the summer seasons of 2022 and 2023 at the Horticulture Polytechnic Farm, Navsari Agricultural University, Gujarat, to assess the impact of integrated nutrient management (INM) on the yield and economics of baby corn (*Zea mays* L.). The study evaluated twelve treatment combinations involving three nitrogen levels (80, 100, and 120 kg N ha⁻¹), two organic nutrient sources (vermicompost and castor cake at 25 kg N ha⁻¹), and two levels of Novel Organic Liquid Nutrients (No spray and 1.5% spray). The experiment followed a Factorial Randomized Block Design (FRBD) with three replications. Results indicated that the highest cob yields, both with and without husk, were consistently recorded under the integrated treatment of 120 kg N ha⁻¹ + castor cake + 1.5% Novel Organic Liquid Nutrients (N₃O₂L₂). This combination significantly enhanced yield components and physiological efficiency compared to other treatments. Economically, treatments with 120 kg N ha⁻¹ + vermicompost (with and without NOVEL) resulted in the highest net income and benefit-cost ratios. The findings suggest that integrating higher nitrogen levels with castor cake and liquid organic nutrients can improve yield, profitability, and sustainability of baby corn cultivation under South Gujarat conditions.

Keywords: Yield; economics; net return; baby corn; INM; nitrogen levels; organic sources; novel organic liquid nutrients; castor cake; vermicompost.

1. INTRODUCTION

Baby corn (*Zea mays* L.) is increasingly gaining popularity as a high-value vegetable crop due to its short growth duration, tender cobs, and potential for multiple harvests. It is harvested at the immature stage, before fertilization, providing both edible young cobs and high-quality green fodder from the residual stover. Baby corn is rich in essential nutrients such as potassium, foliates, and B-complex vitamins, while being low in fat and calories, making it an ideal choice for health-conscious consumers. Its mild flavor and crisp texture make it suitable for use in salads, stir-fries, and processed food products. The crop's early maturity enables quick returns in the market, enhancing its economic potential for farmers (Kumar and Kalloo, 1998; Verma *et al.*, 2013). Additionally, baby corn cultivation promotes sustainable agriculture through efficient land use, a short crop cycle, and compatibility with diversified cropping systems contributing to both nutritional security and improved farm profitability (Singh *et al.*, 2010). However, one of the major challenges limiting baby corn productivity is improper nutrient management. Overreliance on chemical fertilizers has led to declining soil health, reduced microbial activity, and long-term fertility issues (Choudhary *et al.*, 2013). Integrated Nutrient Management (INM) which involves the combined use of inorganic fertilizers with organic sources such as farmyard manure, vermicompost, castor cake, and bio fertilizers has been recognized as a sustainable approach for enhancing soil fertility, nutrient use efficiency, and crop productivity. The

incorporation of organic inputs improves soil physical properties, boosts microbial populations, and enhances enzymatic activities, thereby facilitating better nutrient availability and uptake. The use of liquid organics, such as Novel Organic Liquid Nutrients, further supports crop growth by stimulating beneficial *rhizospheric* activity (Modi *et al.*, 2020; Mahapatra *et al.*, 2018). The integration of these practices not only reduces dependency on chemical inputs but also contributes to long-term soil health and environmental sustainability. Although, the benefits of INM have been demonstrated in various crops, region-specific recommendations for baby corn, particularly under the unique agro-climatic conditions of South Gujarat, remain limited. To address this gap, the present investigation was undertaken to assess the effects of different nitrogen levels, organic nutrient sources (Vermicompost and Castor cake), and Novel Organic Liquid Nutrient on yield attributes, productivity, and economic returns of baby corn (*Zea mays* L.). The study aims to develop a balanced and sustainable nutrient management strategy to enhance the yield and profitability of baby corn, while maintaining soil health under the specific conditions of South Gujarat.

2. MATERIALS AND METHODS

The present field experiment was conducted during the summer seasons of 2022 and 2023 at the Horticulture Polytechnic Farm, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari, Gujarat, India,

located at 20°37' N latitude, 72°54' E longitude, and 11.98 meters above mean sea level. The objective was to evaluate Integrated Nutrient Management Strategies for enhancing yield and economic return of baby corn (*Zea mays* L.) under South Gujarat conditions. The experiment was laid out in a Factorial Randomized Block Design (FRBD) with twelve treatment combinations comprising three nitrogen levels (N_1 : 80 kg N ha⁻¹, N_2 : 100 kg N ha⁻¹, N_3 : 120 kg N ha⁻¹), two organic nutrient sources (O_1 : 25 kg N ha⁻¹ through Vermicompost, O_2 : 25 kg N ha⁻¹ through Castor cake), and two levels of liquid organic nutrient application (L_1 : control, L_2 : Novel Organic Liquid Nutrients @ 1.5%). Each treatment was replicated thrice. The baby corn hybrid GAYMH-1 was sown at a spacing of 60 cm × 25 cm with a seed rate of 15 kg ha⁻¹. Solid organic inputs were incorporated into the soil during land preparation, and foliar applications of Novel Organic Liquid Nutrients developed by Navsari Agricultural University were carried out at 30 and 45 days after sowing as per the treatment schedule. The gross plot size was 3.6 m × 3.0 m, and the net plot size was 2.4 m × 2.5 m, each consisting of six rows with twelve plants per row. All recommended agronomic and plant protection measures were uniformly applied throughout the cropping period. Growth, yield, and quality parameters were recorded from randomly selected, tagged plants, and quality traits were analyzed in the laboratory. Final yield data were computed from the net plot and expressed in kg ha⁻¹. During the crop period, mean monthly maximum temperatures ranged from 29.0°C to 39.5°C, while minimum temperatures varied between 18.0°C and 27.0°C. Relative humidity ranged from 55% to 95%, and due to negligible rainfall, the crop was maintained entirely under irrigated conditions.

3. RESULT AND DISCUSSION

The application of varying nitrogen levels, organic nutrient sources, and Novel Organic Liquid Nutrients (NOVEL) significantly influenced baby corn cob yield both with and without husk during the summer seasons of 2022 and 2023, as evidenced by pooled data. As presented in Table 1, the highest cob yield with husk was consistently achieved with the application of 120 kg N ha⁻¹ (N_3), which resulted in yields of 14388.89 kg ha⁻¹ in 2022, 15138.89 kg ha⁻¹ in 2023, and a pooled mean of 14763.89 kg ha⁻¹. Correspondingly, Table 6 illustrates that the same nitrogen level (N_3) produced the highest cob yield without husk, with values of 2416.67,

2694.44, and 2555.56 kg ha⁻¹ in 2022, 2023, and pooled data, respectively. These results suggest that higher nitrogen availability enhances vegetative growth, photosynthetic efficiency, and reproductive success, ultimately contributing to increased cob biomass and grain filling (Singh *et al.*, 2021).

Organic nutrient sources also exerted a significant effect on yield. Application of 25 kg N ha⁻¹ through castor cake (O_2) outperformed vermicompost (O_1), as shown in Table 1, with yields of 13462.96, 14259.26, and 13861.11 kg ha⁻¹ with husk in 2022, 2023, and pooled data, respectively. Likewise, Table 6 shows corresponding increases in cob yield without husk under O_2 (2240.74, 2462.96, and 2351.85 kg ha⁻¹). The superior performance of castor cake may be attributed to its higher nitrogen content, better nutrient release pattern, and stimulatory effects on soil microbial activity and root development (Meena *et al.*, 2013).

Furthermore, foliar application of Novel Organic Liquid Nutrients at 1.5% (L_2) significantly enhanced cob yield compared to the control (L_1). As detailed in Table 1, L_2 recorded yields with husk of 13329.81, 14056.05, and 13692.93 kg ha⁻¹, while Table 6 reports yield without husk of 2179.82, 2446.16, and 2312.99 kg ha⁻¹ for 2022, 2023, and pooled data, respectively. This improvement can be linked to the presence of phytohormones, micronutrients, and enzymatic compounds in NOVEL derived from banana pseudo stem sap which enhance nutrient uptake, physiological processes, and overall crop vigour.

Collectively, the data presented in Tables 1 and 6 emphasize the effectiveness of integrated nutrient management involving higher nitrogen levels, castor cake, and NOVEL application in improving cob yield of baby corn. These findings are in alignment with earlier research advocating the combined use of organic and inorganic inputs for sustainable yield enhancement (Singh *et al.*, 2020).

3.1 Interaction Effects

The interaction of nitrogen levels, organic sources, and Novel Organic Liquid Nutrients (NOVEL) significantly influenced the cob yield of baby corn, both with and without husk, across two consecutive seasons. As shown in Tables 2 to 5 and visualized in Fig. 1, the highest cob yield with husk was consistently recorded under the integrated treatment $N_3O_2L_2$ (120 kg N ha⁻¹ + 25

kg N ha⁻¹ through castor cake + 1.5% NOVEL), demonstrating a strong synergistic effect of nutrient integration. In the 2022 season, however, the treatment N₃O₁L₁ (120 kg N ha⁻¹ + vermicompost + control) produced the highest cob yield with husk, indicating seasonal variability in nutrient response. Conversely, the lowest cob yields across both years and in pooled analysis were observed under N₁O₁L₁ (80 kg N ha⁻¹ + vermicompost + control), reaffirming the importance of adequate nutrient supply for optimal yield.

This enhancement in cob yield can be attributed to the sustained release of nutrients from castor cake, which improves microbial activity, enhances nutrient mineralization, and promotes better root development. Simultaneously, the readily available nitrogen from chemical fertilizer supports rapid vegetative and reproductive growth, while the application of 1.5% Novel Organic Liquid Nutrients further stimulates physiological processes through the supply of phytohormones, micronutrients, and enzyme-like substances derived from banana pseudo stem sap.

Table 1. Effect of various nitrogen levels, organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) with husk of baby corn

Treatments	Cob yield (kg ha ⁻¹) with husk					
	2022	2023	Pooled			
Nitrogen levels						
N ₁ - 80 kg N ha ⁻¹	11722.22	12583.33	12152.78			
N ₂ - 100 kg N ha ⁻¹	12277.78	13138.89	12708.33			
N ₃ - 120 kg N ha ⁻¹	14388.89	15138.89	14763.89			
S.Em. (±)	191.92	169.94	131.43			
CD at 5 %	562.88	498.43	374.59			
Organics						
O ₁ - 25 kg Nitrogen ha ⁻¹ through Vermicompost	12129.63	12981.48	12555.55			
O ₂ - 25 kg Nitrogen ha ⁻¹ through Castor Cake	13462.96	14259.26	13861.11			
S.Em. (±)	156.70	138.76	107.31			
CD at 5 %	459.59	406.96	305.85			
Novel Organic Liquid Nutrients						
L ₁ – Control	12262.79	13184.69	12723.74			
L ₂ - Novel Organic Liquid Nutrients 1.5 %	13329.81	14056.05	13692.93			
S.Em. (±)	156.70	138.76	107.31			
CD at 5 %	459.59	406.96	305.85			
Interactions	SEm±	CD at 5 %	SEm±	CD at 5 %	SEm±	CD at 5 %
(N × O)	271.41	796.03	240.34	704.88	185.87	529.75
(N × L)	271.41	796.03	240.34	704.88	185.87	529.75
(O × L)	221.61	649.96	196.23	575.53	151.76	432.54
(N × O × L)	383.84	1125.76	339.89	996.85	262.85	749.18
CV %	5.20		4.32		4.87	

Table 2. Interaction effect of nitrogen levels and organics on cob yield (kg ha⁻¹) with husk of baby corn

Levels of Nitrogen	Cob yield (kg ha ⁻¹) with husk					
	Organics					
	2022		2023		Pooled	
	O ₁	O ₂	O ₁	O ₂	O ₁	O ₂
N ₁	10810.21	12634.23	11799.61	13367.05	11304.91	13000.64
N ₂	11447.55	13108.01	12282.75	13995.03	11865.15	13551.52
N ₃	14131.12	14646.65	14862.08	15415.69	14496.60	15031.17
S.Em. (±)	271.41		240.34		185.87	
CD at 5 %	796.03		704.88		529.75	
CV %	5.20		4.32		4.87	

Table 3. Interaction effect of nitrogen levels and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) with husk of baby corn

Levels of Nitrogen	Cob yield (kg ha ⁻¹) with husk					
	Novel Organic Liquid Nutrients					
	2022		2023		Pooled	
	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂
N ₁	10785.41	12659.04	11912.17	13254.49	11348.79	12956.76
N ₂	11340.96	13214.59	12265.89	14011.88	11803.43	13613.24
N ₃	14661.99	14115.79	15376.00	14901.77	15018.99	14508.78
S.Em. (±)	271.41		240.34		185.87	
CD at 5 %	796.03		704.88		529.75	
CV %	5.20		4.32		4.87	

Table 4. Interaction effect of organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) with husk of baby corn

Organics	Cob yield (kg ha ⁻¹) with husk					
	Novel Organic Liquid Nutrients					
	2022		2023		Pooled	
	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂
O ₁	12002.95	12256.30	12888.16	13074.80	12445.56	12665.55
O ₂	12522.62	14403.31	13481.22	15037.29	13001.92	14720.30
S.Em. (±)	156.70		138.76		107.31	
CD at 5 %	459.59		406.96		305.85	
CV %	5.20		4.32		4.87	

Table 5. Interaction effect of nitrogen, organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) with husk of baby corn

Treatment combinations	Cob yield (kg ha ⁻¹) with husk		
	2022	2023	Pooled
N ₁ O ₁ L ₁	9826.6	11158.1	10492.3
N ₁ O ₁ L ₂	11793.8	12441.2	12117.5
N ₁ O ₂ L ₁	11744.2	12666.3	12205.2
N ₁ O ₂ L ₂	13524.3	14067.8	13796.0
N ₂ O ₁ L ₁	10755.6	11511.5	11133.5
N ₂ O ₁ L ₂	12139.5	13054.0	12596.8
N ₂ O ₂ L ₁	11926.4	13020.3	12473.3
N ₂ O ₂ L ₂	14289.6	14969.8	14629.7
N ₃ O ₁ L ₁	15426.7	15994.9	15710.8
N ₃ O ₁ L ₂	12835.6	13729.3	13282.4
N ₃ O ₂ L ₁	13897.3	14757.1	14327.2
N ₃ O ₂ L ₂	15396.0	16074.3	15735.1
S.Em.± (N X O X L)	383.8	339.9	262.9
CD at 5 % (N X O X L)	1125.8	996.9	749.2
CV %	5.20	4.32	4.87

Similar trends were evident for cob yield without husk, as presented in Tables 7 to 10 and illustrated in Fig. 2, where the treatment N₃O₂L₂ consistently recorded the highest yield across years. This reaffirms the positive impact of integrated nutrient management on the physiological efficiency and productivity of baby

corn. These findings align with earlier studies by Singh *et al.* (2021) and Meena *et al.* (2013), who highlighted the effectiveness of combining organic and inorganic nutrient sources for improving maize and baby corn yields. The current results underscore the importance of adopting balanced and integrated nutrient

application strategies to enhance productivity and ensure sustainability under South Gujarat conditions.

3.3 Economics

The economic analysis over two years identified the most profitable nutrient management strategies for baby corn, as presented in Table 11 and Fig. 3. The highest net income of Rs. 171531 ha⁻¹ and benefit-cost ratios (BCR) of 0.78 and 0.79 were recorded with treatments N₃O₁L₁ (120 kg N ha⁻¹ + vermicompost + control) and N₃O₁L₂ (120 kg N ha⁻¹ +

vermicompost + 1.5% Novel Organic Liquid Nutrients), making them the most economically viable options. A slightly lower yet profitable treatment, N₂O₁L₂ (100 kg N ha⁻¹ + vermicompost + 1.5% Novel Organic Liquid Nutrients), provided Rs.135781 ha⁻¹ net income and 0.72 BCR. The integration of vermicompost with inorganic nitrogen improved soil health, nutrient efficiency, and crop yields, while Novel Organic Liquid Nutrients enhanced plant growth and profitability. These results align with findings of Nawaz *et al.* (2017) and Kadari *et al.* (2019), confirming the economic benefits of combined organic and inorganic nutrient use.

Table 6. Effect of various nitrogen levels, organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) without husk of baby corn

Treatments				Cob yield (kg ha ⁻¹) without husk		
				2022	2023	Pooled
Nitrogen levels						
N ₁ - 80 kg N ha ⁻¹				1861.11	2111.11	1986.11
N ₂ - 100 kg N ha ⁻¹				1972.22	2250.00	2111.11
N ₃ - 120 kg N ha ⁻¹				2416.67	2694.44	2555.56
S.Em. (±)				36.83	41.18	28.61
CD at 5 %				108.03	120.78	81.55
Organics						
O ₁ - 25 kg Nitrogen ha ⁻¹ through Vermicompost				1925.93	2240.74	2083.33
O ₂ - 25 kg Nitrogen ha ⁻¹ through Castor Cake				2240.74	2462.96	2351.85
S.Em. (±)				30.07	33.62	23.36
CD at 5 %				88.20	98.62	66.59
Novel Organic Liquid Nutrients						
L ₁ - Control				1986.84	2257.54	2122.19
L ₂ - Novel Organic Liquid Nutrients 1.5 %				2179.82	2446.16	2312.99
S.Em. (±)				30.07	33.62	23.36
CD at 5 %				88.20	98.62	66.59
Interactions	SEm±	CD at 5 %	SEm±	CD at 5 %	SEm±	CD at 5 %
(N × O)	52.09	152.77	58.24	170.81	40.46	115.33
(N × L)	52.09	152.77	58.24	170.81	40.46	115.33
(O × L)	42.53	124.74	47.55	139.47	33.04	94.17
(N × O × L)	73.67	216.06	82.36	241.56	57.23	163.10
CV %	6.12		6.07		6.32	

Table 7. Interaction effect of nitrogen levels and organics on cob yield (kg ha⁻¹) without husk of baby corn

Levels of Nitrogen	Cob yield (kg ha ⁻¹) without husk					
	Organics					
	2022		2023		Pooled	
	O ₁	O ₂	O ₁	O ₂	O ₁	O ₂
N ₁	1664.15	2058.07	1941.93	2280.30	1803.04	2169.19
N ₂	1775.26	2169.19	2109.85	2390.15	1942.56	2279.67
N ₃	2338.37	2494.96	2670.44	2718.45	2504.41	2606.70
S.Em. (±)	52.09		58.24		1941.93	
CD at 5 %	152.77		170.81		115.33	
CV %	6.12		6.07		6.32	



Fig. 1. Interaction effect of nitrogen, organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) with husk during 2022, 2023 and pooled basis of baby corn

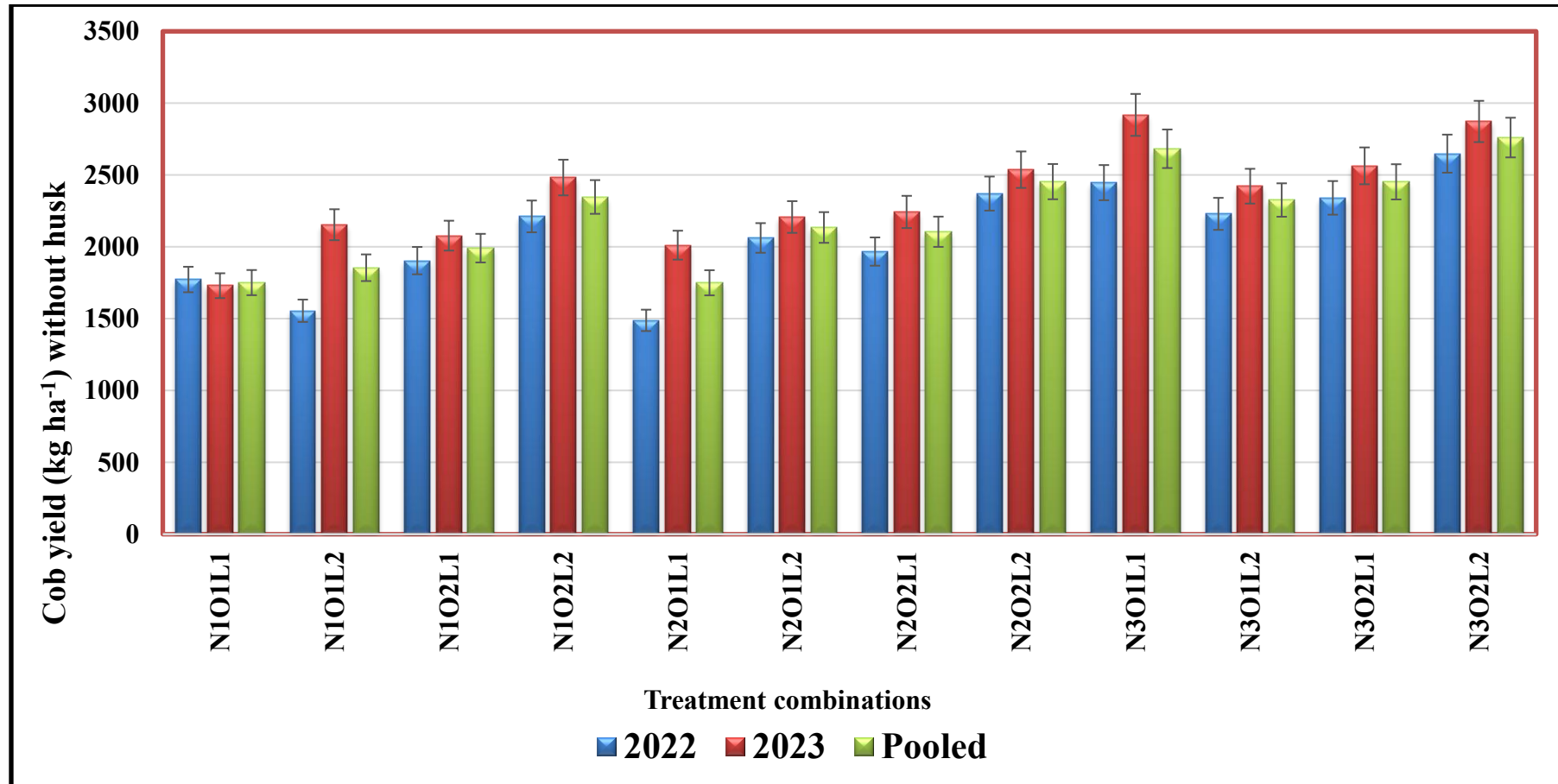


Fig. 2. Interaction effect of nitrogen, organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) without husk during 2022, 2023 and pooled basis of baby corn

Table 8. Interaction effect of nitrogen levels and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) without husk of baby corn

Nitrogen	Cob yield (kg ha ⁻¹) without husk					
	Novel Organic Liquid Nutrients					
	2022		2023		Pooled	
	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂
N ₁	1838.55	1883.67	1903.89	2318.33	1871.22	2101.00
N ₂	1727.88	2216.56	2127.47	2372.53	1927.67	2294.55
N ₃	2394.10	2439.23	2741.28	2647.61	2567.69	2543.42
S.Em. (±)	52.09		58.24		40.46	
CD at 5 %	152.77		170.81		115.33	
CV %	6.12		6.07		6.32	

Table 9. Interaction effect of organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) without husk of baby corn

Organics	Cob yield (kg ha ⁻¹) without husk					
	Novel Organic Liquid Nutrients					
	2022		2023		Pooled	
	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂
O ₁	1902.81	1949.04	2220.04	2261.44	2061.43	2105.24
O ₂	2070.87	2410.61	2295.05	2630.87	2182.96	2520.74
S.Em. (±)	42.53		47.55		33.04	
CD at 5 %	124.74		139.47		94.17	
CV %	6.12		6.07		6.32	

Table 10. Interaction effect of nitrogen, organics and Novel Organic Liquid Nutrients on cob yield (kg ha⁻¹) without husk of baby corn

Treatment combinations	Cob yield (kg ha ⁻¹) without husk		
	2022	2023	Pooled
N ₁ O ₁ L ₁	1772.87	1729.75	1751.31
N ₁ O ₁ L ₂	1555.42	2154.11	1854.76
N ₁ O ₂ L ₁	1904.22	2078.04	1991.13
N ₁ O ₂ L ₂	2211.93	2482.55	2347.24
N ₂ O ₁ L ₁	1488.47	2011.82	1750.15
N ₂ O ₁ L ₂	2062.04	2207.89	2134.97

Treatment combinations	Cob yield (kg ha ⁻¹) without husk		
	2022	2023	Pooled
N ₂ O ₂ L ₁	1967.29	2243.11	2105.20
N ₂ O ₂ L ₂	2371.09	2537.18	2454.13
N ₃ O ₁ L ₁	2447.10	2918.55	2682.82
N ₃ O ₁ L ₂	2229.65	2422.34	2325.99
N ₃ O ₂ L ₁	2341.11	2564.00	2452.56
N ₃ O ₂ L ₂	2648.81	2872.89	2760.85
S.Em.± (N X O X L)	73.67	82.36	57.23
CD at 5 % (N X O X L)	216.06	241.56	163.10
CV %	6.12	6.07	6.32

Table 11. Effect of various nitrogen levels, organics and Novel Organic Liquid Nutrients on economics of baby corn cultivation(Rs. ha⁻¹)

Treatments		Cob yield without husk (t ha ⁻¹)	Green fodder yield (t ha ⁻¹)	Fixed cost (Rs. ha ⁻¹)	Variable cost (Rs ha ⁻¹)	Cost A (Rs ha ⁻¹)	Cost B (Rs ha ⁻¹)	Cost C (Rs ha ⁻¹)	Gross income (Rs ha ⁻¹)	Net income (Rs ha ⁻¹)	BCR
T ₁	N ₁ O ₁ L ₁	1.75	20.86	84,923	80282.8	165205.4	17462.5	182667.9	279400	96732.1	0.53
T ₂	N ₁ O ₁ L ₂	1.85	21.40	84,923	73548	158470.6	18281.25	176751.8	292500	115748.2	0.65
T ₃	N ₁ O ₂ L ₁	1.99	21.95	84,923	118602	203524.7	19303.13	222827.8	308850	86022.1	0.39
T ₄	N ₁ O ₂ L ₂	2.35	22.49	84,923	119755	204678.7	21696.88	226375.6	347150	120774	0.53
T ₅	N ₂ O ₁ L ₁	1.75	21.44	84,923	80571	165493.6	17637.5	183131.1	282200	99068.9	0.54
T ₆	N ₂ O ₁ L ₂	2.13	22.01	84,923	82624.3	167546.9	20221.88	187768.8	323550	135781	0.72
T ₇	N ₂ O ₂ L ₁	2.11	22.36	84,923	122469	207392.7	20143.75	227536.4	322300	94763.5	0.42
T ₈	N ₂ O ₂ L ₂	2.45	23.19	84,923	123431	208354.7	22584.38	230939.1	361350	130410	0.56
T ₉	N ₃ O ₁ L ₁	2.68	24.58	84,923	110296	195218.7	24450	219668.7	391200	171531	0.78
T ₁₀	N ₃ O ₁ L ₂	2.33	23.48	84,923	89011.5	173934.1	21875	195809.1	350000	154190	0.79
T ₁₁	N ₃ O ₂ L ₁	2.45	24.07	84,923	133763	218686.7	22853.13	241539.8	365650	124110	0.51
T ₁₂	N ₃ O ₂ L ₂	2.76	24.84	84,923	133449	218372.7	25018.75	243391.4	400300	156908	0.64

Note: Selling price of baby corn ₹ 100 kg⁻¹

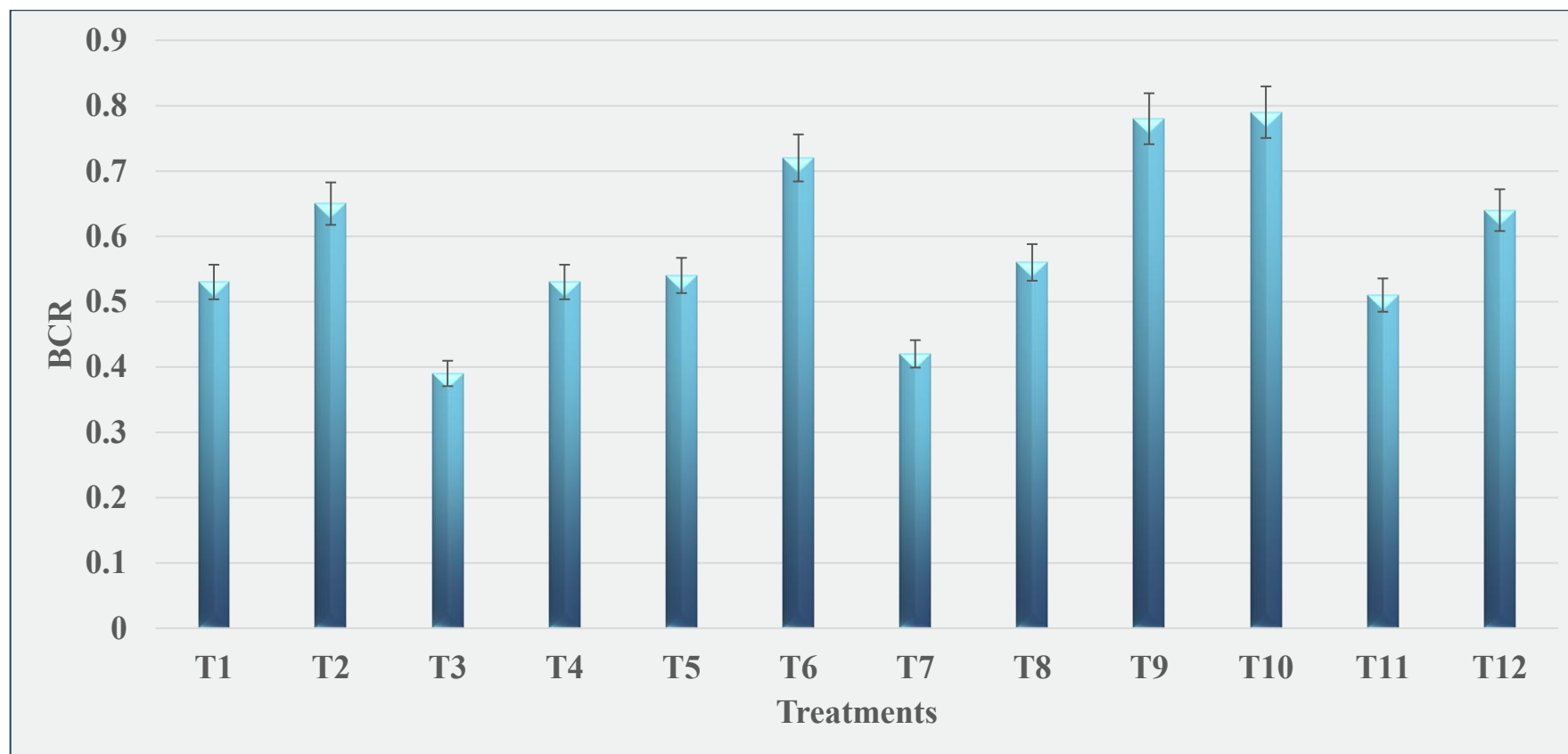


Fig. 3. Effect of various nitrogen levels, organics and Novel Organic Liquid Nutrients on economics of baby corn cultivation (Rs.ha⁻¹)

4. SUMMARY AND CONCLUSIONS

Integrated nutrient management combining 120 kg N ha⁻¹, 25 kg N ha⁻¹ through castor cake or vermicompost, and 1.5% Novel Organic Liquid Nutrients significantly improved baby corn cob yield with and without husk across both years and pooled data. Significant interaction effects confirmed the benefit of combined nutrient strategies. Economically, 120 kg N ha⁻¹ with vermicompost and either control or 1.5% Novel Organic Liquid Nutrients provided the highest net income (Rs.171531 ha⁻¹) and benefit cost ratios (0.78-0.79), making these treatments most suitable for profitable and sustainable baby corn production.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, Copilot, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Choudhary, V. K., & Kumar, P. S. (2013). Maize production, economics, and soil productivity under different organic sources of nutrients in the eastern Himalayan region, India. *International Journal of Plant Production*, 7(2), 167–186.
- Kadari, I. A., Shinde, S. J., & Maske, S. N. (2019). Effect of land configuration with different levels of spacing and fertilizers on yield and economic studies of onion (*Allium cepa* L.) cultivation. *Journal of Pharmacognosy and Phytochemistry*, 8(1), 2452–2455.
- Kumar, S., & Kalloo, G. (1998). Attributes of maize genotype for baby corn production. *Maize Genetics News Letter*, 74.

- Mahapatra, A., Barik, A. K., & Mishra, G. C. (2018). Integrated nutrient management on baby corn (*Zea mays* L.). *International Journal of Bio-resource and Stress Management*, 9(1), 44–48.
- Meena, B. P., Kumar, A., Meena, S. R., Shivadhar, R. D. S., & Rana, K. S. (2013). Effect of sources and levels of nutrients on growth and yield behavior of popcorn (*Zea mays* L.) and potato (*Solanum tuberosum*) sequence. *Indian Journal of Agronomy*, 58(4), 474–479.
- Modi, P. K., Chavan, S. M., & Verma, P. D. (2020). Extent of adoption of “novel organic liquid nutrients” in fruits and vegetable crops. *Agricultural Science Digest*, 41(1), 93–95.
- Nawaz, M. Q., Ahmed, K., Hussain, S. S., Rizwan, M., Sarfraz, M., Wainse, G. M., & Jamil, M. (2017). Response of onion to different nitrogen levels and method of transplanting in moderately salt-affected soil. *Acta Agriculturae Slovenica*, 109(2), 303–313.
- Singh, A., et al., (2020). Tiny microbes, big yields: Microorganisms for enhancing food crop production for sustainable development. In *New and future developments in microbial biotechnology and bioengineering* (pp. 1-15). Elsevier.
- Singh, M. K., Singh, R. N., Singh, S. P., Yadav, M. K., & Singh, V. K. (2010). Integrated nutrient management for higher yield, quality, and profitability of baby corn (*Zea mays*). *Indian Journal of Agronomy*, 55(2), 100–104.
- Singh, R. P., & Agrawal, R. C. (2021). Farmers' varieties to increase nutritional security, eco-system resiliency, and farmers' income. *Indian Journal of Agricultural Sciences*, 91(8), 1107–1111.
- Verma, A. K., Harikal, A. S., & Tomar, S. K. (2013). Fodder quality of baby corn (*Zea mays* L.) as influenced by method of planting, crop geometry, and nitrogen application. *Indian Journal of Animal Nutrition*, 30(2), 157–161.

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