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Economic feasibility of Rice (*Oryza sativa* L.) under Organic Farming in South Gujarat Region

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ABSTRACT

An experiment was conducted to find out the economic feasibility of Rice under organic farming at the Organic Farm, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, during the kharif season of 2021. The experimental design used was Randomized Block Design with two factors i.e., forth levels of Soil application (S_1: 100% RDN through NADEP compost, S_2: 80% RDN through NADEP compost along with Azospirillium and PSB @ 2 l/ha each, S_3: 60% RDN through NADEP compost along with Azospirillium and PSB @ 2 l/ha each and S_4: Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha) and three levels of Foliar application (F_0: control, F_1: Novel Organic liquid nutrient @ 1% and F_2: Moringa leaf extract @ 3%). From the total twelve treatments, the S_1 treatment resulted in significantly higher growth attributes viz., plant height and no. of tillers/m^2 at 60 DAT, yield attributes viz., panicle weight, grain weight/hill as well as grain yield (3749 kg/ha) and maximum gross returns (Rs. 96728/ha), net returns (Rs. 51793/ha). But it was statistically similar to the S_2 treatment. While from foliar application the F_2 treatment recorded significantly higher growth attributes and yield attributes viz., no. of productive tillers/m^2 at 60 harvest, no. of grains/panicle, panicle length, grain and straw weight/hill as well as grain and straw yield (3312, 5665 kg/ha), but it was at par with F_1 treatment. The F_2 treatment also recorded the highest gross returns (Rs. 87300/ha), net returns (Rs. 44704/ha) and benefit: cost ratio (1.05). The findings of the study conclude that, to achieve higher productivity and profitability with soil application of 100 percent RDN through NADEP compost and foliar application of either 3 percent Moringa leaf extract or 1 percent Novel organic liquid nutrient at 15, 30, and 45 days after transplanting in kharif rice var. GNR-7 can be carried out, as these treatments are economically feasible under organic farming.

Keywords: *Rice, economics, Moringa leaf extract, NADEP compost, novel organic liquid nutrient, organic farming, yield*

1. INTRODUCTION

India's agriculture is adopting green revolution technologies as a result of the country's growing population and increased need for food grains. Degradation of the soil has come from the overuse of artificial fertilizers carried on by the continuous goal of higher food crop production. The quality of farm food has been compromised due to soil deterioration caused by the excessive and unbalanced use of agricultural chemicals, such as synthetic pesticides and fertilizers. Health consumers may be at risk from products polluted with needless chemicals. An effective way to address these issues is to cultivate crops using environmentally friendly practices, especially given the rising demand for food of the highest quality [1]. Organic farming is a production strategy that avoids or severely restricts the use of synthetic fertilizers, herbicides, growth regulators, genetically modified organisms, and livestock feed additives. To maintain soil productivity and tilth, organic farming employs practices such as crop rotations, crop residue utilization, animal manures, legumes, green manures, off-farm organic wastes, biofertilizers, mechanical cultivation, mineral-bearing rocks, and various forms of biological control to the greatest extent possible. These natural inputs, readily available, promote the delayed nutrient release, supply both macro and micronutrients, and foster a favorable soil environment for microbial communities [2].

Rice *(Oryza sativa* L.) stands as the primary food source for almost half of the world's population, making it a crucial staple in Asian diets. With over 50 percent of the global population relying heavily on rice consumption, its significance extends beyond mere sustenance, impacting economies, employment, cultural practices, and historical narratives [3]. Rice is a staple food for roughly 65% of India's population. Asia is known as the world's 'rice bowl' because it produces and consumes more than 90% of the world's rice, making it the world's most important food crop. Following China, India is the world's second-largest producer of rice. In 2021-2022, India's rice cultivated area was 46.38 million hectares, yielding 130.29 million tonnes with an average productivity of 2809 kg/ha. India's main rice-producing states are West Bengal, Uttar Pradesh, Punjab, Odisha, Andhra Pradesh, Bihar, Chhattisgarh, Tamil Nadu, and Gujarat [4]. In organic farming, composting, particularly the NADEP method, provides an environmentally favourable alternative in organic farming. Cow-based organic manures, such as jivamrut, bijamrut, and panchgavya, serve as good alternatives to chemical fertilizers, playing an important part in organic farming [5]. Biofertilizers containing nitrogen-fixing and phosphate-solubilizing microorganisms improve soil health by accelerating specific microbial processes, hence improving the

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availability of nutrients in a form that is readily absorbed by plants. *Moringa leaf extract*, acting as a bio-stimulant with zeatin, efficiently enhances crop growth, reducing reliance on chemical fertilizers [6]. Enriched banana pseudo-stem sap can help minimize the negative impacts of inorganic farming. This value-added product, known as "NOVEL-Liquid Organic Nutrient," developed by the Banana Pseudo-stem Processing Unit at Navsari Agricultural University, Navsari, Gujarat, contains essential macro and micronutrients, plant growth regulators, and beneficial microbes, thus promoting crop growth and protecting against pests. These organic approaches, which address both the environmental and economic consequences of chemical fertilizers, are consistent with the expanding global movement toward sustainable agriculture. As knowledge rises, incorporating these practices can lead to a healthier and more ecologically friendly future for pulse growing, contributing to both food security and sustainable agriculture [7]. Given the importance and predicted growth in demand for high-quality food, this research is crucial in resolving these issues.

2. MATERIALS AND METHODS

The field investigation was undertaken during *kharif* season of the year 2021 at Organic Farm, ASPEE College of Horticulture, Navsari Agricultural University, Navsari under South Gujarat heavy rainfall zone. The experiment was laid out in Randomized Block Design with Factorial concept (FRBD) and replicated thrice. There were two factors the first factor *viz*., soil application (S_1: 100% RDN through NADEP compost, S_2: 80% RDN through NADEP compost along with Azospirillium and PSB @ 2 l/ha each, S_3: 60% RDN through NADEP compost along with Azospirillium and PSB @ 2 l/ha each and S_4: Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha) and second factor was foliar application (F_0: control, F_1: Novel Organic liquid nutrient @ 1% and F_2: *Moringa leaf extract* @ 3% was given thrice at 15, 30 and 45 DAT), So total of twelve treatments were there. Two to three seedlings per hill were transplanted. The experimental field's soil had a clayey texture with high OC, although available N, K_2O, and P_2O_5 was found in medium range. The weather condition during the experimental period favored growth and development of rice. The grain and straw yield (kg/ha) was worked out by taking average per plant yield subjected for statistical analysis and interpretation as per Gomes and Gomes (8). The level of significance used in "F" test was at 5%.

3. RESULTS AND DISCUSSION

3.1 Effect of Different Treatment on Growth of rice

3.1.1 Plant height

Based on the results, it was concluded that the plant height at 30 DAT was not significantly influenced by soil and foliar application. The plant height at 60, 90 DAT, and at harvest was significantly influenced by the soil application and foliar application of the organic nutrient sources (Table 1). The S_1 (100% RDN through NADEP compost) treatment recorded significantly higher plant height at 60 DAT (81.1 cm), 90 DAT (102.6 cm) and at harvest (103.8 cm) over the S_4, and it remained at par with S_2. The result revealed that the foliar application of *Moringa leaf extract* @ 3 per cent *viz*., F_2 treatment recorded significantly higher plant height at 60 DAT (81.3 cm) and 90 DAT (98.3 cm) over the control, but it was similar with F_1. The F_1, novel organic liquid nutrient @ 1% recorded significantly higher plant height at harvest (99.7 cm), but it was statistically at par with F_2.

The influence of the interaction effect of soil and foliar application on plant height was found to be statistically non-significant, with no observed variation in plant height. It might be due to the application of NADEP compost as a source of plant nutrients that may improve the soils physico-chemical property by increasing its capacity to absorb and store water and it also contains beneficial microorganisms and plant growth promoting substances that enhance the growth of plants. The improvement in plant height of crop at foliar application of *Moringa leaf extract* might be due to the presence containing numbers of different micronutrients and natural plant growth hormones such as zeatin, gibberellic acid and cytokinin those help to enhance the growth attributing characters. This finding noted with previous experiments conducted by Parmar *et al*. [9] on maize, Naikwade [10] on maize, and Abdalla [6] on rocket (*Eruca vesicaria*) which closely correspond with the results of the present research.

3.1.2 Number of tillers/m^2 at 60 DAT

The details regarding the number of tillers/m^2 at 60 DAT of rice have been presented in Table 1. The significant difference was noticed due to the effect of soil application S_1 treatment, where 100 percent RDN was applied through NADEP compost, recorded a significantly maximum number of tillers/m^2 at 60 DAT (206.7) than the S_4, but it was similar with S_2 treatment. The foliar application of F_1 treatment novel organic liquid nutrient @ 1% was recorded significantly maximum number of tillers/m^2 at 60 DAT (192.2), but it was found statistically at par with F_2, *Moringa leaf extract* @ 3% compare to the control treatment. The influence of the interaction effect of soil and foliar application on number of tillers/m^2 at 60 DAT was found to be statistically non-significant.

3.2 Effect of Different Treatment on Yield attributes of rice

3.2.1 Number of productive tillers/m^2 at harvest

Based on the results, the number of productive tillers/m^2 at harvest (Table 2) was significantly influenced by soil and foliar application. The application of S_2, 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha was recorded significantly higher number of productive tillers/m^2 (165.5) at harvest than the S_4, Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha (136.5), and also it was found statistically at par with S_1, 100% RDN through NADEP compost. The foliar application of F_2, *Moringa leaf extract* @ 3% was recorded significantly higher number of productive tillers/m^2 at harvest (157.4) then the control (142.5), and also it was found statistically at par with F_1, Novel Organic liquid nutrient @ 1% than the control. The influence of the interaction effect of soil and foliar application on number of productive tillers/m^2 at harvest was found to be statistically non-significant.

3.2.2 Number of grains/panicle

The current data regarding the number of grains/panicles of rice is presented in Table 2. The results revealed that recorded significantly higher number of grains/panicle (228.6) at harvest the application of S_2 treatment (80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each) then the S_4 treatment (180.6), but statistically similar with S_1 treatment. The number of grains/panicle was significantly influenced by foliar application. The application of F_2 treatment (*Moringa leaf extract* @ 3%) recorded significantly higher number of grains/panicle at harvest (214.0) then the control (188.1), but statistically similar with F_1 treatment.

The interaction between soil and foliar application of various organic nutrient sources on number of grains/panicle was obtained result being statistically non-significant.

3.2.3 Panicle length

The organic nutrient sources applied to the soil application of different treatment did not show a significant difference in the resulting panicle length (Table 2). The numerically higher panicle length (21.3 cm) was achieved with application of S_3 treatment (60% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each). The results revealed that the foliar application of F_2 treatment (*Moringa leaf extract* @ 3%) was recorded significantly higher panicle length at harvest (21.7 cm) then the control, and also it was found statistically at par with F_1 treatment. The influence of the interaction effect of soil and foliar application on panicle length at harvest was found to be statistically non-significant.

3.2.4 Panicle weight

Based on the results, the panicle weight of rice was recorded at harvest (Table 2). The results revealed that organic nutrient sources applied to the soil and foliar application did produce a significant effect on panicle weight at harvest. The significantly higher panicle weight (4.1 g) at harvest was recorded with the application of S_1 treatment (100% RDN through NADEP compost) then the S_4 treatment (3.0 g), and also it was found statistically similar with S_2 treatment (80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each). The foliar application of F_1 treatment (Novel Organic liquid nutrient @ 1%) was recorded significantly higher panicle weight at harvest (3.8 g) then the control (3.1 g), and also it was found statistically similar with F_2 treatment (*Moringa leaf extract* @ 3%). The interaction effect of soil and foliar application on panicle weight at harvest was found to be statistically non-significant.

3.2.5 Test weight

The test weight of rice was recorded at harvest presented in Table 2. The results revealed that organic nutrient source applied to the soil and foliar application were failed to produce a significant effect on test weight. The application of S_1, 100% RDN through NADEP compost was recorded numerically higher test weight (13.4 g) and foliar application of F_1, novel organic liquid nutrient @ 1% (13.2 g), while numerically lowest test weight was observed with S_4 and F_0: *i.e.* control. The interaction effect of soil and foliar application on test weight at harvest was found to be statistically non-significant.

3.2.6 Grain weight/hill

The data on grain weight/hill of rice was recorded at harvest that presented in Table 3. The results revealed that recorded significantly maximum grain weight (13.9 g) at harvest with application of S_1 treatment (100% RDN through NADEP compost) then the S_4 treatment (10.9 g), but statistically at par with S_2 treatment. In case of foliar application of F_2 treatment (*Moringa leaf extract* @ 3%) was recorded significantly maximum grain weight/hill at harvest (13.0 g) then the control (11.7 g), but it was statistically similar with F_1 treatment. The interaction effect of soil and foliar application on grain weight/hill at harvest was found to be statistically non-significant.

3.2.7 Straw weight/hill

The current data regarding the straw weight/hill of rice is presented in Table 3. The results revealed that the application of S_2 treatment (80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each) was recorded significantly maximum straw weight/hill (26.8 g) at harvest then the S_4 treatment (21.9 g), while statistically similar with S_1 treatment (100% RDN through NADEP compost). In case of foliar application significant maximum straw weight/hill at harvest (26.6 g) was achieved with F_2 treatment (*Moringa leaf extract* @ 3%) then the control (21.7 g), while being at par with F_1 treatment. The interaction effect of soil and foliar application on straw weight/hill at harvest was found to be statistically non-significant.

3.3 Effect of Different Treatment on Yield of rice

3.3.1 Grain yield

Based on the results, it was concluded that the grain yield was significantly influenced by the soil application and foliar application of the organic nutrient sources (Table 4). The S_1 (100% RDN through NADEP compost) treatment recorded a significantly higher grain yield of 3749 kg/ha and it remained at par with S_2 (80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each) treatment which recorded 3538 kg/ha grain yield. The result revealed that the foliar application of *Moringa leaf extract* @ 3 per cent *viz*., F_2 treatment recorded significantly higher grain yield of 3312 kg/ha but was statistically similar with F_1 treatment where, novel organic liquid nutrient @ 1 per cent was sprayed and it recorded 3257 kg/ha grain yield. The F_0 treatment, which served as the control with no spray applied, recorded the lowest grain yield at 2959 kg/ha. The influence of the interaction effect of soil and foliar application on grain yield was found to be statistically non-significant, with no observed variation in grain yield. Analysis of grain yield data indicated that the combination of soil application of organic nutrient sources and foliar spray of liquid organic sources significantly influenced seed production, as evident from the substantial variation detected, which positively impacted yield. The higher seed yield attributed to *Moringa leaf extract* may be attributed to its capacity to enhance the loading and unloading of assimilates across membrane boundaries of vascular tissues, thereby increasing yield. Additionally, cytokinins present in *Moringa leaf extract* are known to promote carbohydrate metabolism and establish new source-sink relationships, further contributing to increased crop yield. These findings align with previous studies by Sahare and Mahanpatra [11] on rice, Ghube *et al*. [12] on organic rice, Jhilik *et al*. [13] on wheat, Biswas *et al*. [14] on maize.

3.3.2 Straw yield

The results revealed that the application of S_2 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each significantly recorded the highest straw yield *i.e*. 5442 kg/ha. While the S_4 treatment where Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha was applied recorded the lowest straw yield of 4329 kg/ha. The foliar spray of 3 per cent *Moringa leaf extract* (F_2 treatment) resulted in significantly higher straw yield (5265 kg/ha) and was statistically similar with the foliar spray of 1 per cent novel organic liquid nutrient (F_1 treatment) which recorded 5117 kg/ha straw yield. While the F_0 treatment as control where no foliar application was given recorded the lowest grain yield *i.e*. 4605 kg/ha (Table 2). The statistically non-significant result was obtained for the straw yield due to the interaction effect between the soil and foliar application of various nutrient organic sources. The findings of the present research work were closely related to previous experiment results observed by Parmar *et al*. [9] on maize, Abusuwar and Abohassan [15] on cereals forages, Safiullah *et al*. [16] on sweet corn.

3.4 Economics

Based on the prevailing market prices of the inputs and produce, the economics of the different treatments *i.e*., the cost of cultivation, net benefit and BCR was calculated on hectare basis which is depicted in Table 4. The economics analysis of different soil application treatment revealed that the highest gross income (Rs. 96728 /ha) and net return (Rs. 51793 /ha) was noted for the S_1 *i.e*.100% RDN through NADEP compost treatment followed by S_2 *i.e*. 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each treatment with gross income of Rs. 92528/ha and net return of Rs. 49700/ha. However, the cost of cultivation was lowest Rs. 42828/ha and maximum BCR of 1.16 noted for S_2 treatment.

The results regarding foliar spray of different liquid organic sources indicated F_2, *i.e. Moringa leaf extract* @ 3% treatment as the best because it recorded maximum yield which generated higher gross income (₹ 87300/ha) and net return (₹ 44704/ha). So, it recorded the highest benefit-cost ratio (1.05) among the various treatments. The gross return (₹ 85608/ha) and net return (₹ 42292/ha) of F_1, *i.e.* novel organic liquid nutrient @ 1% treatment was found better than the control treatment but due to the highest cost of cultivation (₹ 43316/ha) it recorded the lowest benefit-cost ratio (0.98). These findings are in agreement with those of Potkile *et al*. (17) on soybean-wheat, Mahanta *et al*. (18) on black rice, Abusuwar and Abohassan (15) on cereals forage and Rafi and Charyulu (19) on foxtail millet.

From the various combination treatments as shown in Table 4 of soil and foliar application of different nutrient organic sources, it was observed that the S_1F_2 combination (100% RDN through NADEP compost + *Moringa* leaf extract @ 3%) resulted in the highest grain yield (3985 kg/ha) and straw yield (6046 kg/ha) with the maximum net return of ₹ 58105/ha and B:C ratio 1.27 followed by the S_1F_1 (100% RDN through NADEP compost + Novel Organic liquid nutrient @ 1%) combination also gave good resulted in terms of gain yield (3886 kg/ha) and net return ₹ 52861/ha.

4. CONCLUSION

The findings of the study conclude that, in order to achieve higher productivity and profitability with soil application of 100 percent RDN through NADEP compost and foliar application of either 3 percent *Moringa leaf extract* or 1 percent Novel organic liquid nutrient at 15, 30, and 45 days after transplanting in *kharif* rice var. GNR-7 can be carried out, as these treatments are economically feasible under organic farming.

Table 1: Effect of different treatments on plant height at 30, 60, 90 DAT, harvest and no. of tillers/m² of rice

Treatments	30 DAT (cm)	60 DAT (cm)	90 DAT (cm)	Harvest (cm)	No. of tillers/m²
Factor I: Soil application (S)					
S_1 - 100% RDN through NADEP compost	58.1	81.4	102.6	103.8	206.7
S_2 - 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	59.1	81.3	99.1	100.0	196.7
S_3 - 60 % RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	54.5	73.0	92.6	93.4	175.7
S_4 - Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha	55.2	72.6	92.0	93.3	167.9
SEm±	1.3	2.1	1.63	2.0	4.9
CD at 5%	NS	6.3	4.8	6.0	14.6
Factor II: Foliar application (F)					
F_0 – Control	55.5	72.7	92.5	93.7	177.4
F_1 - Novel Organic liquid nutrient @ 1%	57.0	77.2	98.3	99.7	192.2
F_2 - *Moringa* leaf extract@ 3%	57.7	81.3	98.9	99.6	190.6
SEm±	1.1	1.9	1.4	1.8	4.3
CD at 5%	NS	5.4	4.1	5.2	12.7
Interaction					
S×F	NS	NS	NS	NS	NS
CV (%)	6.9	8.4	5.1	6.2	8.0

Table 2: Effect of different treatments on no. of productive tillers/m², no. of grains/panicle, panicle length, panicle weight and test weight of rice

Treatments	No. of productive tillers/m²	No. of grains/ panicle	Panicle length (cm)	Panicle weight (g)	Test weight (g)
Factor I: Soil application (S)					
S_1 - 100% RDN through NADEP compost	162.8	223.4	20.7	4.1	13.4
S_2 - 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	165.5	228.6	21.2	3.9	13.2
S_3 - 60% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	140.0	182.1	21.3	3.1	13.1
S_4 - Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha	136.5	180.6	20.3	3.0	12.5
SEm±	3.4	5.5	0.6	0.12	0.2
CD at 5%	10.0	16.1	NS	0.4	NS

Factor II: Foliar application (F)					
F_0 – Control	142.5	188.1	19.6	3.1	13.0
F_1 - Novel Organic liquid nutrient @ 1%	153.7	209.0	21.3	3.8	13.2
F_2 - *Moringa* leaf extract@ 3%	157.4	214.0	21.7	3.6	13.1
SEm±	2.9	4.8	0.4	0.10	0.1
CD at 5%	8.8	13.9	1.3	0.3	NS
Interaction					
S×F	NS	NS	NS	NS	NS
CV (%)	6.8	8.1	7.8	10.1	5.0

Table 3: Effect of different treatments on grain and straw weight/hill of rice

Treatments	Grain weight/hill (g)	Straw weight/hill (g)
Factor I: Soil application (S)		
S_1 - 100% RDN through NADEP compost	13.9	25.2
S_2 - 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	13.7	26.8
S_3 - 60 % RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	11.6	23.9
S_4 - Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha	10.9	21.9
SEm±	0.4	0.6
CD at 5%	1.0	1.8
Factor II: Foliar application (F)		
F_0 – Control	11.7	21.7
F_1 - Novel Organic liquid nutrient @ 1%	12.8	25.0
F_2 - *Moringa* leaf extract@ 3%	13.0	26.6
SEm±	0.3	0.5
CD at 5%	0.9	1.6
Interaction		
S×F	NS	NS
CV (%)	8.3	7.8

Table 4: Effect of different treatments on yield and economics of rice

Treatments	Grain yield (kg/ha)	Straw yield (kg/ha)	Cost of cultivation (₹/ha)	Gross income (₹/ha)	Net income (₹/ha)	B:C ratio
Factor I: Soil application (S)						
S_1 - 100% RDN through NADEP compost	3749	5437	44935	96728	51793	1.15
S_2- 80% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	3538	5442	42828	92528	49700	1.16
S_3- 60% RDN through NADEP compost along with *Azospirillum* and PSB @ 2 l/ha each	2908	4774	39437	77256	37819	0.96
S_4- Ghan-jivamrut @ 500 kg/ha + Jivamrut @ 500 l/ha	2511	4329	40375	67536	27161	0.67
SEm±	96	149	-	-	-	-
CD at 5%	281	437	-	-	-	-
Factor II: Foliar application (F)						
F_0- Control	2959	4605	39770	77600	37830	0.95
F_1- Novel Organic liquid nutrient @ 1%	3257	5117	43316	85608	42292	0.98
F_2- *Moringa* leaf extract@ 3%	3312	5265	42596	87300	44704	1.05
SEm±	83	129	-	-	-	-
CD at 5%	243	378	-	-	-	-
Interaction						
S×F	NS	NS	-	-	-	-
CV (%)	9.0	8.9	-	-	-	-

***Selling Price: seed = Rs. 20 per kg and Straw = Rs. 4 per kg*

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