



Effect of Bio-fertilizer on the Agronomic Characteristics of Livestock and Medicinal Herb (*Echinacea purpurea*)

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ABSTRACT: In order to study the effect of organic fertilizers and biological characteristics on the growth, yield and agronomic characteristics of medicinal plant Purple Coneflower in the cloud for factorial in a randomized complete block design, with three replications research farm, located in the city were carried out in the year 2014 Mahmoud Abad. Factor of organic fertilizers include manure application in three levels to the value of 5 and 10 tons per hectare and the lack of control or consumption, and bio-fertilizer on plots with four levels of bacteria, *Pseudomonas putida*, *Azospirillum lipoferum Pseudomonas + Azospirillum* and control. The results showed that the application of animal and biological fertilizers leads to increase in height, flower number, number of leaves, the size of the canopy, leaf dry weight, shoot weight, dry air and the flowers were compared to the control. Use a combination of two bacteria, along with 10 tons of manure consumption increased about 40 percent in comparison with control performance were dry. Mutual effects of manure and the bacteria showed that the highest number of goals in 10 tons of the fertilizer application and integration of a number of bacteria with an average of 15.66 consumption and the lowest number in it with an average of 5.13 patients not using cow manure and bacteria, respectively.

Keywords: Manure growth stimulating bacteria, number of flowers, Purple Coneflower

INTRODUCTION

Purple Coneflower *Echinacea purpurea* plant scientific name alfi and perennial Asteraceae from families of the order Asterales, kasani astral and zirkhanoadeh of is Asteroeidae (Ghasemi dehkordi 1991). One of the most important needs in the application of high-yield agricultural planning in order to ensure optimum quality and especially in the case of medicinal plants is to evaluate different systems of plant nutrition (Hassan Zadeh, 2001). Organic materials in addition to providing nutrients, the effects of different Specifications on soil productivity, especially on the physical characteristics of the soil are (Polo and Pedra, 2006). Application of biological agriculture is many fertilizers, but in the interest of history and science does not have much experience of such resources. Nowadays, due to the numerous environmental problems that the consumption of chemical fertilizers with procedures is the use of fertilizers is raised again in biological agriculture (Hag NIA, and sharifi 2007). And try it is up to the potential of soil organisms and organic material in order to produce maximum quality of the product and at the same time improving the soil and the observance of health and safety the environment used (Moalem and Eshgezadea, 2007).

The bacteria of nitrogen fixation in *Khakazi azadsi* and *Azospirillum* genus *Pseudomonas* includes two line improvement of biological activity of the soil organic matter and nutrients for the plant and economic increase yield, especially in medicinal plants is (Cocobas *et al*, 2001 Sharma, 2003 and Cocobas, 2010 and Olmorgan *et al*, 2008). Studies on the barley by kamacksi and colleagues (2007) showed that the number of weight and leaf area on the effect of inoculation with the bacteria of biostimulators 28.8 up 45.2 percent increase, depending on the type of bacteria. Khandan (2004) stated that manure fertilizers on increase yield of grain and straw and Stover and percent mosilage pp is effective. Rezai and accounted for (2000) said that organic fertilizers cause a significant increase in soil organic matter and soil elements increase the uptake. A study on the view that the application of 20 tons of manure will improve growth and development were in the medicinal plant thymus *Vulgaris* (Ateya *et al*, 2009). Due to the importance of organic herb production and increase the sustainability of production and environmental research in order to compare the impact of bio-fertilizers and agricultural properties of the medicinal plant and animal on the Purple Coneflower, was done.

MATERIALS AND METHOD

This test is based on factorial completely randomized blocks design with three replications in citrus trees located in the city between Mahmood Abad with a height of 11 m above sea level with a 32° 36' North longitude and latitude 18° 52' East carried out in 2014. Bio for *Pseudomonas putida* and *Azospirillum lipoferum* used are fitted. Physical and chemical properties of the preparation for the 0-30 cm depth soil samples were prepared (Table 1). In order to apply the Treatments bacteria, Purple Coneflower herb root after the wash is complete with water for 8 hours in the liquid and then to farm Infusion insemination of transplanting at the desired interval Between cultures 30 *40 cm between rows and performed on the row.

After the establishment of the plant, the weed appeared in few steps immediately to manually was disposed of. The measured traits include height, the size of the canopy, dry weight, leaf dry weight, flower, flower number, number of pages and the weight of metric traits were aerial organs by other traits and ruler and was counted manually. To measure the desired traits of the plant from the text of every plot 6 after removing the margin of accuracy out of the base of the plant, which was then on extremities cut and after counting the number of leaves and flowers and stalks separated and after weighing to determine the dry weight of Avon for 48 hours and 72°C average number obtained was used in the statistical analysis. Karyotype analysis for the results obtained from the software Exell and sas to compare the average of LSD was used.

Table 1: Some physical and chemical characteristics for soil of experiment site.

Sand (%)	Silt (%)	Clay (%)	EC (ds/m)	PH	K (mg kg-1)	P (mg kg-1)	N (%)
42	18	22	0.24	7.21	225.62	10.85	0.16

RESULTS AND DISCUSSION

A. Height

The impact of bacteria and cow manure at the level of 1 percent was significant, but their interaction is not significant (Table 2). The maximum amount of this trait in manure and fertilizer application 10-ton forklift with an average bacteria 66.33 cm *Azospirillum* treatments with the meter and control were in a statistical level but the lowest it with an average of 36.33 cm in patients taking cow manure and bacteria, respectively (Table 3). The use of biological fertilizers containing Azospirillum bacteria in medicinal plant *Salvia officinalis*, increased plant height and dry weight of shoot plant organs (Vandbrvk 1999). Marashi *et al*, (2014) tested the effect of incorporating manure and *Salvia officinalis* on medicinal plant growth stimulating bacteria found in between the different Treatments combination of the greatest impact on plant height to along.

B. Number of flowers

The use of Treatments bacteria and manure in the 1% level of probability and the interaction of bacteria and application of cow manure at the 5% level, meaning there was significant (Table 2). Mutual effects of manure and 10tn showed that Treatments bacteria consume the bacteria with manure and *Azospirillum*, and the combination of bacteria levels were statistically, but the highest number of goals in 10 tons of the

fertilizer application and integration of a number of bacteria with an average of 15.66 consumption and the lowest number in it with an average of 5.13 patients not using cow manure and bacteria, respectively (Table 2). Application of *Calendula officinalis* L. Bio-fertilizers causes an increase in performance was improving the quality of medicinal flowers and Sanchez Gavin *et al*. (2005).

C. Canopy

The impact of manure and the interaction of bacteria and they are at the level of 1% means the lift was significant (Table 2). The maximum amount of the canopy in the fertilizer application integration and application of two bacteria, bacteria with an average consumption of 10 ton of 64.20 cm and the lowest average of 41.33 cm in patients taking cow manure and bacteria, respectively (Table 3). Many of plant growth parameters including plant fresh weight, dry weight of plant, plant height, leaf area, influenced by the increase of growth stimulant, recover Bacteria (Gholami *et al* 2009). Experiments conducted on medicinal plant growth stimulant *Malva neglectain* combination with the application of manure bacteria to attribute a percentage of the volume of canopy control with a difference of 45 patients showed (Tahmasebi *et al*, 2014).

Table 2: Average little squares of various Treatments characteristics of manure under the Purple Coneflower and bacteria.

Cow Manure	Bacteria	Canopy (cm)	Plant weight (gr)	Dry weight Leaf (gr)	Leaves (number)	Dry flowers (gr)	Flowers (number)	Height (cm)
5 tn	AZ	51.60 c	119.00 ab	52.33 cd	27.86 d	33.83 e	9.23 b	52.33 bc
	PS	47.06 de	116.33 b	45.33 d	26.33 de	36.33 de	8.93 bc	49.86bcd
	AZ+PS	56.20 b	122.66 ab	53.83 c	35.60 b	40.33 dc	13.40 a	56.73 b
	Control	44.00 ef	114.33 b	44.80 d	22.40 f	33.00 ef	6.03 ef	49.50 bcd
10 tn	AZ	54.40 bc	126.33 ab	64.33 b	31.80 c	48.83 ab	14.83 a	56.16 b
	PS	50.66 cd	126.00 ab	65.66 b	28.20d	46.66 ab	13.66 a	52.60 bc
	AZ+PS	64.20 a	131.33 a	76.16 a	38.33 a	49.09 a	15.66 a	66.33 a
	Control	44.20ef	122.33 ab	54.33 c	22.40 f	43.16 bc	8.60 bcd	50.33 bcd
Control	AZ	42.73ef	96.66 c	35.00 e	24.06 ef	25.33 g	6.43 de	38.86 e
	PS	45.43 ef	97.33 c	36.00 e	23.73 f	24.66 gh	6.46 cde	41.80 de
	AZ+PS	46.66 de	100.00 c	37.23 e	23.06 f	27.66 fg	6.16 def	43.56 cde
	Control	41.33 f	75.16 d	31.50 e	19.13 g	24.08 h	5.13 f	36.33 e

D. Number of leaves

The use of the different Treatments bacteria and manure and its effects on the number of adjectives leaves with 1% level of probability, was significant (Table 2). Mutual effects of bacterial manure and the table showed that the maximum value is the number of leaves in the fertilizer application 10 tons of cow manure and integration with an average consumption of *Azospirillum* and *Pseudomonas* bacteria 38.33 and the lowest number in patients with non-average 19.13 using cow manure and bacteria, respectively. Research on the effect of glycyrrhiza on *Pseudomonas fluorescens*, thyme (*Origanum majorana* L.) was conducted and some azaqbil that were fitted indicator: number of leaves, plant weight, increasing the length, number of nodes and shoot dry weight in comparison with control showed significant differences (Bachy *et al.*, 2008).

E. Dry weight of leaf

the results of the average of the squares of the attribute table leaf dry weight indicated that the impact of the use of cow manure and the stimulus for the growth of bacteria on the surface of 1% and 5% in the level of their interaction meaning lift was significant (Table 2). Mutual effects of bacterial manure and the table showed that the greatest amount of leaf dry weight in 10 tons of manure and fertilizer application in conjunction with an average consumption of bacteria and Treatments *Azospirillum* 76.16 g, modulation and control without

consumption of cow manure at a statistical level, but the lowest it with an average of 31.50g in patients taking cow manure and controls, respectively. Studies on the barley by kamacksi and colleagues (2007) showed that the number of weight and leaf area on the effect of inoculation with bacteria biostimulators 28.8 up 45.2 percent increase, depending on the type of bacteria. In order to evaluate the effects of manure brajzai qualitative and quantitative characteristics of morphological and yield of the essential oil to the Lemon verbena showed treatments on leaf dry weight, root dry weight, and medicinal plants significant differences to the lemon is shown (Kyaf *et al.*, 2014).

F. The dry weight of the flowers

The results of anova, the average dry trait called baate flowers indicated that the impact of bacteria and manure each at the level of 1% means meaningful was fitted but in the interaction between bacteria and manure fertilizer application means the lift is not significant (Table 2). Mutual effects of bacterial manure and the table showed that the highest dry weight of 10 tons of the fertilizer application and integration of flower in the bacteria with an average consumption of 49.09 g and lowest with an average of 24.08 g in patients taking cow manure and bacteria, respectively. Inoculation with biological fertilizers was increased statistically dramlkard flowers, Chamomile essential oil yield is percent. (Salehi 1999).

G. Shoot weight

Results of weight in the average of the squares of the attribute table for the shoot showed that a 5% level of effect of bacteria and cow manure at the level of 1% means meaningful, significant, and their interaction has not been significant. Mutual effects of manure and the table showed that the bacteria, *Pseudomonas* treatments *Azospirillum* incorporated, are statistically the same as the amount of air they are organs in patients weighing

10 tons and hot with an average consumption of bacteria synthesize 131.33 g and the lowest it with an average of 75.16 g patients not using cow manure and bacteria, respectively. Cochaki *et al.* (2008) reported that a useful role and application of bio-fertilizer can result in improved performance, features of the growth of the extremities of the qualitative characteristics of air-and medicinal herb hyssop (*Hyssopus officinalis* L.).

Table 3: Interaction of cow manure and bacteria on different Treatments properties of the manure under a little Purple Coneflower and bacteria.

S.O.V	df	Height (cm)	Flowers (number)	Dry flowers (gr)	Leaves (number)	Dry weight Leaf (gr)	Plant weight (gr)	canopycm (cm)
Block	2	125.52	6.46	46.93	8.32	41.50	3.27	18.63
bacteria	3	318.33 *	203.77**	212.44 **	187.30 **	76.20 **	49.84**	166.69**
Cow Manure	2	3812.52 **	263.47**	2793.31 **	187.77 **	1639.79 **	166.89 **	848.48 **
bacteria* Cow Manure	6	79.53 ns	54.70**	53.03 *	26.88**	14.39 ns	6.28 *	23.57 ^{ns}
total error	22	70.79	6.99	20.00	1.95	11.70	2.13	31.43
C.V	-	7.49	5.39	9.01	5.16	9.60	15.46	11.31

REFERENCE

- Ameri, A.A., Nasiri-Mahallati, M. (2009). The effects of different levels of nitrogen and density on flower production rate ingredients and medicinal herb consumed in light performance are always researches and construction in the spring. *Natural resources*, **81**.
- Banchio, E., Bogino, PC., Zygadlo, J. and Giordano, W., (2008). Plant growth promoting rhizobacteria improve growth and essential oil yield in *Organum majorana* L., **36**: 766-771.
- Ghasemi Dehkordi, N., Taleb, A. (1991). Extraction, identification and quantification of compounds in medicinal plants, Isfahan, 3-5,
- Gholami, A., S. Shahsavani. and S. Nezarat. (2009). The effect of plant growth promoting rhizobacteria (PGPR) on germination, seedling growth and yield of maize. Proceedings of Word Academy of Science. *Engineering and Technology*. **37**: 2070-3740.
- Hassanzadeh Gulp Hill, A. Ghalavand, M. R. Ahmadi And KH. Mirnia. (2001). The effect of fertilizers, organic and introduced to the qualitative and quantitative characteristics of sunflower cultivars in Western Azerbaijan. Journal of Gorgan University of agricultural sciences page. 85-104
- Sharifi Z and Haghnia GH. (2007). Effect of Nitroxin biofertilizer application on grain yield and yield components of wheat (Cv Sabalan). Proceedings of the 2nd National Conference on Agroecology in Iran, Gorgan, Iran. 2007, pp: 123.
- Kiafar D., khomami, M, popular A.S. Akbar Zadeh. (2013). Effect of organic fertilizers on some qualitative and quantitative yield essential oil plants on lemon (*Lippia citriodora* L.) in Gilan. The second National Conference on agricultural sustainable development and a healthy environment.
- Kocabas, I., Kaplan, M., Kurkcuoglu, M., Baser, K.H.C., (2010). Effects of different organic manure applications on the essential oil components of Turkish sage (*Salvia fruticosa* Mill.). *Asian Journal of Chemistry*, **22**(2): 1599-1605.
- Koocheki A, Tabrizi L and Ghorbani R. (2008). Effect of biofertilizers on agronomic and quality criteria of Hyssop (*Hyssopus officinalis* L.). *Iranian J. Field Crops Res.* **6**(1): 127 - 37.

- Marashi, C; Y. Niknejad, Y.Fallah Amoli, H. Tahmasebi. R. (2013). Survey use organic fertilizers and bio-medicinal plant Phenology on the development of milk thistle, the National Conference on medicinal plants, Amol, Islamic Azad University, science and research-Ayatollah Amoli.
- Moallem A and Eshghizadeh HR. (2007). The use of biological fertilizers: benefits and limitations. Proceedings of the 2nd National Conference on AgroEcology in Iran, Gorgan, Iran. 2007; Pp. *National Conference of Iranian ecology*. Gorgan. pp: 47.
- Pedra, F., A. Polo, A. Ribero, and H. Domingues. (2006). Effect of municipal solid waste compost and sewage sludge on minerlization of soil organic matter. *Journal of Soil Biology and Biochemistry*, **29**: 1375-1382.
- Rezai, The Race and M. Afyuni. (2000). The effect of organic matter on soil chemical properties, yield and uptake by corn and it. *Journal of agricultural science and technology and resources*. The fourth issue of the fourth volume, natural 27-19 Page.
- Salehi, S. (1999). Effect of biological fertilizer and organic matter on the yield of essential oil yield with (flowers) and boneh German articles.
- Sanches Govin, E., Rodrigues Gonzales, H. and Carballo Guerra, C., (2005). Ifluencia de los abonos organicos y biofertilizantes en la calidad de las especies medicinales *calendula officinalis*.1.y *Matricaria recutita* L. *Revista Cubana de Plantas Medicinales*. **10**(1): 1.
- Sharma, A.K. (2003). Biofertilizers for sustainale agriculture. *Agrobios India*,**12**: 319-324.
- Sharifi Z and Haghnia GH. (2007). Effect of Nitroxin biofertilizer application on grain yield and yield components of wheat (Cv Sabalan). *Proceedings of the 2nd National Conference on Agroecology in Iran, Gorgan, Iran*. 2007, pp: 123.
- Tahmasbi, R. Niknejad, Y. Fallah Amoli, H., Marashi. C. (2013). The breed's development; (c) and the use of 2013, organic fertilizers and bio-medicinal plant *Silybum marianum* phenology on the process of development, National Conference on medicinal plants, Amol, Islamic Azad University Ayatollah Amoli, science and research-
- Vande Broek A. (1999). Auxins upregulate expression of the indol-3-pyruvate decarboxylase gene in *Azospirillum brasilense*. *Journal of Bacteriology*, **181**: 1338-1342.