



The Effects of Different Sources of Nitrogen and Biologic Fertilizers on yield and some yield components of *Coriandrumsativum*L.

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ABSTRACT

This study was conducted to evaluation of different sources of nitrogen and biologic fertilizers on yield and some yield components of *coriandrumsativum*. Split plot in RCBD was used as experimental design and main plot included 100% organic, 100% chemical, 75% organic + 25% chemical, 50% organic+50% chemical, 25% organic + 75%chemical fertilizer and sub plot included incubate application (*Azotobacterchroococcum*, *Azospirillumbrasilense*) and non-application. All treats had lowest means by 100% organic treatment and values increased by using of chemical percentages. Inoculation had positive effects on treats although application of organic fertilizer increased inoculation effects. The end of experiment, we recommended 25% organic + 75%chemical fertilizer as best as treatment for Coriander culture at research area.

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Introduction

Coriander (*Coriandrumsativum* L.) is a culinary and medicinal plant belongs to the Apiacea family. This plant is of economic importance since it has been used as flavoring agent in food products, perfumes and cosmetics (Emamghoreishi et al., 2005). Plant nutrition one of the most important factors that increase plant production. Nitrogen (N) is the most recognized in plant for its presence in the structure of the protein molecules. Accordingly, N plays an important role in synthesis of the plant constituents through the action of different enzymes (Jones et al., 1991). Akbarinia et al., (2007) indicated that increase N up to 60 kg ha⁻¹ caused a significant increase in coriander (*Coriandrumsativum* L.) seed yield, but the highest essential oil content and fatty acids were obtained with 90 kg N ha⁻¹. Plant growth promoting rhizobacteria (PGPR) influence plant health and productivity by a variety of mechanisms that involve solubilization of mineral nutrients, stimulation of root growth, and suppression of root diseases (Zehnder et al., 2001). PGPR have been subjected to numerous investigations focused on biotechnological applications in agriculture, horticulture, forestry and environmental protection (Zahir et al., 2004). The mechanisms through which PGPR may stimulate plant growth are probably due to the production of indole-3-acetic acid (IAA) and cytokinin-like compounds as well as by lowering ethylene levels in plants (Ali et al., 2009); fixing nitrogen (Zaidi and Mohammad, 2006), and increasing the availability of nutrients such as phosphate (Malboobi et al., 2009). The aim of experiment was evaluation of evaluation of different sources of nitrogen and biologic fertilizers on yield and some yield components of *coriandrumsativum*.

Material and Methods

An experiment was conducted to evaluation of N₂ sources and biological fertilizer treatments on yield of *Coriandrumsativum*. Split plot in RCBD was used as experimental design and main plot included 100% organic, 100% chemical, 75% organic + 25% chemical, 50% organic+50% chemical, 25% organic + 75%chemical fertilizer and sub

plot included incubate application (*Azotobacterchroococcum*, *Azospirillumbrasilense*) and non-application. The end of experiment, some traits were evaluated such as vegetative yield, 1000 seedweight, umbels per plant, The number of branches per plant.

Table 1: Soil profile

0-30cm depth	(soil)		0-30cm depth	(soil)	
50	Clay%	62	SP		
46	Silt%	2.51	EC(ds/m)		
4	Sand%	8.45	pH		
3.68	Fe	0.94	O.C%		
0.32	Zn	0.09	N total		
0.84	Cu	4.4	P(p.p.m)		
1.62	Mn	480	P(p.p.m)		
0.36	B				

Result and discussion

Umbels per plant: Analysis of variance shows that fertilizer treatments and inoculation had significant effects on umbels per plant. Highest (43) and lowest (34.5) means were obtained by 25% organic + 75%chemical fertilizer and 100% organic, respectively. Evaluation of treatments interaction demonstrated that inoculation increased umbels per plant with fertilizer treatments. Simultaneously, Application of inoculation and 100% organic, 75% organic + 25% chemical, 50% organic+50% chemical, 25% organic + 75%chemical fertilizer increased 30, 24, 22, 20 and 12 % in compared to 100% chemical treatment, respectively.

Biologic yield: Analysis of variance shows that fertilizer treatments and inoculation had significant effects on biologic yield (table 2), 5.4 and 5 ton per hectare were obtained by 100% chemical and 100% organic treatments, respectively. Simultaneously, Application of inoculation and 75% organic + 25% chemical, 50% organic+ 50% chemical, 25% organic + 75%chemical fertilizer increased 2, 3 and 6 % in compared to 100% chemical treatment, respectively. Zahir et al., 2004 showed that inoculation of alfalfa by *P.putida* R-20 had positive effects on biologic yield.

	df	Umbels per plant	Biologic yield	number of branches per plant	Seed yield	1000 seed weight
Replication	2	11.7	10	0.208	15.85	0.468
Fertilizer	4	70.95**	61.46**	1.278**	78.52**	1.8**
Error	8	4.95	4.22	0.088	9.59	0.198
Bacteria	1	433.2**	599.7**	12.28**	465.7**	10.8**
Fertilizer * bacteria	4	3.45	9.5	0.198	0.714	0.075
Error	10	11.7	10	0.208	16.3	0.468
CV		18.7	13	13.5	26	16.7

** Significant at 1%

Table 3. comparison of means (means of square) according to Duncan test

		Umbels per plant	Biologic yield (ton/ha)	number of branches per plant	Seed yield (kg/ha)	1000 seed weight (gr)
100%org		34.5 b	4.9 c	12.5 c	1078 c	9.75 c
75% org + 25% che		37 b	5.0 bc	12.7 bc	1215 bc	9.65 c
50% org+ 50% che		40 a	5.1 b	13 b	1531 ab	10.1 bc
25% org + 75%che		43 a	5.3 a	13.4 a	1844 a	10.55 ab
100% che		41.5 a	5.3 a	13.6 a	1881 a	10.95 a
100%org	Non-inoc	30 e	4.6 e	11.6 e	663 d	9 d
	inoc	39 bcd	5.3 ab	13.4 ab	1493 abc	10.5 abc
75% org + 25% che	Non-inoc	33 de	4.8 de	12 de	847.7 cd	9 d
	inoc	41 abc	5.3 ab	13.4 ab	1582 abc	10.3 a-d
50% org+ 50% che	Non-inoc	36 cde	4.9 cde	12.4 cde	1111 cd	9.5 cd
	inoc	44 ab	5.3 ab	13.6 ab	1951 ab	10.7 abc
25% org + 75%che	Non-inoc	39 bcd	5.0 bcd	12.8 bcd	1423 bcd	10 bcd
	inoc	47 a	5.5 a	14 a	2265 a	11.1 ab
100% che	Non-inoc	39 bcd	5.2 abc	13.2 abc	1534 abc	10.5 abc
	inoc	44 ab	5.5 a	14 a	2228 ab	11.4 a
	Non- inoculation	35.4 b	4.9 b	12.4 b	1115 b	9.6 b
	inoculation	43 a	5.4 a	13.68 a	1903 a	10.8 a

Org : organic, Che : Chemical, Inoc: inoculation,

The number of branches per plant: According to table 2, the number of branches per plant was affected by our treatments at level of 1%. 100% chemical and 100% organic treatments showed highest and lowest means respectively. 75% organic + 25% chemical, 50% organic+ 50% chemical, 25% organic + 75%chemical fertilizer increased 2, 4and 7 % in compared to 100% organic treatment, respectively. Inoculation could increase number of branches per plant (10%).

Seed yield: This trait was affected by factors and it increased by inoculation. Increasing in organic fertilizer could increase seed yield. 100% chemical and 100% organic treatments showed highest (1881kg/ha) and lowest (1078 kg/ha) means, respectively. Application of inoculation and 75% organic + 25% chemical, 50% organic+ 50% chemical, 25% organic + 75%chemical fertilizer increased 12.42 and 71 % in compared to 100% organic treatment and no inoculation, respectively.

1000 seed weight: Analysis of variance shows that fertilizer treatments and inoculation had significant effects on 1000 seed weight (table 2), 10.9 and 9.7 gr were obtained by 100% chemical and 100% organic treatments as highest and lowest means, respectively. According to interaction between factors, Application of inoculation and 75% organic + 25% chemical, 50% organic+ 50% chemical, 25% organic + 75%chemical fertilizer increased 12, 11and 8% in compared to 100% organic treatment and no inoculation, respectively. All treats had lowest means by 100% organic treatment and values increased by using of chemical percentages. Inoculation had positive effects on treats although application of organic fertilizer increased inoculation effects. The end of experiment, we recommended 25% organic + 75%chemical fertilizer as best as treatment for Coriander culture at research area.

Resources

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