The Pharma Innovation Journal 2022; 11(7): 3749-3754

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(7): **3749-3754**

www.thepharmajournal.com
Received: 19-05-2022
Accepted: 25-06-2022

Hancy Saxena
M.Sc. Scholar, Department of Agriculture, Rama University, Kanpur, Uttar Pradesh, India

Ambreesh Singh Yadav
Assistant Professor (Agronomy), Department of Agriculture, Rama University, Kanpur, Uttar Pradesh, India

Ram Niwas
Assistant Professor (Agronomy), Department of Agriculture, Rama University, Kanpur, Uttar Pradesh, India

Corresponding Author:
Hancy Saxena
M.Sc. Scholar, Department of Agriculture, Rama University, Kanpur, Uttar Pradesh, India

Effect of integrated nutrient management on growth and yield of mustard (*Brassica juncea* L.)

Hancy Saxena, Ambreesh Singh Yadav and Ram Niwas

Abstract
A field experiment was allotted throughout 2021-2022 to envision the result of Integrated Nutrient Management on Mustard (*Brassica juncea* L.) Observations were recorded for Growth attributes, Yield attributes and yields, Nutrient content and uptake by mustard crop, Soil quality, political economy in several combos (biofertilizers and organic manure) the treatment are employing a randomized Block design (RBD) with 3 replications, seven treatments were employed in the experiment, together with T1 (Control, NO NPK at 5 t/ha^{-1}), T2 (100 p.c NPK at 5 t/ha^{-1}), and T3 (75 percent NPK + N- twenty five percent (FYM). 100 percent NPK+ S @40 weight unit, T4. T5 - {100%|one hundred pc|100 p.c at 5 t/ha^{-1}} NPK+ twenty five% kg ZnSO4 at 5 t/ha^{-1}, T6 - 75% NPK+ 25% (FYM) +S @ kg, T7: 75 percent NPK+ 25 percent (FYM) and 25 kg of ZnSO4, respectively. Thanks to differing INM and none treatments, plant height, branch count, and dry matter accumulation were all significantly completely different from treatment T1-control (NO NPK+NO none). However, neither INM nor any of the sessions' activities considerably altered plant^{-1}' height or variety of branches at thirty DAS. The most plant height, number of branches, and dry matter accumulation were according for each year at 30 DAS once scrutiny the treatment T6 @5 t/ha^{-1} to alternative treatments. Treatment T6 @5 t/ha^{-1} at sixty DAS and harvest, followed by application of T7 -75 p.c NPK+N-25 percent (FYM)+25kg ZnSO4 there have been significantly higher yield qualities with the T6 @5t/h^{-1} application than with the INM and none treatments. The treatment T1- management (NO NPK) showed the best pH scale and international organization lowering. The best internet returns (Rs. 49408.00 and 52309.00 ha^{-1}) were obtained by the T6 @5 t/ha^{-1} treatment, whereas the highest B:C ratios were generated by the T6 - seventy-five p.c NPK+ N-25 percent (FYM) +S @40 weight unit treatment (1.32 and 1.45).

Keywords: Mustard (*Brassica juncea* L.), integrated nutrient management, actinomycetes

Introduction
Mustard (*Brassica juncea* L.) is an Indian crop with a respectable oilseed yield that belongs to the Cruciferae family, also known as Rai. It is touted as a fancy spice (38-40% oil content). This is appropriate for the short seasons and low rainfall in this region. Nitrogen increased crop yields by affecting unique developmental boundaries and providing more important growth and progression, as demonstrated in ways to increase plant size and flower-producing branches, total plant weight, record leaf area, and amount and mass of seeds and pods per plant. After peanuts, mustard is the second most important edible oil seed. it accounts for more than 30% of all oilseeds produced in India. India is a major producer of rapeseed and mustard. Countries in the world both rapeseed and mustard covered 6.33 million hectares in India and produced 6.69 million tons and yield kg ha^{-1}. During 2021-22. In UP, mustard is grown as an oilseed covering 0.95 million hectares of the region and 20.23 percent of total national production (0.79 million tons) in 2021-2022 with a typical production of 962 kg ha^{-1}, which is incredibly good. However, Indian mustard remains an important winter crop for oilseeds. In Uttar Pradesh it has a very low rate of return. One of the key factors behind the low production is the insufficient use of plant supplements, especially nitrogen. The importance of nitrogen treatment in achieving the more extreme producing potential of mustard is not surprising I suppose. Nitrogen plays an important metabolic role. Component for plant growth and development. Biological substances such as chlorophyll and nucleic acids, which are cellular and corrosive components, are considered essential for the digestion of proteins and other foods. Hence it is the central idea. part of the vegetation. It is a significant amount of vegetative development and administration of various supplements. It assumes an imperative role in the development of chlorophyll. Nitrogen is an important component of supplementation that gives the yield a rich green hue (due to increased chlorophyll) and its poor performance in arid and semi-arid areas is extensive due to the large

number of natural elements that are the main source of raw nitrogen, are exceptionally low at the two sites and would be consumed immediately regardless of whether they were detected. They are essential to carry out the creation of and the most basic social acts throughout the planet. Among the agronomic elements recognized to improve crop production, manure is considered the most effective substance. Contribution to horticulture as a source of nutritional supplements, especially nitrogen, which is lacking in most of our Indian soils, for which it is said to be of great importance in the cultivation of mustard. Due to intensive pruning and pruning of the high-yielding cultivars and the increasing inadequacy of these supplements in the soil, Indian soils are considered poor in nitrogen, phosphorus and sulfur. Manure plays a crucial role in plant growth and significantly increases crop yields. The best nutritional supplement for canola mustard is nitrogen. Where there are no reliable agronomic recommendations for the amounts of N compost for a certain unit zone. advocated 120 kg N ha^{-1} for the optimum Indian mustard output, whereas and also suggested this quantity.

Materials and Methods

Effect of integrated nutrient management on growth and yield of mustard (*Brassica juncea* L.) is proposed to be undertaken at the Agricultural Research Farm, Faculty of Agricultural Sciences and Allied Industries, Rama University, the area of Kanpur during 2021 2022. District comes under subtropical belt in the South East of Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46º C and seldom falls as low as 4 ºC – 5 ºC. The relative humidity ranged between 20–94 percent. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months. Treatments T1- Control (NO NPK), T2- 100% NPK, T3- 75% NPK + N-25% (FYM), T4- 100% NPK+ S @40 kg, T5 100% NPK+ ZnSO4 @25 kg, T6 - 75% NPK+ N-25% (FYM) +S @40 kg, T7 -75% NPK+ N-25% (FYM) + ZnSO4 @25kg were tested in randomized block design with three replications. The observations were recorded on three randomly selected plants from each treatment. Growth attributes, Yield attributes and yields, Nutrient content and uptake by mustard crop, Soil quality, Economics.

Results and discussion

Growth characters

Vertically, plant population, height, and range of branches will all be accustomed quantify a plant' growth, whereas horizontally, dry matter accumulation are often used to live growth, among alternative things. Production of dry matter is a lot of crucial since it contains all other vegetative characteristics. The knowledge relating to the plant population of mustard at thirty days when planting as laid low with numerous levels of nitrogen management and none has been reported in Table 1 and portrayed in Fig. The plant population of the mustard crop at 30 DAS wasn't considerably affected by variable nutrient levels or none practises; nevertheless, the best plant population was found with the treatment T6 @5 t/ha^{-1} for the years 2020 and 2021. Though in every of the 2 years the treatment T1-Control (NO NPK+bNO none) was shown to own the bottom plant population. The mustard crop' plant height at sixty DAS and at the harvest stage is shown in table 1 with the continuance of the mustard crop, plant height step by step grew. Crop growth was at its quickest up till 60 DAS, following that it gradually picked up until harvest. The varied INM and None had a significant impact on plant height. Treatment T6 @5t/ha^{-1}, that was statistically at parity with T8 and considerably higher than the treatments, recorded the utmost plant height in any respect stages. The treatment T1-Control (NO NPK) was noted to own the bottom plant height at all stages. However, diminished weed density at the initial stage, an important time within the crop life cycle, was the rationale for the multiplied plant height. As a result, there was now not any conflict amongst crops for nutrients, moisture, or area. The crop grew powerfully as a result. multiplied fertilizer uptake by crops as a results of integrated nutrient management vegetative development Conversely, a decrease in atomic number 7 absorption by crop is higher up to speed and lower the assembly of growth regulators resulted in an exceedingly decrease within the crop' vegetative growth. There have been considerably a lot of branches in $plant^{-1}$ than influenced by totally different INM strategies and none in any respect with the exception of thirty DAS throughout each the expansion years (Table 4.3). Below the treatment T6 @5t/ha^{-1}, the best number of branches $plant^{-1}$at 60DAS were noted. It had been discovered to be statistically cherish T2, T3, T4, T5and T7 treatment in 2020–2021. The medical care T6 was statistically superior than the treatment within the years T2, T3, T4, and T5 and considerably comparable to the remainder.

In any respect stages, the management therapy (No NPK and No None) had the fewest branches reported. Multiplied nutrient intake caused by INM and None techniques might have resulted in higher vegetative growth. A larger range of branches occurred from the favourable synthesis of growth-promoting substances within the plant system thanks to increased nutrient availability.

In any respect growth phases except thirty DAS, plant one had the best dry matter accumulation. With the exception of treatment T6 @5t/ha^{-1}, that was statistically cherish treatments T2, T3, T4, and T5 and far higher than the rest of the medical care in 2020–2021, Statistics show that therapy T6 is statistically comparable to treatments T2, T3, T4, and T5 which rest is statistically superior to treatment. It had been brought on by Nothing the soil surface may stop. Additionally, it regulates soil temperature, that results in less irrigations.

The treatment T6 @5 t/ha^{-1} had the utmost dry matter accumulation $plant^{-1}$ at sixty DAS and harvest stage. Throughout each year of the experiment, this was statistically cherished T2, T3, T4, T5 and T7 far higher than the remainder of the treatment. The build-up of dry matter at intervals a plant is that the finish outcome of all internal metabolic (physiology and biochemistry) processes. The multiplied rate of the photosynthetic organ, specifically leaves, was accountable for the upper price of total dry matter per plant below these treatments, as a result of the plants in these treatments were taller, they accumulated a lot of dry matter (Table 1). The treatment T1-Control (NO NPK) plots showed the lowest values of dry matter accumulation (1.22 and 1.23 g $plant^{-1}$) whereas, T1 - Control (NO NPK +), accumulation $plant^{-1}$ (12.09 and 13.03 g $plant^{-1}$) was seen NO None) high dry matter accumulated.

Table 1: Effect of Integrated Nutrient Management on Growth parameters of Mustard

Treatments	Plant population (m^{-1})	Plant height (cm)	Number of branches $plant^{-1}$
T1- Control (NO NPK)	13.76	136.05	16.75
T2- 100% NPK	14.20	166.40	20.19
T3- 75% NPK + N-25% (FYM)	14.40	170.42	20.25
T4- 100% NPK+ S @40 kg	14.80	175.45	21.39
T5 100% NPK+ ZnSO4 @25 kg	14.50	175.40	21.27
T6 - 75% NPK+ N-25% (FYM) +S @40 kg	15.80	183.75	23.25
T7 -75% NPK+ N-25% (FYM) + ZnSO4 @25kg	15.00	176.45	22.40

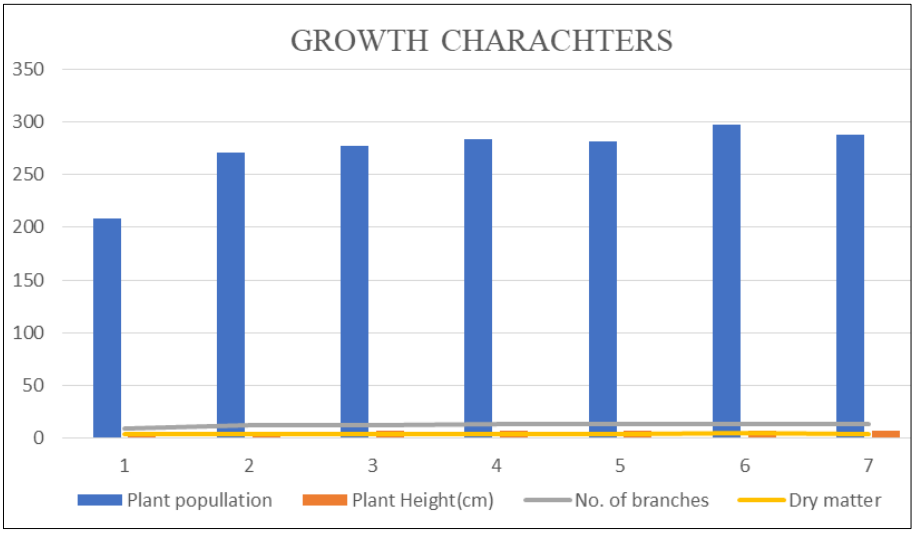

Fig 1: Effect of Integrated Nutrient Management on Growth parameters of Mustard

Yield and economic attributes

The remedy T6 @5t/ha^{-1} produced the best variety of siliquae $plant^{-1}$ (304.83 and 316.96). The remedy T1-Control (No NPK) become proven to have notably fewer siliquae $plant^{-1}$ (208.65 and 211.97) remedy T6 @ 5t/ha^{-1} recorded the longest duration of siliquae (7.91 and 8.14 cm). The smallest duration of siliquae (5.79 and 5.90 cm) become recorded in remedy T1 - Control (No NPK) plots at some stage in the yr of 2021-22 respectively. Treatment T6 @five t/h^{-1} had a better variety of seeds $siliquae^{-1}$ (14.82 and 15.03) remedy T1 - Control (No NPK), a notably decrease variety of seeds $siliquae^{-1}$ (9.05 and 9.26, respectively) have been discovered the best take a look at weights (4.92 and 5.03 g) have been recorded below the remedy T6 @5 t/ha^{-1}, observed with the aid of using the bottom take a look at weights (3.29 and 3.71 g) below the remedy T1 - Control (No NPK), at some stage in the 2 years, respectively. T6 + remedy. The finest recorded seed output (21.05 and 22.08 q ha^{-1}) in the course of each seasons become none @ 5 t/ha^{-1}. In relation to years the minimal seed yield (10.forty one and 10.41 q ha^{-1}) become determined under the remedy T1 - Control (No NPK).Therapy T6 @five t/ha^{-1} maximum stover output, which become statistically akin to T2, T3, T4, T5, T7, and 49.42 and 51.43 q ha^{-1}, the remedy T1 – Control (No NPK) confirmed the bottom stover yield (31.59 and 32.23 q ha^{-1}).The remedy T6 @ 5 t/ha^{-1} after the remedy T7 @ 5 t/ha^{-1} had the best harvest index recorded (29.90 and 30.87 percent) (29.87 and 30.19 percent). During the years 2021–2022 and 2019–2020, respectively, the remedy T1 Control (No NPK) had the lowest harvest index (24.03 and 24.15 percent).

Table 2: Effect of Integrated Nutrient Management on Yield parameters of Mustard

Treatments	No. of siliquae/ plant	Length of Siliquae (cm)	No. of seeds/ siliquae	Test weight (g)
T1- Control (NO NPK)	208.60	5.78	9.00	4.05
T2- 100% NPK	271.00	6.50	12.64	4.15
T3- 75% NPK + N-25% (FYM)	277.00	6.75	13.00	4.20
T4- 100% NPK+ S @40 kg	283.30	6.86	13.30	4.35
T5 100% NPK+ ZnSO4 @25 kg	281.30	6.85	13.10	4.25
T6 - 75% NPK+ N-25% (FYM) +S @40 kg	297.65	7.00	14.00	4.55
T7 -75% NPK+ N-25% (FYM) + ZnSO4 @25kg	288.00	6.85	13.35	4.40

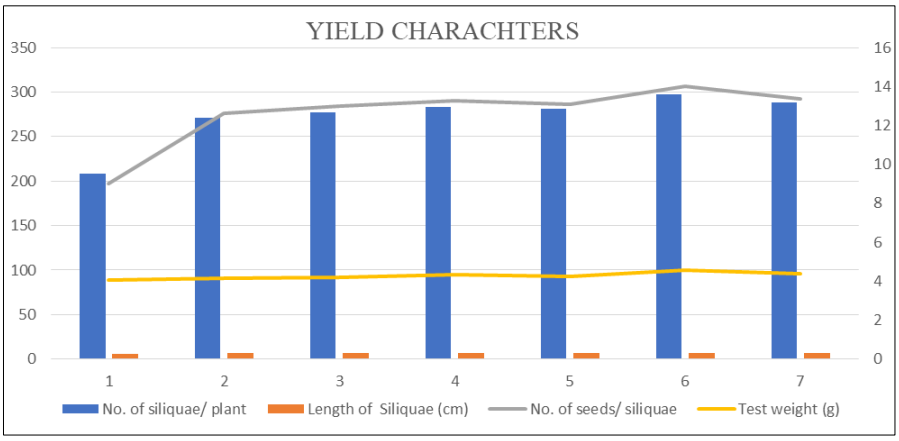

Fig 2: Effect of Integrated Nutrient Management on Yield parameters of Mustard

Plant Nutrient analysis

Treatment T6 @5 t/ha^{-1} had significantly higher N uptake by seed (50.52 and 57.18 metric weight unit ha^{-1}) and fodder (38.54 and 48.34 kg h^{-1}) over each year, respectively. very cheap N absorption by seed (20.85 and 26.43 kg ha^{-1}) and also the lowest N uptake by stover (22.11 and 24.46 kg ha^{-1}) throughout the 2 years, respectively, were examined with treatment T1 -control (NO NPK).The entire nitrogen uptake showed that among the various INM and None practises, treatment T6 @5t/ha^{-1} recorded the very best total nitrogen uptake (89.06 and 105.52 kg ha^{-1}) and the lowest total gas uptake (42.96 and 50.89 metric weight unit ha^{-1}) was recorded in treatment T1-Control (NO NPK).

Higher phosphorus content (0.52 and 0.69%) in fodder throughout each the season underneath the treatment of T6 @5 t/ha^{-1} as compared to treatment T1-control (NO NPK), that had a phosphorus content of 1.02 and 119 percent in seed and also the treatment T6 @5 t/ha^{-1} created the very best phosphorus uptake by seed (23.78 and 28.48 kg ha^{-1}). treatment T1-control (NO NPK) throughout both years had very cheap measured phosphorus uptake by seed (10.25 and 12.60 metric weight unit ha^{-1}, respectively), The treatment T6 @5 t/ha^{-1} had the very best phosphorus uptake by fodder (30.14 and 38.05 kg ha^{-1}), whereas largest phosphoric uptake (38.05 kg ha^{-1}) was conjointly recorded within the second year underneath constant treatment (T6).The treatment T1 management (NO NPK) had very cheap P uptake (10.25 and 12.60 kg ha^{-1}) in seed and stover (16.42 and 22.24 kg ha^{-1}).The treatment T6 @ 5t/ha^{-1} recorded the highest total phosphorus uptake (53.92 and 66.53 kg ha^{-1}).The treatment T1Control - (NO NPK) plots were found to possess very cheap total uptake of P (26.67 and 34.63 metric weight unit ha^{-1}) throughout the corresponding years of (2021-22 and 2021-22).

The treatment T6 @ 5t/ha^{-1} during each year was related to the very best metal concentration in seed (1.91 and 2.11 percent) and fodder (0.89 and 1.04 percent). whereas underneath the T1 management (NO NPK) very cheap potassium content in seed (1.78 and 1.94 percent) and lowest potassium content in stover (0.79 and 0.95 percent) were noted.

Information on however completely different INM and None procedures affected P uptake in seed and fodder were shown to be significant. The treatment T6 @5 t/ha^{-1} considerably increased the utmost potassium uptake by seed (40.20 and 46.58 metric weight unit ha^{-1}) and also the maximum potassium uptake by stover (43.98 and 53.48 kg ha^{-1}). The treatment T1 - management (No NPK) was shown to possess very cheap potassium uptake by seed (17.89 and 19.15 kg ha^{-1}) and the lowest potassium uptake by stover within the corresponding years.

The utmost total absorption of potassium (84.18 and 100.06) was obtained underneath the treatment T6 @5 t/ha^{-1}. However, throughout each year, the treatment T1 - management (NO NPK) plots had very cheap metal uptake (42.85 and 50.50 metric weight unit ha^{-1}, respectively).

The impact of INM and None were determined to be insignificant. With treatment T6 @5 t/ha^{-1}, it absolutely was attainable to look at a spread of INM and None practises with most sulphur content in seed (0.90 and 0.93 percent) and maximum fodder (0.51 and 0.58 percent) over both years. whereas minimum content of sulphur in seed (0.76 and 0.79%) and minimum content of stover (0.39 and 0.46%) was discovered treatment T1 - management (No NPK).

The treatment T6 @5 t/ha^{-1}, most sulphur uptake by seed (18.94 and 28.53 metric weight unit ha^{-1}) and also the maximum sulphur uptake by fodder (25.20 and 29.82 kg ha^{-1}) were identified. Whereas the treatment T1 -control None) plots were shown to possess very cheap sulphur uptake by seed (7.64 and 8.22 kg ha^{-1}) and lowest sulphur uptake by stover (12.32 and 14.83 kg ha^{-1}).

The treatment T6 @5 t/ha^{-1} was shown to have the very best total sulphur uptake (44.14 and 58.35 kg ha^{-1}) over each year, followed by T2, T3, T4, and T5 treatments. The treatment T1 - management (No NPK) had very cheap total sulphur uptake (19.96 and 23.05 metric weight unit ha^{-1}) for the years 2021–2022, nevertheless.

Soil properties

The treatment T6 @5 t/ha^{-1} for each years showed the best hydrogen ion concentration depletion (7.91 and 7.76) at the harvest stage. whereas the treatment T1- management (NO NPK) showed the smallest amount pH depletion (8.25 and 8.23 respectively) over the corresponding years. At harvest stage, treatment T6-control (NO NPK) resulted within the largest soil EC depletion (0.21 and 0.20 dSm^{-1}), whereas control (0.23 and 0.23 dSm^{-1}) resulted in the smallest soil EC depletion throughout the course of both years. The treatment T6 @5 t/ha^{-1} made the best levels of organic carbon (3.60 and 3.83 g/kg). whereas quantity} amount of organic carbon build up (2.11 and 2.35, respectively) was seen below the T1 - management (No NPK) for every of the 2 years.

Availability of nutrients in soil

It is evident that the treatment T6 @5 t/ha^{-1} was used throughout each year to look at the utmost available nitrogen at 142.76 and 146.61 kilo ha^{-1}, respectively. The treatment T1 - management (No NPK) plot throughout every of the 2 years, the bottom price of accessible nitrogen was found to be 128.03 and 126.96 kg ha^{-1}, respectively. The increase in accessible nitrogen content with the addition of organic sources may be due to nitrogen mineralization from organic manure. The most soluble soil state of the organic source may have assisted in the mineralization of soil nitrogen and the build-up of more readily accessible nitrogen (Verma *et al.*, 2017).

The treatment T6 @5 t/ha^{-1} was found to own the very best levels of accessible phosphorus in both years, at 14.50 and 18.70 kg ha^{-1}, respectively. That was statistically on par with T7 and statistically considerably better at rest than treatments than T2, T3, T4, and T5, that was statistically on par with T6 and significantly better at rest than treatments within the corresponding years 2021–2022 than T6. Beneath the treatment T1 - management (No NPK) for every of the 2 years, the minimally accessible phosphorus was found to be 11.01 and 12.67 kg ha^{-1}, respectively (Singh *et al.*, 2015) and Vyavahare and Bhilara (2014).

The treatment T6 @ five t/ha^{-1} was shown to supply the very best levels of metallic element offered (288.51 and 291.95 kg ha^{-1}) was statistically such as the treatments however far better with T4. Beneath treatment T1 - management (No NPK), the minimum offered metallic element (273.45 and 274.90 kilo ha^{-1}) was seen in each of the 2 years, respectively. The addition of potassium to the soil's available potassium pool may also be responsible for the use of mulch. Singh *et al.*, (2015) and Vyavahare and Bhilara (2014).

The treatment T6 @ five t/ha^{-1} for every of the two years, the utmost accessible sulphur concentrations (7.78 and 7.98 ppm) were noted. Treatment T7 was statistically at parity with Treatments T2, T3, T4, and T5 respectively. Throughout each of the two years, the treatment T1 - control (No NPK) was found to own the minimum available sulphur (6.02 and 6.37 ppm, respectively) (Vyavahare and Bhilara 2014 and Singh *et al*., 2015).

Microbial Population

The treatment T6 @5 t/ha^{-1} was found to own the very best microorganism population in each year (23.81 and 24.80 cfu g^{-1}, respectively). The T1 -control (No NPK) treatment made very cheap bacterial population (15.80 and 16.60 cfu g^{-1}). The treatment T6 @5 t/ha^{-1} was employed in the years 2021 and 2022 to look at the best plant life populations (19.90 and 20.50 cuf g^{-1}, respectively). Underneath the therapy T1 - management (No NPK) throughout every of the 2 years, the lowest bacterial population (12.60 and 13.30 cfu g^{-1}) was noted. The very best actinomycetes populations (21.00 and 22.00 cfu g^{-1}) were found throughout the corresponding years 2021 and 2022 with the treatment T6 @ 5t/ha^{-1}. This was statistically similar to the therapies over the 2 years treatments with T2 and T8, respectively. Underneath therapy T1 - management (No NPK), very cheap actinomycetes population (13.45 and 14.10 cfu g^{-1}) was noted in 2021-22 and 2021-22, respectively. (Dongale (2011). The mulch-treated plot had excellent crop development, which might be attributed to the mulch's capacity to improve the physical, chemical, and biological aspects of the soil and provide plants with a healthy habitat. According to, the use of various mixtures of straw mulch increased the bacterial population (Kaur *et al.*, 2014, Das, S.K. 2016, and Tejashree *et al.*, 2020).

The economic feasibility of different treatments

For all of the treatments, the value of cultivation was calculated. The treatment T6 @5 t/ha^{-1} for mustard crop resulted within the highest total cost of cultivation of Rs. 39101.00 and 39226.00 ha^{-1}). The fertiliser, none cost, and alternative techniques were answerable for the upper expense of agriculture during this approach. T6 @5 t/ha^{-1} made the best gross come back (88509.00 and 92835.00 rupees per hectare) and web return (44485.00 and 50685.00 rupees per hectare). The T6 - 75% NPK+ N-25 percent (FYM) +S @40 weight unit was found to own a B:C quantitative relation of 1.32 and 1.45. the bottom gross come back (Rs. 42273.00 and 45868.00 ha^{-1}), Net return (Rs. 16257.00 and 18427.00 ha^{-1}) and B:C ratio (0.059 and 0.59) were reportable beneath treatment T1- control (NO NPK) and treatment T1 @5 t/ha^{-1} plot, respectively, for the years 2020 and 2021. The increase in net and gross returns the larger addition return and lower input value is also the reason behind the rise in gross return, net return, and B:C ratio that was recorded under the T6 therapy and T7 treatment, respectively. Singh *et al.*, 2020, Dwivedi and Puhup 2021, and Mukherjee *et al.*, (2014) additionally found similar findings.

Conclusion

The treatment T6 @5 t/ha^{-1} each year was related to a larger microbic population within the soil (Bacteria, Fungi, and Actinomycetes, respectively). Supported the findings of all annual tests, it had been determined that Treatment T6 @5 t/ha^{-1} was a lot of roaring in enhancing the yield and yield qualities of mustard. Whereas T7 @5 t/ha^{-1} was found to be more successful than T6 to spice up the yield and yield attributes of mustard throughout both seasons than alternative INM and none practises. The crop' most nutrient uptake was seen below the treatments T6 @5 t/ha^{-1} and T7 @5 t/ha^{-1}. Treatment T6 @5 t/ha^{-1}, the soil' highest levels of organic carbon, nutrients, and microbic population were noted. Treatment T1-Control (NO NPK) showed the best hydrogen ion concentration and Common Market lowering. variations in pH and also the most web come in treatment T6 @5 t/ha^{-1} (Rs. 49408.00 and 52309.00 ha^{-1}, respectively), whereas the T6 - 75% NPK+ N-25 percent (FYM) +S @40 weight unit created the best B:C ratios (1.32 and 1.45).

It may be same that T6 @5 t/ha^{-1} and T7 @5 t/ha^{-1} were determined to be higher and superior for manufacturing mustard crops and enhancing soil quality. whereas T6 - 75% NPK+ 25% (FYM) + S @ forty weight unit was discovered to be better for producing mustard crop yield**.**

References

1. Adarsh Sharma, Meena BS, Meena RK, Yadav RK, Patidar BK, Ramesh Kumar. Effect of Different Levels of Nitrogen, Phosphorous and Potassium on Growth, Yield Attributes and Yield of Indian Mustard (*Brassica juncea*L.) Czern and Coss) in S-E Rajasthan. Int. J Curr. Microbiol. App. Sci. 2020;9(9):2216-2221.
2. Allen EJ, Morgan DG. A quantitative analysis of the effects of nitrogen on the growth, development and yield of oilseed rape. J Agri. Sci. 2009;78:315-324.
3. Anonymous. Department of agriculture cooperation.

Government of India, 2019-20.
4. Devkota Chakra, BhattaraiBishnu Prasad, Mishra Saroj Raj, GhimirePrabin, ChaudhariDipendra. Effect of integrated plant nutrient management on growth, yield and leaf nutrient status of broadleaf mustard (*Brassica juncea var. rugosa*). Horticulture International Journal. 2020;4(3):78-81.
5. GautamSusheel, Mishra SK, Pandey Hanuman Prasad, Pathak RK, Pandey Shivam. Effect of Nitrogen, Phosphorus, Potassium, Sulphur and Zinc on Yield and their Attributing Characteristics of Mustard Crop. International Journal of Advances in Agricultural Science and Technology. 2019 Nov;6(11):1-17.
6. Gomez KA, Gomez AA. Statistical Procedures for Agricultural Research. 2"** Ed. J Wiley and Sons. New York, 1984.
7. Kumar Amit, Mahapatra BS, Ajit Yadav, UshaKumari, Singh SP, Gaurav Verma. Effect of different fertility levels on growth, yield attributes, yield and quality of Indian mustard (*Brassica juncea* L.). Ann. Agric. Res. New Series. 2017;38(1):98-103.
8. Özdenöztürk. Effects of source and rate of nitrogen fertilizer on yield, yield components and quality of winter rapeseed (*Brassica napus* L.). Chilean journal of agricultural research. 2010;70(1):132-141.
9. Riaj MMR, Hussain ASMI, Shila A, Islam MT, Hassan SMZ, Hossain ME. Effect of nitrogen and boron on the yield and yield attributes of mustard. International Journal of Natural and Social Sciences. 2018;5(4):54-64.
10. Rimi TA, Islam MM, Siddik MA, Islam S, Shovon SC, Parvin S. Response of Seed Yield Contributing Characters and Seed Quality of Rapeseed (*Brassica campestris* L.) to Nitrogen and Zinc. International Journal of Scientific and Research Publications, 2015, 5(11).
11. Keivanrad S, Zandi P. Effect of nitrogen levels on growth, yield and oil quality of Indian mustard grown under different plant densities. Agronomical and Qualitative Features of Indian Mustard. 2014;XLVII(1):157.
12. Tomar SK, Karan Singh. Response of Indian mustard (*Brassica juncea*) to nitrogen and sulphur fertilization under rainfed condition of Diara land. Internat. J Agric. Sci. 2007;3(2):5-9.
13. Shorna SI, Polash MAS, Sakil MA, Mou MA, Hakim MA, Biswas A, *et al*. Effects of nitrogenous fertilizer on growth and yield of Mustard Green. Tropical Plant Research. 2020;7(1):30-36
14. Singh GK, Prasad K. Studies on the effect of raw spacing and nitrogen doses on the yield and profit from Indian mustard. Progress. Agric. 2003;3(1/2):146-147.
15. Thaneshwar, Vishram Singh, Jai Prakash, Manoj Kumar, Sateesh Kumar, Singh RK. Effect of Integrated Nutrient Management on Growth and Yield of Mustard (*Brassica juncea* L.) in Irrigated Condition of Upper Gangetic Plain Zone of India. Int. J Curr. Microbiol. App. Sci. 2017;6(1):922-932.