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EFFECT OF *AZOTOBACTER CHROOCOCCUM*, *AZOSPIRILLUM BRASILENSE*, AND POULTRY RESIDUES ON SOME GROWTH TRAITS OF (*SORGHUM BICOLOR* L.)

Hussein Ahmed Abdul Ali* and Jawad Abdul Kadhim Kamal

Department Sciences of soil and water Resources, College of Agriculture, University of AL-Qadisiyah, Iraq.

Abstract

A field experiment was carried out in one of the fields located in Muthanna Governorate - Samawah district - Mohammed Ali Orchards area in Silt Clay sedimentary soil in autumn season 2018 to study the effect of biofertilization and poultry residues ån soil nitrate content and some plant growth characteristics *Sorghum bicolor* L. (leaf area, Dry weight of root total, leaf content of nitrogen at flowering and end of season), the experiment was carried out using a three-fold replication of Randomized Complete Black design (R.C.B.D). *Azotobacter chroococcum* bacterial inoculation It is (inoculation and without) and two inoculation levels of bacterial inoculated *Azospirillum brasilense* (inoculation and without inoculation) and three levels of poultry residue (0, 3, 5) tons. *Sorghum bicolor* L. Moench seeds were planted in the form of lines in the slabs on 23/7/2018. The results of triple interaction can be summarized as follows: The triple interaction treatment (*A.brasilense* + *A.chroococcum* + 5 tons. ha^{-1} poultry residues) gave a significant increase in all the above traits (except leaf area, The treatment of double inoculation +3 tones ha^{-1} residue was Superior) reaching (4.17, 1.34)% and 12.90 g. plant^{-1} respectively compared to the control treatment that gave the lowest values.

Key words: *A.brasilense*, *A.chroococcum*, Poultry waste, *Sorghum*

Introduction

Sorghum bicolor L. *Moench* is a genus sorghum that belongs to the Poaceae family (Graminae). The native country of white maize is Africa and spread to different parts of the world through humans. White maize is the fifth crop worldwide after wheat and rice. Maize and barley in terms of economic importance and the area planted and is considered to be the grain of the least grain crops, has reached the area planted with white corn in the world (50.724) million hectares and produced 48.495) million tons with a yield (1.981) tons. (Awail and Shehab, 2014).

Between Walsh and McDonnell (2012), organic matter affects the physical, chemical, and biological properties of soils, improving soil composition, increasing positive cation exchange capacity or positive ion exchange capacity, and controlling changes in soil reaction or amplitude. Organic matter is a source of nutrients and energy for soil biomass and high end plants.

Biofertilizers are a complementary and low-cost chemical fertilizer source that has gained significant importance in recent decades and plays an important role in maintaining soil fertility and long-term sustainability. The use of biofertilizers leads to increased crop productivity and helps maintain soil fertility and quality (Yuvaraj, 2016).

The bacteria of the genus *Azotobacter sp*. *Azospirillum sp*. One of the most common bacterial species that has been used as a fertilizer in fertilizing agricultural crops either individually or as a double pollen. 1-ha per year (Vessey, 2003) and(Gothandapani *et al*., 2017).

Sultana *et al*., (2016) observed a significant increase in Foliar area when inoculating the sorghum plant with *Azotobacter chroococcum* also Nitrogen uptake increased by 163.6%. Harran (2010) observed a significant increase in the nitrogen content of sorghum plant by 76% when inoculated with *A. brasilense*. Mahato and Kafle (2018) fended a significant increase in the dry weight of the total root by 458.3 mg. Plant^{-1} when wheat was inoculated with *Azotobacter*. Mohammed (2012)

***Author for correspondence :** E-mail : ussamusa5@gmail.com

studied the effect of inoculation of *Azosperillum* on growth of sorghum plant and found that inoculation led to an increase in dry weight of plant.

Amujoyegbe *et al.,* (2007) obtained a significant increase in dry matter yield and leaf area when fertilizing sorghum plant with poultry residues, reaching 68.1 g. Also, Agbede *et al*., (2008) obtained a significant increase in plant height, leaf area and leaf nitrogen content when poultry residues were added to sorghum. Ahmed *et al.,* (2010) showed that the inoculation of sorghum with *Azotobacter* with the addition of organic residues resulted in an increase of dry weight by 230.12 g. Yadav *et al.,* (2007) also found an increase in dry matter yield when sorghum was inoculated with double bacterial inoculation (*Azotobacter + Azospirillum*).

The study referred to:

Effect of *A.chroococcum* and *A.brasilense* and poultry residues in some growth characteristics of sorghum plant.

Effect of interaction between factors in some growth characteristics of sorghum plant.

Materials and Methods

A field experiment was carried out in clay soils to cultivate *Sorghum bicolor* L. Moench local variety (Akifa) in one of the fields of a peasant in the area of Mohammed Ali orchards in Samawah district - the center of Muthanna province.

soil samples

Soil samples are analysis conducted in the laboratories of the College of Agriculture / University of Muthanna to study some physical and chemical Table 1.

Experimental design

The experiment was designed using a full randomized sector design (R.C.B.D) experiment using two levels of *Azotobacter chroococcum* (inocoulation and noinoculion) and two levels of *Azospirillum brasilense* (inoculion and no vaccination) and the addition of three poultry residues (0, 3, 5) ha^{-1}.

Bacterial isolates (*Azospirllum* and *Azotobacter*) and poultry residues

The bacterial isolation of *Azospirllum* bacteria from the agricultural research department in Al-Zaafaraniya area of Baghdad governorate. The isolation of *Azotobacter* bacteria was obtained from the college of agriculture - Al-Qadisiya University, also obtained organic matter (poultry waste) from one of the poultry fields in the province of Muthanna.

Add compost (poultry waste)

Poultry residues were added at the rate of (0, 3, 5) ton. h^{-1} according to the experimental parameters, as 1200 g was added to the experimental unit containing the treatment 3 tons. h^{-1}, while 2000 g was added to the experimental unit containing the treatment 5 tons. h^{-1} and without addition to the experimental unit containing the treatment zero ton. Some chemical properties of the studied poultry waste were analyzed Table 2.

Inoculation of seeds

The seeds were sterilized superficially using $Hg_2\ cl_2$ chloride and 95% ethyl alcohol according to Vincent, (1970) and then washed with sterile distilled water 4 times to remove any trace of chloride and then inoculated with white corn seeds by adding 10% of gum Arabic (prepared by dissolving 8 g in 100 ml water). Distilled into a pot containing seeds and left the seeds in it for 8 minutes and then dried pneumatically and placed in 300 ml of liquid farm for the bacteria *A.chroococcum* and left for a quarter of an hour as fogging section of the seeds inoculated *A.brasilense* bacteria and then planted directly.

Crop service operations

Crop service after planting included grafting, as well as the process of individualization, as well as weeding in the early stages of growth, as well as Use of granular diazinon 10% active feed to control leg insect *Sesamia cretica* L. by 800 g diazinon / acres and in the first two batches at the stage of flowering and the second after 15 days after the first addition, was also regular irrigation of the field. The fertilizer recommendation was added to use N46% $(NH_2)_2$ CO fertilizer per treatment at a rate of 60 kg. ha-1 was a source of nitrogen and DAP fertilizer (P46, N: 18 (DAP%)) was added after deducting nitrogen from it at a rate of 80 kg. As a source of phosphorus, 80 kg was added of K_2SO_4 (36%) of potassium sulphate fertilizer was used as a source of potassium. Phosphorus and Potassium was added in the form of two batches, the first in planting and the second after a month of germination (Al-Sultani, 2008).while urea added in three batches (Shalji, 2000).

Leaf area (cm^2. $Plant^{-1}$): The average leaf area of the plant was calculated At the end of the season by randomly selecting 4 leaves from three plants from each experimental unit and then using the following equation $A = L \times W \times 0.75$ to calculate the leaf area by multiplying the leaf length by Its maximum width is 0.75.

Leaf plant nitrogen content at flowering and the end of the season: leaf nitrogen was determined in digestion solution (leaf samples were digested in a wet way using concentrated acids) at flowering and end of season using Kilda Micro Kjeldahl after adding Naoh solution to samples according to Bremner and Keeney (1965) method in (Black, 1965).

Dry weight of root total ($gm.plant^{-1}$): the root total was taken from three plants from each treatment and placed in paper bags and written on them their own transactions and then dried in the electric oven at (60) m until stability Weight The sensitive scale was used to calculate the dry weight of the root total.

Statistical analysis

The mean parameters were compared using the least significant difference test (L..S.D) at a significant level of 0.05 using the calculator based on the statistical program (S.A.S) under the operating system (Windows 2010).

Results and Discussion

Effect of addition of *A. brasilense, A. chroococcum* and poultry residues on leaf area (cm^2 $plant^{-1}$)

The results of Table 3 showed that the single inoculation *with A. chroococcum* showed an increase in the leafy area. The pollination gave the highest leaf area 3606.2 cm^2. Plant $^{-1}$ and significantly increased compared to the control treatment 2973.8 cm^2. *A. chroococcum* bacteria in the free fixation of atmospheric nitrogen, which is involved in the construction of the chlorophyll molecule, amino acids, proteins and nucleic acids RNA.DNA, which may contribute to the growth of the vegetative total (Faraj, 2011) and thus increase the leaf area of the plant. This finding is consistent with Sultana *et al*., (2016).

The results of the (two tables) showed a significant increase in the leaf area as a result of the addition of the bacterial inoculation *A. brasilense*, where the leaf area was 3637.1 cm^2 plant $^{-1}$ compared to the control treatment 2973.8 cm^2 plant $^{-1}$. *A. brasilense* plants lead to the secretion of plant hormones beneficial to the plant such as oxins in addition to processing the plant with nutrients such as nitrogen and thus increase the leaf area (Orozcosegovia and Huante, 2010).

As for the results of adding poultry waste (C) in the leaf area, the results indicated that the level of addition was 5 tons. h^{-1}, the highest value was 3762.3 cm^2. $plant^{-1}$ compared to the control treatment 2973.8 cm^2 $plant^{-1}$, also this level was significantly higher than the level of 3 tons. The important role of organic residues in plant nitrogen processing (Singh, 1975). Nitrogen enters into the construction of cell membranes such as chloroplasts important in Yep photosynthesis which directly affects an increase in paper space. This finding is consistent with what he found (Amujoyegbe *et al.*, 2007).

Table 1: Some characters physical and chemical to soil before planted

unit	value	unit	value
pH (1:1)	7.52	Sant($gm.kg^{-1}$)	118
EC (1:1)	3.8	lomy($gm.kg^{-1}$)	479
Nitrogen availability $Mg.kg^{-1}$ soil	18	clay($gm.kg^{-1}$)	403
phosphorus $Mg.kg^{-1}$ soil	7.2	texture	Clay lomy
patasuam $Mg.kg^{-1}$ soil	99	o.m	
C.E.C	25	Cinte $moul.kg^{-1}$ soil	

Table 2: Some characters chemical to poultry residues for steady.

Adjective	unit	value
pH(1:4)	----	7.52
E.c(1:4)	$ds.sm.m^{-1}$	7.1
Carbon Orgin	$gm.kg^{-1}$	244.12
CN	----	8.78
Total nitrogen	$gm.km^{-1}$	27.8
Total phosphorus	$gm.km^{-1}$	16.2

It is also observed from the table that the bilateral interaction A + B (*A.chroococcum* + *A.brasilense*) did not significantly affect the leaf area, the highest value was 3786.8 cm^2. The lowest value is 2973.8 cm^2.

The results indicated that the bilateral interaction C+ A (*A. chroococcum* + poultry residues) did not lead to a significant increase in the area, and generally the highest value was the highest value 3919.3 cm^2 $plant^{-1}$ for the treatment of addition (*A.chroococcum* + 5 ton. Poultry) and the lowest value 2973.8 cm^2. The results also showed that there was no significant effect of C + B (*A.brasilense* + poultry residues) in the average area, with a maximum value of 3961.5 cm^2 $plant^{-1}$ for treatment (*A.brasilense* + 5 tons. 2973.8 cm). The reason for this may be due to the high content of residues of nitrogen, which inhibited the effectiveness of Azosprillum and Azotobacter bacteria in the avaialabilaty of nitrogen important in the formation of chlorophyll molecules that affect the increase of leaf area.

The results confirmed that the triple interaction between bacterial inoculation and poultry residues significantly affected the leafy area. However, this treatment (double intraction+3 $tons.h^{-1}$ residues) was give the height value 4183.0 $cm.plant^{-1}$ and significantly increased compared to the control treatment 2973.8 cm^2 $plant^{-1}$.

Effect of addition of *A. brasillense, A. chroococcum* and poultry residues on leaf nitrogen

content at flowering and end of season (%)

Results of Tables 4 and 5 showed that single inoculation with *A. chroococcum* resulted in a significant increase in the average nitrogen concentration at the flowering and end of the season, the highest nitrogen concentration was 2.79 and 0.74%, respectively, compared with control treatment 1.03 and 0.21%. This increase in plant nitrogen content is attributed to the ability of *A. chroococcum* to freely availability atmospheric nitrogen as well as its ability to secrete plant growth regulators that improve plant growth and increase the density of its root group. Nitrogen (Faraj, 2011). These results are consistent with Gupta *et al*., (2002).

The results of the addition of the bacterial inoculation *A. brasilense* indicate a significant increase in nitrogen concentration for both periods, where inoculation gave the highest concentration of 2.92 and 0.78% respectively compared to the comparison treatment 1.03 and 0.21% respectively, the reason for this increase is attributed to *A. brasilense* has a spongy effect on the roots, which leads to increased absorption of nutrients such as nitrogen (Okon, 1982) and thus increased plant nitrogen content. This result is consistent with the results of Mohammed, (2012).

The results of the addition of poultry waste (C) in the nitrogen concentration of the plant, when flowering gave the level of addition 5 ton.$^{-1}$ higher value of 3.18% and an increase compared to the control treatment 1.03% also differed level 5 tons.h^{-1} 2.58%, which differed significantly from the level of non-addition (0 tons.h^{-1}) 1.46%, as well as a similar result was obtained at the end of the season above the level of 5 tons.h^{-1} in giving the highest value 0.92% and a significant increase compared to the treatment of control 0.21%, the level of 5 tons.h^{-1} differed significantly from the level of 3 ton.h^{-1} 0.66% while the level of non-addition (0 tons.h^{-1}) gave the lowest value of 0.31%. Nitrogen (Amanullah *et al.*, 2010) and Table 2, where this element plays an important role in the construction of various compounds within the plant and increase the efficiency of vital activities and thus increase the plant absorption of various nutrients (Alston, 1979), including nitrogen. This finding is consistent with those of Vasanthi and Kumaraswamy, 2000.

The results of the two tables showed that the interaction of A + B (*A. chroococcum* + *A.brasilense*) did not significantly affect the nitrogen content of the leaves and the growth duration, with the highest value of 3.33 and 0.88% respectively for the interraction treatment and the lowest value 1.03 and 0.21% respectively for the control treatment.

The results also indicated that the bilateral interaction C + A (*A. chroococcum* + poultry residues) led to an increase in the nitrogen concentration in the leaves for flowering and the end of the season. Percentage of content was 3.64% for the treatment (*A. chroococcum* + 5t.h^{-1} poultry residues)and significantly increased compared to control treatment 1.03%. in the end of season The highest treatment rate (*A.chroococcum* + 5 tons.h^{-1} residue) was 1.09% and significantly increased compared with the control treatment 0.21%. The reason for the increase achieved by C + A is due to the use of *Azotobacter* bacteria as an organic source of carbon and consequently to increase its important numbers in increasing the stabilization of atmospheric nitrogen and thus increase the content and absorption of the plant. (Alexander, 1977) pointed out that *Azotobacter* bacteria One of the disparate neighborhoods that use organic matter as a source of carbon and energy.

As well as Tables 5 and 6 show the significant effect of bilateral interference C + B (*A.brasilense* + poultry residues) on the leaves content of nitrogen and for both periods, in the flowering period achieved the pollinated treatment (*A.brasilense* + 5 ton. Poultry) had the highest nitrogen content of 3.70% and significantly increased compared with the control treatment 1.03% . also at the end of the season Inoculated treatment (*A.brasilense* + 5 t.h^{-1} residue) had the highest content of 1.17% and an increase compared to the non-inoculation treatment 0.21%. The reason for the increase achieved by the B + C interaction may be attributed to the positive effects of poultry residues added in the activation of *A. brasilense* bacteria and hence increased their significant numbers in increasing nitrogen fixation which led to increased nitrogen absorption and reflected in the plant nitrogen content. This finding is consistent with Abdullahi *et al*., (2014).

As for the effect of triple interaction between bacterial inoculation and poultry residues on leaf nitrogen, in the flowering period the results indicated the treatment (*A.brasilense* + *A. chroococcum*) and 5 ton. h^{-1} poultry residues higher 4.17% and significantly increased compared to the control treatment 1.03%.

At the end of the season the treatment (*A.brasilense* + *A.chroococcum* + 5 tons.h^{-1} residues) was also exceeded in giving the highest nitrogen content 1.34% and significantly increased compared to the control treatment 0.21%.

The results of the tables show that the nitrogen content of the plant is reduced at the end of the season when compared to the flowering period.

Effect of the addition of *A. brasilense, A. chroococcum* and poultry residues on dry weight of root total (gm. plant^{-1})

Table 6 shows that single inoculation with *A. chroococcum* showed a significant increase in the dry weight of the total root 8.52 g. plant^{-1} compared to no-added treatment 3.60 g. Plant^{-1}, the reason for this increase may be attributed to the positive effect of pollination by *A. chroococcum* bacteria through the secretion of plant hormones such as oxins (Kukreja *et al.,* 2004). Which has a fundamental role in root growth and increase the density of the root group and thus increase the dry weight. This finding is consistent with the study of Mahato and Kafle, (2018) on the wheat plant.

The results indicated that there was a significant effect on the dry weight of the roots as a result of the addition of the bacterial inoculation *A. brasilense* 8.66 g .Plant^{-1} and significantly increased compared to the treatment of non-pollination 3.60 g.plant^{-1} This increase in the mean dry weight of the root total is attributed to the ability of *A. brasilense* to secrete oxins, cytokines and other plant growth stimulants that increase the density of the root group (Bashan *et al.*, 1989) and thus increase the weight of the roots. This result is consistent with Harran 's findings (2010).

The results of the effect of adding poultry residues (C) on dry root weight, exceeded the level of 5 tons.h^{-1} in giving the highest value in the dry weight of the roots 10.09 g.plant^{-1} and significantly increased compared to the treatment of non-pollination 3.60 g.plant^{-1} .The level

Table 3: Effect of Addition of *A. brasilense, A. Chroococcum* and Poultry Residues on foliar Area (cm^2. plant^{-1}).

A.chroococcum (A)	*A.brasilense* (B)	Levels poultry residue (C) Ton.h^{-1} 0	3	5	Mine (A+B)	Mine (A)
With out add	Non inoculation	2973.8	3280.2	3307.9	3187.3	With out add 3337.4
	inoculation	3047.2	3512.6	3902.7	3425.6	
Mine(C+A) With out add		3010.5	3396.4	3605.3		
add	Non inoculation	3052.7	3405.9	3818.3	3487.5	add 3606.2
	inoculation	3157.0	4183.0	4020.3	3786.8	
Mine (C+A) add		3104.8	3794.4	3919.3		Mine(B) Non inoculation 3306.5
Mine (C+B) Non inoculation		3013.2	3343.1	3563.1		
Mine (C+B) inoculation		3102.1	3847.8	3961.5		
Mine (C)		3057.65	3595.4	3762.3		Inoculation 3637.1
L.S.D$_{0.05}$ to factor (A) 259.78		L.S.D0.05 to Factor B 259.78		L.S.D0.05 to Factor C 318.16		
L.S.D$_{0.05}$ to interaction between tow factor B*A N.S		L.S.D$_{0.05}$ to interaction between tow factor C*A N.S		L.S.D$_{0.05}$ to interaction between tow factor C*b N.S		
L.S.D$_{0.05}$ to interaction between Factors A*B*C 636.32						

Table 4: Effect of addition of *A. brasilense, A. chroococcum* and poultry residues on plant nitrogen content in flowering period (%).

A.chroococcum (A)	*A.brasilense* (B)	Levels poultry residue (C) Ton.h^{-1} 0	3	5	Mine (A+B)	Mine (A)
With out add	Non inoculation	1.03	1.29	2.21	1.51	With out add 2.01
	inoculation	1.25	3.07	3.23	2.26	
Mine(C+A) With out add		1.14	2.18	2.72		
add	Non inoculation	1.20	2.49	3.11	2.52	add 2.79
	inoculation	2.35	3.46	4.17	3.33	
Mine (C+A) add		1.78	2.97	3.64		Mine(B) Non inoculation 1.89
Mine (C+B) Non inoculation		1.11	1.89	2.66		
Mine (C+B) inoculation		1.80	3.27	3.70		
Mine (C)		1.46	2.58	3.18		Inoculation 2.92
L.S.D$_{0.05}$ to factor (A) 0.17		L.S.D0.05 to Factor B 0.17		L.S.D0.05 to Factor C 0.12		
L.S.D$_{0.05}$ to interaction between tow factor B*A N.S		L.S.D$_{0.05}$ to interaction between tow factor C*A 0.80		L.S.D$_{0.05}$ to interaction between tow factor C*b N.S 0.63		
L.S.D$_{0.05}$ to interaction between Factors A*B*C 0.42						

of 5 ton. h^{-1} was significantly different from the level of 3 tons .h^{-1} 7.88 g, $plant^{-1}$ which in turn differed significantly from the level of non-addition 0 tons.h^{-1} 4.57 g. Poultry residues contain essential nutrients that increase the photosynthesis of the plant, leading to increased growth of the contacted and root groups (John *et al.,* 2004) and consequently the increase in dry weight.

The results also showed that the interaction of A + B (*A. chroococcum* + *A. brasilense*) did not significantly affect the weight, reaching the highest value of 9.70 g. $Plant^{-1}$ for the treatment (*A.chroococcum* + *A.brasilense*) and the lowest value of 3.60 g. $Plant^{-1}$ for the control treatment.

The results also showed that C + A (*A. chroococcum* + poultry residues) did not significantly affect the mean dry weight, generally the highest value was 11.43 g. $Plant^{-1}$ for the treatment (*A.chroococcum* + 5 tons. h^{-1} residue) and the lowest value of 3.60 g. $Plant^{-1}$ for the control treatment.

It was noticed from the table the significant increase in the dry weight of the total root achieved by the bilateral interaction C + B (*A.brasilense* + poultry residues), where the inoculated treatment (*A.brasilense* + 5 tons. h^{-1} residue) gave the highest dry weight of the roots 11.76 g. $plant^{-1}$ compared to the control treatment 3.60 g. $Plant^{-1}$. The reason for this increase achieved by bilateral interaction C + B may be attributed To activate the poultry residues added to *A. brasilense* by supplying carbon as an energy source, which increased its important activity in increasing the fixation of atmospheric nitrogen and the secretion of hormones such as alauxinat and thus increase the growth of the plant and reflected in the increase of

Table 5: Effect of *A. brasilense, A. chroococcum* and poultry residues on plant nitrogen content at the end of the season (%).

A.chroococcum (A)	***A.brasilense* (B)**	**Levels poultry residue (C) Ton.h^{-1}**			**Mine (A+B)**	**Mine (A)**
		0	**3**	**5**		
With out add	Non inoculation	0.21	0.38	0.47	0.35	With out add 0.52
	inoculation	0.34	0.70	1.01	0.68	
Mine(C+A) With out add		0.27	0.54	0.74		
add	Non inoculation	0.360	0.61	0.85	0.60	add 0.74
	inoculation	0.366	0.94	1.34	0.88	
Mine (C+A) add		0.36	0.78	1.09		Mine(B) Non inoculation 0.48
Mine (C+B) Non inoculation		0.28	0.49	0.66		
Mine (C+B) inoculation		0.35	0.82	1.17		
Mine (C)		0.31	0.66	0.92		Inoculation 0.78
$L.S.D_{0.05}$ to factor (A) 0.08		L.S.D0.05 to Factor B 0.08		L.S.D0.05 to Factor C 0.09		
$L.S.D_{0.05}$ to interaction between tow factor B*A N.S		$L.S.D_{0.05}$ to interaction between tow factor C*A 0.29		$L.S.D_{0.05}$ to interaction between tow factor C*b 0.20		
$L.S.D_{0.05}$ to interaction between Factors A*B*C 0.19						

Table 6: Effect of the addition of *A. brasilense, A. chroococcum* and poultry residues on dry weight of root total(gm. $plant^{-1}$).

A.chroococcum (A)	***A.brasilense* (B)**	**Levels poultry residue (C) Ton.h^{-1}**			**Mine (A+B)**	**Mine (A)**
		0	**3**	**5**		
With out add	Non inoculation	3.60	5.71	6.89	5.40	With out add 6.51
	inoculation	4.55	7.69	10.62	7.34	
Mine(C+A) With out add		4.08	6.70	8.75		
add	Non inoculation	4.68	7.37	9.95	7.62	add 8.52
	inoculation	5.44	10.75	12.90	9.70	
Mine (C+A) add		5.06	9.06	11.43		Mine(B) Non inoculation 6.37
Mine (C+B) Non inoculation		4.14	6.54	8.42		
Mine (C+B) inoculation		5.00	9.22	11.76		
Mine (C)		4.57	7.88	10.09		Inoculation 8.66
$L.S.D_{0.05}$ to factor (A) 1.45		L.S.D0.05 to Factor B 1.45		L.S.D0.05 to Factor C 1.77		
$L.S.D_{0.05}$ to interaction between tow factor B*A N.S		$L.S.D_{0.05}$ to interaction between tow factor C*A N.S		$L.S.D_{0.05}$ to interaction between tow factor C*b 2.64		
$L.S.D_{0.05}$ to interaction between Factors A*B*C 3.55						

dry weight of the roots. who received an increase in dry weight of the roots on millet.

The results also indicated that the triple interaction A + B + C (*A.brasilense* + *A.chroococcum* + poultry residues) significantly affected the dry weight of the total root by giving treatment additive (*A.brasilense* + *A.chroococcum* and 5 tons.h^{-1}), The highest value is 12.90 g. $plant^{-1}$ and significantly increased compared with the control treatment 3.60 g. $Plant^{-1}$.

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