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EFFICIENCY OF *PRIESTIA ARYABHATTAI* COMBINATION WITH DIFFERENT NITROGEN FERTILIZER ON GROWTH, YIELD ATTRIBUTE, YIELD AND QUALITY OF BABY MAIZE (*ZEA MAYS* L.)

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Abstract

The efficiency of five various nitrogen ratios (0, 325, 224.8, 162.5 and 81.3 kg N/ha) and *Priestia aryabhattai* on soil chemical properties, growth, development and productivity of baby corn was carried out outside net house in agricultural research center of An Giang university from Jun to August of 2023. The experimental design was performed by using randomized complete block design with five treatments and four repeats. Research results showed that various nitrogen ratios remarkably increased on soil chemical properties (Available P, total N, CEC and OM), biomass and ear number per plant. Furthermore, nitrogen rates and *Priestia aryabhattai* were significantly affected plant height, leaf number and total chlorophyll per plant. Nonetheless, five N_2 ratios applied, the optimal N level between 162.5 and 243.8 kg N /ha combined with *Priestia aryabhattai* inoculation potentially raised the edible cob yield, indicating that N treatment had the ability to produce higher edible cob yield as well as higher quality contents of baby corn edible cob. However, Interaction between nitrogen rates and *Priestia aryabhattai* was not affected on yield composition, edible cob yield and edible cob quality of baby corn.

Keywords: *Priestia Aryabhattai*, Nitrogen Fertilizer, Baby Corn, Edible Cob, Quality, Fresh Yield

INTRODUCTION

The baby maize has been planting as good choice for increasing the profit of tillers. Baby maize, which is the sweet flavor and harvest from 65 to 75 days after sowing, is a crop kind and provides green ears. Baby maize is an importance role as vegetable and salad in meals around the world. The baby maize that is a short duration, helps tillers to take up many crop yearly as intercrop other plants and helps the tillers to get more profit per unit area per unit time by increasing cropping output (Rani et al., 2015). Baby maize for vegetable aim is successfully planted in Asian countries like Vietnam, Thailand, Taiwan, etc. It has been brought into a good income because of its potential product for export and a good foodstuff (Gondaliya et al., 2022**).** The N_2 element plays an important role in different physiological function of baby corn. It raises the leaf width effectively, reducing senescence and essential element for creation of baby corn ear and kernel. Furthermore, N_2 element significantly improves maize yield (Torbert et al., 2011), promotes kernel's function by raising number and weight of the grain, affecting the final size of kernel (Hopf et al., 1992; John & Schmitt, 2007). The positive effects of N_2 on essential agronomic and yield components of baby maize has been observed by several prior studies (McCullough et al., 1994; Evans, 2008). Among the different generous nutrition required for various plants, The N_2 element, which has an important role and particularly, has been discovered for maize by many various researches (Subramanian et al., 2006; Carpici et

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al., 2010). The N_2 demand of baby corn is to depend on conditions of soil kinds, weather and crop rotation system (Blackmer, et al., 2009; Bundy, et al., 2011).

The growth and productivity of plants mainly relies on the interactions with rhizosphere microorganisms, which exist the crop soil. These relationships are very complicated and critical for meeting the bio-difference per the soil type (Lau and Lennon, 2011; Bever et al., 2013; Shao et al., 2018). Microorganisms are the most abundant and diverse entity in soil and can be directly involved in ecological processes and nutrient cycling. The rhizosphere microorganism role of agricultural soil has been significantly studied via isolation and identify of cultural microbes and culture-independent techniques (Liu et al., 2019; Roy et al., 2020). According to studied results of Nguyen Van Chuong et al., (2023) presented that co-application of vermicompost with three rhizosphere N2 fixing bacterial strains raised the growth, yield attribute and yield of peanut to compare with inorganic fertilizers alone. further, addition of vermicompost and with E. *asburiae* inoculation, which obtained the maximum yield attributes and yield of peanut when planting on the poor nutrition soil, produced better increase in number and weight of peanut nodules compared with chemical fertilizer application alone. The research discovered the effects of rhizosphere microbial and soil nutrients to raise yield of various crop s under sustainable agriculture systems. Roots contain a huge biomass and the important part of the crops to take water and nutrients for the plant growth. Rhizosphere and the narrow soil nearly contact the root is the plant root-soil interface and is the hot spot for interactions between plants and rhizosphere bacteria (Nguyen Van Chuong, 2023; Korenblum et al., 2020). Rhizosphere N_2 fixing bacteria and the crop could form symbiotic interactions where the root microorganism use root exudates and secretes compositions positive plant growth (Berendsen et al., 2012). Rhizosphere N_2 fixing bacteria can synthesize antibiotics for prevention of soil-borne pathogens and protect the plant health (Mendes et al., 2013; Lazcano et al., 2021). Other interactions between rhizosphere bacteria and plant consists of N_2 fixing bacteria and contributing essential elements (e.g., nitrogen) for growth and yield of plant (Moreau et al., 2019). Rhizosphere N_2-fixing microbiome could also bring root exudation of metabolites and mediate root-root signaling promoting soil conditioning (Korenblum et al., 2020). Rhizosphere microorganisms could have ability of hormone production, which helps to promote growth and nutrient uptake of plant, inhibit and kill the growth of pathogenic bacteria and create crop resistance to biological or no biological stresses (Ahmed and Hasnain, 2014).

One of the most researched genera is *Bacillus* strains among the benefit rhizobacteria for plant growth and and shows huge potential in raising the growth and yield of crops(Chen et al., 2007; Tahir et al., 2017; Backer et al., 2018). *Priestia aryabhattai (Bacillus aryabhattai)* are widely existed in nature but were only discovered in 2009 (Shivaji et al., 2009). More strains of B. *aryabhattai* have been isolated from different plant roots, and appreciation of these rhizosphere bacterial strains have significantly related promising attributes of this *Bacillus* strains for the impulsion of plant growth and crop yield, further having drawn thriving of fascination from scientists (Bhattacharyya et al., 2017; Park et al., 2017; Ghosh et al., 2018). According to prior study of Mehmood et al. (2021) discovered that B. *aryabhattai* fostered wheat growth and decreased the impacts of stress on wheat due to salt concentration. Nonetheless, the rhizobia strain mechanism fostering plant growth and

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development remains to have been studying. With new technologies, genome sequencing usage for identifying the isolated microbial was widely used to find out the new and potential species of the microbes in foster the plant performance (Chu et al., 2020; Chen et al., 2022). In a recent discovery, an excellently endogenous bacterium species, B. *aryabhattai*, was isolated from baby corn roots, and its effect was also found out in the recent study (Deng et al., 2022). Ability of B. *aryabhattai* has significantly fostered the plant growth and yield, such as N_2 fixing and phosphorus solution and IAA producibility. Objective of this study is to find out the best N_2 fertilizer rate combined with B. *aryabhattai* for the best baby corn growth and yield.

MATERIALS AND METHODS

Priestia aryabhattai resource

Priestia aryabhattai was **isolated** on aseptically nutrient agar (Nfb) media **and identified by** 16S rRNA sequencing technology **from the baby maize roots.** The baby corn root samples were collected from local farmers' farms in Cho Moi, An Giang, and Vietnam. *Priestia aryabhattai* was isolated in the center laboratory of An Giang university, and was identified through sequencing technology of 16S rRNA and phylogenetic position, were used by blasting the 16S rRNA sequence on NCBI. The similar rates of the 16S rRNA sequence of our target bacterium was 100% of the 16S rRNA sequence of our target bacterium (Chuong et al., 2023). *Priestia aryabhattai* was increased population on dilute nutrient Nfb media to be 10^8 CFU/ml, and then inoculated with baby corn seeds about 24 hours in dark before sowing.

Design and location of experiment

A field experiment was carried out from Jun to august of 2023 outside the net house of agricultural research center in AG university. The field experiment consisted of five treatments (Table 1) with four N2 fertilizer levels (0, 325, 224.8, 162.25 and 81.3 kg/ha) and four treatments (2, 3, 4 and 5) of *Priestia aryabhattai* inoculation (except control treatment) with four replications. The variety "HM-4" of baby corn was selected as a test crop. And four replications. The distance of each hole was 30 cm x 20 cm (166,666 plants/ha) and planted 03 seeds per hole. The variety Baby Corn 271 of Vino Joint Stock Company was planted during the experiment. Breed characteristics: milky white fruit, growing time from 50-55 days, healthy growth, high yield, good water tolerance. The whole area of study was 200 m^2 (1 m in width x 10 m in length x 04 replications x 05 treatments). Baby corn seeds preparation and bacterial population increase: baby corn seeds were incubated under dark conditions for germination one 24 hours before sowing. Then, baby corn seeds were well inoculated with a 10 mL bacterial (10^8 CFU/ mL) before sowing and two seeds per hole. Soil samples were taken 0-20 cm in the soil depth to determine the soil properties before experiment. Soil samples determined the physical – chemical properties by methods of Carter & Gregoric, (2007).

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Table 1: Nitrogen rates and *Priestia aryabhattai* inoculation of the experiment

Treatments	*Priestia aryabhattai* (10^8CFU/ml)	Inorganic fertilizers (Kg/ha)		
		Nitrogen (N)	Phosphorous (P)	Potassium (K)
1 (control: 0% of N_2)	Uninoculated	0.00	355	75
2 (100% of N_2)	Inoculated	325		
3 (75% of N_2)	Inoculated	224.8		
4 (50% of N_2)	Inoculated	162.5		
5 (25% of N_2)	Inoculated	81.3		

The stage of withdrawing the corn tassel plays an importantly role for growing baby corn ears, especially bringing high yield, focusing on nutrition for faster growing baby corn, shorter growth time, and increasing edible cob weight. Usually harvest is withdrawn the baby corn tassel from 45 to 50 days after sowing. Agronomy, yield attributes and edible cob yield, which were observed by during growth and development time of baby corn, counted such as height, number of branch, total chlorophyll, cob diameter and length of cods, biomass, fresh weight of pods, corn silks, husks and cob per plant. The fresh yield of baby corn parts was counted by t/ha. Physical-Chemical analysis of the soil (top 20 cm) had a neutral pH (6.7), 0.80% SOM, 0.065 % total nitrogen, 58.1 mg/100g available phosphorus and no exchangeable potassium. Nitrogen as per the treatments was applied in three splits. The whole dose of P was applied one day before sowing, different nitrogen levels along with 80 kg K/ha was divided to apply at four stage from sowing to harvest. In general, experimental soil had very low nutrition and silt sand (sand: 80.0%, silt: 18.7%, clay: 1.3%).

Statistical analysis

The recorded data of statistical analysis per character has been using the standard analysis of variance in split plot design ($P < 0.05$) with the help of statistical software stat graphics software version XV.

RESULTS AND DISCUSSION

Effects of four N2 ratios and Priestia aryabhattai inoculation on the Soil attributes at harvest

Soil pH

The results in Table 2 showed that soil pH ranged from 6.47 to 7.22 at all treatment and insignificant differences at level 5% at harvest. According to study of Ren et al., (2015) showed that there was not any effect of rhizosphere N_2 fixing bacteria and N_2 fertilizer on soil pH, was no their interaction on the soil pH.

Total nitrogen

The results in Table 2 showed that the total N_2 concentration of the soil at harvest ranged from 0.04 to 0.09 (%) in all treatments and was statistically significant differences at level 1%. The highest total N_2 content was 0.09 % at co-application of 162.5 kg N/ha + *Priestia aryabhattai* inoculation, and lowest total N_2 value (0.04 %) obtained at two treatments of 162.5 kg N/ha +

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Priestia aryabhattai inoculation and 325 kg N/ha + *Priestia aryabhattai* inoculation (without nitrogen application). Entophytic bacteria play an important role in N_2 fixing processes of taking N_2 from the air into soils (NH_4^+ and NO_3^-) (Peng et al., 2022). Maize roots plant in a low N_2 condition that can stimulate N_2 fixing from the air and promote the N_2 fixation efficiency of maize by entophytic bacteria (Fan et al., 2019). Furthermore, levels of N_2 application affected a huge impact on rhizosphere N_2 fixing microorganisms and their community development. Some researchers have found that soil total nitrogen has a significant impact on bacterial community population (Zhang et al., 2020).

Table 2: Chemical properties of soil at harvest

Treatment	Chemical attributes of soil at harvest				
	pH $_{H2O}$	Total N (%)	Available P (mg/100g)	CEC (Cmol+/kg)	OM (%)
0.00 kg N/ha + None *Priestia aryabhattai* inoculation	6.69	0.060^{b}	57.3^{a}	4.22^{bc}	0.880^{b}
325 kg N/ha + *Priestia aryabhattai* inoculation	7.22	0.040^{c}	39.2^{b}	4.99^{b}	0.950^{b}
224.8 kg N/ha + *Priestia aryabhattai* inoculation	6.68	0.040^{c}	51.0^{a}	4.43^{bc}	1.19^{a}
162.5 kg N/ha + *Priestia aryabhattai* inoculation	6.89	0.090^{a}	55.3^{a}	4.21^{c}	1.29^{a}
81.3 kg N/ha + *Priestia aryabhattai* inoculation	6.47	0.,070^{b}	51.0^{a}	6.22^{a}	0.930^{b}
F	ns	**	*	**	**
CV (%)	8.85	14.4	17.3	18.8	18.1

The different letters in the same column indicate significant differences at 1% (**), and insignificant difference at 5% (ns); DAS: days after sowing; CV: coefficient of variation.

Available phosphorous, CEC and Organic matter (OM)

Nitrogen rates ($p<0.05$), CEC ($p<0.01$) and their interaction ($p<0.01$) had remarkably affected on available P and CEC of crop soil (Table 2). The values of available P and CEC ranged from 39.2 to 57.3 mg/100g and 4.21 to 6.22 ($Cmol^+/kg$), respectively. Available P, which was recorded in the co-application of 325 kgN/ ha and *Priestia aryabhattai* inoculation, had lower content than other treatments, while the minimum CEC value of 162.5 kg N/ha + *Priestia aryabhattai* inoculation. Relationship between N_2 level and N_2 fixing bacteria had less impact on available P and CEC of soil (Xia et al., 2020; Ran et al., 2021). The results in Table 2 showed that the soil OM at harvest ranged from 0.88 to 1.29% at all treatments and their interaction ($p<0.01$). Soil OM of 162.5 kg N/ha + *Priestia aryabhattai* inoculation was the highest OM content in 350 kg N/ha and lowest OM value in control. Leu, (2005) and Monaco et al. (2008), proved that interaction between entophytic N_2fixiation bacteria and plant released over fifty percent of the total CO_2 released from rhizosphere soil. Soil organic matter are the increase or decrease in order to rhizosphere bacteria (Bade and Cheng, 2007), and is the most important factor of rhizosphere bacteria and root correlation (Bengtson et al., 2012).

Effects of N_2 fertilizer rates and Priestia aryabhattai on agronomical composition

Table 3: agronomical attributes of baby corn

Treatment	Plant height (cm)		Leaf number (leaf/plant)		Total chlorophyll (µg /mL)	
	15 DAS	30 DAS	15 DAS	30 DAS	15 DAS	30 DAS
1	33.5^{b}	95.8	6.50^{c}	12.5^{ab}	34.5^{c}	34.9^{c}
2	42.8^{a}	97.7	7.75^{ab}	12.8^{a}	43.3^{a}	39.8^{b}
3	40.4^{a}	96.0	7.00^{bc}	13.3^{a}	37.4^{bc}	44.0^{a}
4	38.8^{ab}	102	7.50^{ab}	13.3^{a}	39.4^{ab}	39.8^{b}
5	41.6^{a}	90.9	8.00^{a}	11.8^{b}	36.9^{bc}	39.7^{b}
F	*	ns	*	*	**	**
CV (%)	12.4	6.70	10.1	6.31	10.4	8.84

The different letters in the same column indicate significant differences at 5% (∗), at 1% (**), and insignificant difference at 5% (ns); DAS: days after sowing; CV: coefficient of variation.

Studied data in Table 3 also presented that N_2 fertilizer ratios of 325, 224.8, 162.5 and 81.3 kg N/ha + Priestia aryabhattai inoculation were higher plant height as compared to control at 15 DAS, and their interaction at $P < 0.05$. Nonetheless, plant heights were not the interaction at 30 DAS. The leaf number and total chlorophyll were significant differences at level 5% ($p< 0.05$) and 1% ($p<0.01$) at 15 and 30 DAS. Application of four N_2 fertilizer ratios (325, 224.8, 162.5 and 81.3 kg N/ha) combined with Priestia aryabhattai inoculation had higher leaf number and total chlorophyll index as compared to control treatment at 15 and 30 DAS. However, the highest leaf number (13.3 leaf/plant) and total chlorophyll (44.0 µg /mL) obtained in treatment 3 of 224.8 kg N/ha + Priestia aryabhattai inoculation at 30 DAS, whereas the lowest leaf number and total chlorophyll of control (treatment 1). The reduction in N_2 application with without Priestia aryabhattai inoculation could cause the intensified nutrient competition between plants and bacteria (Moosavi et al., 2012). Usage of right and sufficient nitrogen for increasing cod yield, profit's tillers and N_2 efficiency usage, while it minimizes the potential for loss of N_2, thus decreasing environmental contamination. Nitrogen application has significant impact on growth yield of baby corn (Thavaprakaash and Velayudham, 2009). Furthermore, suitable application of N_2 fertilizer could promote N_2 fixing process of rhizosphere bacteria due to N_2 deficiently of crop soils (Kar et al., 2006)

Effects of N_2 fertilizer rates and Priest aryabhattai on yield attributes, yield and quality of baby corn Results in Table 4 showed that application of lesser N_2 fertilizer level (0.00 kg N/ ha) was significantly lower number of ears and biomass by 2.58 ear/plant and 26.8 t/ha, respectively, over higher N_2 levels (243.8 and 325 kg N/ha). The results of Table 4 also showed that, among all inoculated treatments of Priest aryabhattai had number of ears (4.25 ears/plant) and biomass (38.8 t/ha) were higher than those of all uninoculated treatments at number of ears (3.74 ears/ plant) and biomass (31.8 t/ha). Nitrogen rates ($p<0.01$), and Priest aryabhattai ($p<0.01$), nonetheless, their interaction between thee N_2 ratios and Priest aryabhattai was insignificant impact on increasing number of ears and biomass (Table 4). Agronomical and yield attributes was significantly impacted by soil nutrient and types, planting technology, bacterial population, and environmental condition and weather, etc. (Zhai et al., 2019).

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Table 4: Yield Attributes and Yield of Baby Corn

Factor	Number of ears (ears/plant)	Fresh yield (t/ha)				
		Ear	Silk	Husk	Edible cob	Biomass
Nitrogen ratios (kg/ha) (A)						
0.00	2.58^{d}	6.02^{c}	0.831^{c}	3.80^{c}	1.39^{b}	26.1^{c}
325	5.06^{a}	14.5^{a}	2.18^{a}	10.1^{a}	2.15^{ab}	35.1^{b}
243.8	4.43^{b}	15.0^{a}	1.85^{b}	10.4^{a}	2.75^{a}	42.8^{a}
162.5	4.38^{b}	10.5^{b}	0.950^{c}	6.53^{b}	3.00^{a}	35.1^{b}
81.3	3.50^{c}	9.60^{b}	0.950^{c}	6.73^{b}	1.93^{ab}	37.5^{b}
Priestia aryabhattai **(10^8CFU/mL) (B)**						
Uninoculated	3.74^{b}	10.0^{b}	1.23^{b}	6.99^{b}	1.79^{b}	31.8^{b}
Inoculated	4.25^{a}	12.2^{a}	1.46^{a}	8.04^{a}	2.70^{a}	38.8^{a}
F (A)	**	**	**	**	*	**
F (B)	**	**	**	**	*	**
F (AxB)	ns	ns	ns	ns	ns	ns
CV (%)	23.6	15.5	14.3	17.0	15.8	20.7

The different letters in the same column indicate significant differences at 5% (*), at 1% (**), and insignificant difference at 5% (ns); DAS: days after sowing; CV: coefficient of variation.

The highest fresh yield of baby corn ear (15.0 t/ha) in the application of 243.8 kg N/ha, the lowest fresh yield of baby corn ear (6.02 t/ha) without N_2 fertilizer application. The fresh yield of baby corn ear ranged from 6.02 to 15.0 t/ha at five different N_2 fertilizer rates. Fresh yield of corn ear (12.2 t/ha) at treatments of *Priest aryabhattai* inoculum were higher without *Priest aryabhattai* inoculum (10.0 t/ha). The interaction of N rates × *Priest aryabhattai* was not significant; all mean values for each treatment are showed in Table 4. Similar, the interaction of N_2 rates × entophytic bacteria were insignificant differences on fresh yields of baby corn silk, husk and edible cob (Table 4). The highest silk yield (2.18 t/ha) was in the application of 325 kg N/ha, the lowest fresh yield of baby corn silk had 0.831 t/ha without N_2 application of 0.0 kg N/ha. The average fresh silk yield ($P<0.01$) ranged from 0.831 to 2.18 t/ha at N_2 rates, and 1.23 to 1.46 t/ha at *Priest aryabhattai* inoculum. The average silk yield, which obtained at treatments of *Priest aryabhattai* inoculum (1.46 t/ha), was higher than without *Priest aryabhattai* inoculum (1.23 t/ha) and insignificant differences ($P < 0.01$) on the fresh silk yield of baby corn.

The results in Table 4 showed that there were significant differences among treatments of five N_2 fertilizer rates ($p < 0.01$) (0, 81.3, 162.5, 243.8 and 325 kg/ha) and *Priest aryabhattai* ($p < 0.01$) on fresh husk yield of baby corn. But, the interaction of N rates × Entophytic bacteria was insignificantly different on fresh husk yield of baby corn. Nitrogen ratios ($p<0.05$), *Priest aryabhattai* ($p<0.05$) had significant effect on fresh yield of edible cob. Data on Table 4 showed that highest edible cob yield of baby corn (3.0 t/ha) was recorded at N_2 levels (162.5 kg N/ha), in contrast, application of 0.0 t N/ ha (control) produced lowest cob yield (1.39 t/ha). The fresh cob yield was obtained 2.70 t/ha at treatment of *Priest aryabhattai* inoculum, which was higher than without *Priest aryabhattai* inoculation (1.79 t/ha). Nitrogen application significantly improved yield components and yield of plants. The results of research of Yang et al., (2021), fertilizer application was less effect on rhizosphere bacteria, but the significant effect was on

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rhizobial strains the legume nodules. This was though the effects of N_2 levels on the soil fertility, and the benefit relation between soil nutrients and the rhizosphere bacteria population. Results of Abdel-Gayed et al., (2019) discovered the entophytic bacterium strain inoculation for crop, which could be affected by soil chemical properties, further, rhizosphere entophytic bacteria could be used as a positive bacterium to increase growth and yield of crops.

Table 5: effect of N2 ratios and Priestia aryabhattai on baby corn Quality

Factor	Baby corn cob quality (%)				
	Moisture	Lipid	Protein	Phosphorous	Potassium
Nitrogen rates (kg/ha) (A)					
0.00	82.9^{ab}	0.170^{c}	2.00^{c}	0.045^{c}	0.241^{b}
325	87.6^{a}	0.180^{c}	2.32^{b}	0.066^{b}	0.245^{b}
243.8	86.6^{a}	0,.220^{b}	2.62^{a}	0.054^{c}	0.279^{a}
162.5	88.9^{a}	0.130^{d}	2.74^{a}	0.217^{a}	0.250^{b}
81.3	78.3^{b}	0.240^{a}	2.37^{b}	0.052^{c}	0.242^{b}
Priestia aryabhattai **(10^8CFU/mL) *(B)***					
Uninoculated	78.5^{b}	0.174^{b}	2.23^{b}	0.080^{b}	0.233^{b}
Inoculated	91.2^{a}	0.202^{a}	2.59^{a}	0.093^{a}	0.270^{a}
F(A)	**	**	**	**	**
F (B)	**	**	**	**	**
F (A x B)	ns	ns	ns	*	ns
CV (%)	11.7	23.5	15.3	17.5	12.2

The different letters in the same column indicate significant differences at 5% (∗), at 1% (**), and insignificant difference at 5% (ns); DAS: days after sowing; CV: coefficient of variation.

The results revealed that different N_2 rates had a considerable effect on baby corn cob moisture concentration (Table 5). The N_2 fertilizer weight (162.5 kg N/ ha) obtained the highest cob moisture (88.9%), while the N_2 fertilizer weight (81.3 kg N/ha) provided the lowest (78.3%) cod moisture. The average cob moisture of *Priestia aryabhattai* inoculation ($P<0.01$) valued 78.5% (uninoculated) and 91.2% (inoculated*)*. The cob moisture obtained at treatment of *Priestia aryabhattai* inoculation*,* which was higher than cob moisture of non *Priestia aryabhattai* inoculation. Their interaction of N rates × *Priestia aryabhattai* was insignificant differences on baby corn cob moisture. The N_2 fertilizer impact of 81.3 kg N/ha recorded the highest lipid content with 0.240% and lowest value of lipid was 0.170% at control treatment and the differences were statistically significant at level 1%. The average lipid concentration of *Priestia aryabhattai* inoculation ($P<0.01$) valued 0.174% (uninoculated) and 0.202% (inoculated*)*. The lipid value, which obtained at treatment of *Priestia aryabhattai* inoculation, was higher than lipid value of non *Priestia aryabhattai* inoculation. However, their interaction of N rates × *Priestia aryabhattai* was not significant differences on baby corn lipid contents (Table 5). The phosphorous and potassium concentration of baby corn cob was significantly impacted by different levels of different N_2 ratios. The highest phosphorous and potassium values were 0.217% (162.5 kg N/ha) and 0.279 (243.8 kg N/ha), respectively, with statistical differences ($p<0.01$), and the lowest the phosphorous (0.045%) and potassium (0.241%) value was presented by control treatments (no N_2 application). The average P and K concentration of

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Priestia aryabhattai inoculation ($P<0.01$) valued 0.08% (uninoculated) and and 0.233% (inoculated*),* respectively. The P and K content, which observed at treatment of *Priestia aryabhattai* inoculation, was higher than those of non *Priestia aryabhattai* inoculation. Nonetheless, their interaction of N rates × *Priestia aryabhattai* was significant differences on baby corn P contents (except K content). According to Eltelib et al. (2006), the relation between pod quality and soil N_2 concentration was significant an effect. Further, the studied results found out where nitrogen remarkably raised the quality composition of baby maize. Thus, recent study has discovered that increased N levels increased baby corn cob contents (Lipid, protein, P and K) in cod maize. Otherwise, low N rate not only restrict pod yield but also cob quality including moisture, lipid, protein, P and K contents (Tsai et al., 1992; Hammad et al., 2011).

CONCLUSION

This research discovered the impacts of N_2 fertilizer ratios and *Priestia aryabhattai* inoculation on soil fertility, baby corn yield and quality. The discovery revealed that raised fertilizer application had significant effect on either yield and yield attributes or cob quality, such as moisture, oil, protein, P and K contents. Nonetheless, out of the five N_2 ratios applied, the optimal N level between 162.5–243.8 kg N /ha and *Priestia aryabhattai* inoculation might potentially raise the edible cob yield, indicating that N treatment has the ability to produce higher grain yield as well as higher quality contents of baby corn edible cob. Further, all quality and fresh yield properties of baby corn edible cob can be enhanced with the right rate of N fertilizer and *Priestia aryabhattai* inoculation, promoting its better nutritional quality and creating it of greater important agriculture in the future.

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