

EVALUATION OF NANO FERTILIZER AND ABSTRACT OF ORGANIC MATTER AND METHOD OF APPLICATION ON AVAILABILITY AND UPTAKE OF SOME ELEMENTS AND GROWTH AND YIELD OF FABA BEAN (*VICIA FABA L*)

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ABSTRACT : A field experiment was conducted in Al – Najaf Governorate during winter season 2017 to study the effect of foliar and soil application of abstract of organic matter with three abstracts (water: organic matter, 2:1, 3:1 and 4:1) and Nano fertilizer with three levels (0, 2 and 4) g L⁻¹ on availability and uptake of NPK and growth and yield of Fababean (*Vicia Faba .L*) Grano variety. according to RCBD with three replicates was designed (54 treatments). results showed Superior the abstract of organic matter 4:1 in all parameters. Superior the level of nano fertilizer 4g L⁻¹ in pods no., weight of 100 seeds, yield, seed N %, seed P %, seed K % and up take of NPK. Superior foliar application in pods no., weight of 100 seed, yield, percentage of seed PK % and up take of N. Superior interaction 4 :1 and 4 g L⁻¹ in all parameters. Superior interaction 4:1 and foliar application in plant height, yield and seed N %. Superior interaction 4g L⁻¹ and foliar application in plant height, pods no., weight of 100 seed, yield, up take of K. Superior interaction 4 :1*4g L⁻¹*foliar in plant height, pods no., weight of 100 seed, yield and similar results for others interaction between foliar and soil application.

Key words : Abstract organic matter, nano fertilizer, methods, uptake, faba bean.

INTRODUCTION

Faba beans (*Vicia faba L.*) are important food in Iraq and many countries as seeds or pods. They are an important source of macro and micronutrients, high amount of proteins, amino acids and have high effective role in human health. Turco *et al* (2016); Amarowicz and Pegg (2008). Yield of plant increased after addition of fertilizer to soil and / or leaves in deficient soils. Nanoparticles increasing in macro and micro nutrients contents in plant tissues. Christian *et al* (2017). nano fertilizer improved growth and yield of cereal. Shashidara *et al* (2015) , Prem *et al* (2015). The Nanofertilizers showed an initial effect and a subsequent slow-release compared to the commercial fertilizer, which released heavily early followed by the release of low and non-uniform quantities (Fujinuma and Balster 2010). The organic matter and its components are affected directly and non-directly on crop growth and yield. (Sangeetha and Devi 2006).

The aims of this research to Evaluation of Nano fertilizer and abstract of organic matter and method of application on availability and uptake of some elements and growth and yield of Faba bean (*Vicia faba. L*) .

MATERIALS AND METHODS

A field experiment was carried out in a winter season 2017 in clay loam soil (Table 1). the experiment carried out by using RCBD design with three replication, first factor Nano fertilizers super micro plus that containing the following elements: (N 5%, P 3%, K 3%, Fe 4.5% , Zn 8%, Ca 6%, Mg 6%, Mn 0.7% , Cu 0.65%, B 0.65% and Mo 0.1%) in three levels (0, 2 and 4 g L⁻¹). Second factor abstract of organic matter (organic matter : water 1:2, 1:3 and 1:4) Nitrogen fertilizer was added, 100 kg N h⁻¹ from urea fertilizer 46% nitrogen while phosphorus 52 kg Ph⁻¹ from triple super phosphate. Potassium 33 kg k⁻¹ from potassium sulphate. Ali *et al* (2014). The experiment was planted at 20/11. Crop service operations and removal of weeds were carried out as needed. The harvest was done 22 / 4. Statistical analysis of the data was performed and the least significant difference was used for L.S.D under the probability level of > 0.05.

RESULTS AND DISCUSSION

Plant height cm

A results in table 2 showed significantly differences on plant height 49.4 Cm at 4:1 abstract of organic matter, May be because abstracted most of material and elements

Table 1 : Some properties of physical and chemical soil before planting.

Properties	Unit	Estimation method
Gypsum	2.9 gm kg ⁻¹ soil	Page <i>et al</i> (1982)
Organic matter	3.9 gm kg ⁻¹ soil	Page <i>et al</i> (1982)
Nitrogen available	17.5 mg kg ⁻¹ soil	Page <i>et al</i> (1982)
Phosphor available	8.9 mg kg ⁻¹ soil	Page <i>et al</i> (1982)
Potassium available	160 mg kg ⁻¹ soil	Jackson (1958)
Sand	345 gm kg ⁻¹	
Silt	265 gm kg ⁻¹	
Clay	390 gm kg ⁻¹	
Soil texture	Clay loam	Black (1965)
EC _e	6.2 D.S m ⁻¹	Page <i>et al</i> (1982)
pH	7.8	Page <i>et al</i> (1982)
CaCO ₃	314 gm kg ⁻¹ soil	Page <i>et al</i> (1982)

of organic matter and provided it to plant. Nano fertilizer affected significantly on 2g L⁻¹ and 4g L⁻¹ (49.1 and 48.2) Cm. that results showed affectivity of nano fertilizer and contained high levels of Macro and Micronutrients, this results was in contrast with Shashidara *et al* (2015) that nano fertilizer improved growth and yield of cereal . There are not significantly differences between foliar and soil application. Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (51.1 Cm). 4:1 with foliar application affected significantly for 50Cm. Nano fertilizer and two methods of application are equal significant effect at 2g L⁻¹ soil (49 Cm) and 4g L⁻¹ foliar (49.2 Cm). The third interaction affected

significantly on 4:1 * 4g L⁻¹ * foliar (52 Cm).

Pods per plant

A results in table 3 showed significantly differences on pods per plant 12.95 at 4:1 abstract of organic matter, May be because abstracted most of material and elements of organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ (14.27) pods per plant, That because nano fertilizer was high efficiency and contained high levels of Macro and Micronutrients. A significantly differences for foliar application at pods per plant (12.79). Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (14.27) pods per plant. 4:1 with soil application affected significantly for 13.2 pods per plant. Nano fertilizer and foliar application are significant effect at 4g L⁻¹ foliar (13,67) pods per plant. the third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar (14.71) pods per plant.

Weight of 100 seed

A results in table 4 showed significantly differences on weight of 100 seed 157 g at 4:1 abstract of organic matter, May be because this organic abstract contains most of material and elements of organic matter and provided it to plant. Nano fertilizer affected significantly on 2g L⁻¹ and 4g L⁻¹ (148.22 and 156.06) gm. that results because affectivity of nano fertilizer and contained high levels of Macro and Micronutrients. foliar application affected significantly for 149.67 gm, because absorbed more elements than soil application. Interaction between

Table 2 : Effect of levels and methods of application for abstract of organic matter and nano fertilizer on plant height cm.

Abstract of OM OM	Nano fertilizer N	Method of application M			OM	M	
		Soil	Foliar			Soil	Foliar
2 : 1	0	46.0	45.8		2:1	47.4	47.2
Water : organicmatter	2gL ⁻¹	48.2	47.5		3:1	48.0	47.5
	4gL ⁻¹	48.1	48.1		4:1	49.1	50.1
					Range	48.2	48.2
3 : 1	0	47.8	47.1		N	Soil	Foliar
	2gL ⁻¹	47.4	48.1		0	47.3	47.1
	4gL ⁻¹	48.7	47.5		2gL ⁻¹	48.2	48.2
4 : 1	0	48.1	48.4		4gL ⁻¹	49.0	49.2
	2gL ⁻¹	48.9	49.0		-	-	-
	4gL ⁻¹	50.2	52.0		-	-	-
OM	Nanofertilizer	-	-	-	-	LSD OM=0.421	
	0	2 g L ⁻¹	4 g L ⁻¹	Range	-	LSD N = 0.421	
2 : 1	45.9	47.8	48.1	47.3	-	LSD M = 0.343	
3 : 1	47.5	47.8	48.1	47.8	-	LSD OM * N = 0.728	
4 : 1	48.2	49.0	51.1	49.4	-	LSD OM * M = 0.595	
Range	47.2	48.2	49.1	-	-	LSD M * N = 0.595	
					-	LSD OM * M * N =.030	

Table 3 : Effectof levels and methods of application for abstract of organic matter and nano fertilizer on pods plant¹ no.

Abstract of OM OM	Nano fertilizer N	Method of application M			OM	M	
				Soil		Foliar	
		Soil	Foliar				
					2:1	10.37	10.57
2 : 1 Water : organicmatter	0	9.17	9.12		3:1	12.41	12.72
	2gL ⁻¹	10.58	10.99		4:1	13.24	12.66
	4gL ⁻¹	11.36	11.61		Range	11.81	12.79
3 : 1	0	10.23	10.31		N	Soil	Foliar
	2gL ⁻¹	12.80	13.15		0	10.19	10.37
	4gL ⁻¹	14.20	14.70		2gL ⁻¹	12.12	12.49
4 : 1	0	11.17	11.69		4gL ⁻¹	13.13	13.67
	2gL ⁻¹	12.98	13.33	-	-	-	-
	4gL ⁻¹	13.83	14.71	-	-	-	-
OM	Nanofertilizer	-	-	-	-	LSD OM=0.182	
	0	2 g L ⁻¹	4 g L ⁻¹	Range	-	LSD N = 0.182	
2 : 1	9.14	10.79	11.48	10.47	-	LSD M = 0.149	
3 : 1	10.27	12.97	14.45	12.56	-	LSD OM * N = 0.316	
4 : 1	11.43	13.15	14.27	12.95	-	LSD OM * M = 0.280	
Range	10.28	12.30	13.40	-	-	LSD M * N = 0.280	
					-	LSD OM * M * N =0.447	

Table 4 : Effectof levels and methods of application for abstract of organic matter and nano fertilizer on weight of 100 seed gm.

Abstract of OM OM	Nano fertilizer N	Method of application M			OM	M	
				Soil		Foliar	
		Soil	Foliar				
					2:1	139.22	140.11
2 : 1 Water : organicmatter	0	134.67	134.33		3:1	1520.00	152.00
	2gL ⁻¹	138.00	139.67		4:1	157.11	156.89
	4gL ⁻¹	145.00	146.33		Range	148.78	149.67
3 : 1	0	142.00	142.33		N	Soil	Foliar
	2gL ⁻¹	149.67	153.00		0	143.33	143.44
	4gL ⁻¹	158.00	160.67		2gL ⁻¹	147.56	148.89
4 : 1	0	153.33	153.67		4gL ⁻¹	155.44	156.67
	2gL ⁻¹	155.00	154.00	-	-	-	-
	4gL ⁻¹	163.00	163.00	-	-	-	-
OM	Nanofertilizer	-	-	-	-	LSD OM=0.733	
	0	2 g L ⁻¹	4 g L ⁻¹	Range	-	LSD N = 0.733	
2 : 1	134.50	138.83	145.67	139.67	-	LSD M = 0.599	
3 : 1	142.17	151.33	159.50	151.00	-	LSD OM * N = 1.270	
4 : 1	153.50	154.50	163.00	157.00	-	LSD OM * M = 1.037	
Range	143.39	148.22	156.06	-	-	LSD M * N = 1.037	
					-	LSD OM * M * N =1.796	

abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹(163) gm. 4:1 with foliar application affected significantly for 156 89 gm. Nano fertilizer and two methods of application are equal significant effect at 4g L⁻¹ soil (155.44 gm) and 4g L⁻¹ foliar (156.67 gm). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar and soil (163 gm).

Yield mega gram h⁻¹

A results in table 5 showed significantly differences on yield (4.69) mega gram h⁻¹ at 4:1 abstract of organic matter, May be because abstracted most of material and elements of organic matter and supplied to plant. Nano fertilizer affected significantly on 2g L⁻¹ and 4g L⁻¹ (4.32 and 4.72) mega gram h⁻¹, that results because affectivity

Table 5 : Effectof levels and methods of application for abstract of organic matter and nano fertilizer on seeds yield (mega gram h⁻¹).

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M		
		M				2:1	Soil	Foliar
		Soil	Foliar				3:1	4:1
						3.76	3.80	
2 : 1 Water : organicmatter	0	3.53	3.51		3:1	4.27	4.43	
	2gL ⁻¹	3.77	3.69		4:1	4.66	4.72	
	4gL ⁻¹	3.97	4.22		Range	4.23	4.32	
3 : 1	0	3.93	3.96		N	Soil	Foliar	
	2gL ⁻¹	4.31	4.38		0	3.79	3.79	
	4gL ⁻¹	4.61	4.94		2gL ⁻¹	4.31	4.33	
4 : 1	0	3.92	3.91		4gL ⁻¹	4.60	4.84	
	2gL ⁻¹	4.85	4.92	-	-	-	-	
	4gL ⁻¹	5.20	5.34	-	-	-	-	
OM	Nanofertilizer	-	-	-	-	LSD OM=0.0751		
	0	2 g L ⁻¹	4 g L ⁻¹	Range	-	LSD N = 0.0751		
2 : 1		3.52	3.73	4.10	3.78	-	LSD M = 0.0613	
3 : 1		3.95	4.35	4.35	4.36	-	LSD OM * N = 0.1300	
4 : 1		3.91	4.86	4.86	4.69	-	LSD OM * M = 0.1062	
Range		3.79	4.32	4.72	-	-	LSD M * N = 0.1062	
						-	LSD OM * M * N =0.1839	

Table 6 : Effectof levels and methods of application for abstract of organic matter and nano fertilizer on nitrogen seed percentage %.

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M		
		M				2:1	Soil	Foliar
		Soil	Foliar				3:1	4:1
						2.82	2.82	
2 : 1 Water : organicmatter	0	2.50	2.53		3:1	2.90	2.72	
	2gL ⁻¹	2.80	2.70		4:1	2.41	3.13	
	4gL ⁻¹	3.17	3.23		Range	3.04	2.89	
3 : 1	0	2.40	2.30		N	Soil	Foliar	
	2gL ⁻¹	2.70	2.57		0	2.51	2.44	
	4gL ⁻¹	3.60	3.30		2gL ⁻¹	3.03	2.82	
4 : 1	0	2.63	2.50		4gL ⁻¹	3.59	3.41	
	2gL ⁻¹	3.60	3.20	-	-	-	-	
	4gL ⁻¹	4.00	3.70	-	-	-	-	
OM	Nanofertilizer	-	-	-	-	LSD OM=0.141		
	0	2 g L ⁻¹	4 g L ⁻¹	Range	-	LSD N = 0.141		
2 : 1		2.52	2.75	3.20	2.82	-	LSD M = 0.115	
3 : 1		2.35	2.63	3.45	2.81	-	LSD OM * N = 0.244	
4 : 1		2.57	3.40	3.85	3.27	-	LSD OM * M = 0.199	
Range		2.49	2.93	3.50	-	-	LSD M * N = 0.244	
						-	LSD OM * M * N =0.345	

of nano fertilizer and contained high levels of Macro and Micronutrients. foliar application affected significantly for 4.32 mega gram h⁻¹, because absorbed more elements than soil application. Interaction between abstract of organic matter and nano fertilizer are affected significantly on 3:1 and 4g L⁻¹ and not different than 4:1 and 4gm L⁻¹ (4.86) mega gram h⁻¹. 4:1 with foliar application affected significantly (4.72) mega gram h⁻¹. Nano fertilizer and

foliar application are significant effect at 4g L⁻¹ foliar (4.84 mega gram h⁻¹) and 4g L⁻¹ soil application (4.60 mega gram h⁻¹). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar (5.34) mega gram h⁻¹.

Percentage of N in seed %

A results in table 6 showed significantly differences on percentage of N in seed at 4:1 abstract of organic matter

Table 7 : Effectof levels and methods of application for abstract of organic matter and nano fertilizer on phosphor seeds percentage %.

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M		
		M				2:1	Soil	Foliar
		Soil	Foliar					
2 : 1	0	0.333	0.333		3:1	0.366	3.53	
Water : organicmatter	2gL ⁻¹	0.357	0.350		4:1	0.372	0.349	
	4gL ⁻¹	0.407	0.377		Range	0.442	0.421	
						0.393	0.374	
3 : 1	0	0.343	0.327		N	Soil	Foliar	
	2gL ⁻¹	0.370	0.333		0	0.340	0.377	
	4gL ⁻¹	0.403	0.387		2gL ⁻¹	0.392	0.371	
4 : 1	0	0.343	0.320		4gL ⁻¹	0.448	0.423	
	2gL ⁻¹	0.450	0.430	-	-	-	-	
	4gL ⁻¹	0.533	0.513	-	-	-	-	
OM	Nanofertilizer	-	-	-	-	LSD OM=0.015		
	0	2 g L ⁻¹	4 gL ⁻¹	Range	-	LSD N = 0.015		
2 : 1	0.333	0.353	0.392	0.359	-	LSD M = 0.012		
3 : 1	0.335	0.352	0.395	0.361	-	LSD OM * N = 0.026		
4 : 1	0.332	0.440	0.523	0.432	-	LSD OM * M = 0.021		
Range	0.333	0.382	0.437	-	-	LSD M * N = 0.021		
				-		LSD OM * M * N =0.037		

Table 8 : Effectof levels and methods of application for abstract of organic matter and nano fertilizer on potassium seeds percentage%.

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M		
		M				2:1	Soil	Foliar
		Soil	Foliar					
2 : 1	0	1.313	1.290		3:1	1.354	1.318	
Water : organicmatter	2gL ⁻¹	1.370	1.333		4:1	1.402	1.353	
	4gL ⁻¹	1.380	1.330		Range	1.659	1.609	
						1.472	1.427	
3 : 1	0	1.343	1.300		M	Soil	Foliar	
	2gL ⁻¹	1.400	1.330		0	1.342	1.310	
	4gL ⁻¹	1.463	1.430		2gL ⁻¹	1.504	1.450	
4 : 1	0	1.370	1.340		4gL ⁻¹	1.569	1.520	
	2gL ⁻¹	1.743	1.687	-	-	-	-	
	4gL ⁻¹	1.863	1.800	-	-	-	-	
OM	Nanofertilizer	-	-	-	-	LSD OM=0.0294		
	0	2 g L ⁻¹	4 gL ⁻¹	Range	-	LSD N = 0.0294		
2 : 1	1.302	1.352	1.355	1.336	-	LSD M = 0.0240		
3 : 1	1.322	1.365	1.447	1.378	-	LSD OM * N = 0.0509		
4 : 1	1.355	1.715	1.832	1.634	-	LSD OM * M = 0.415		
Range	1.326	1.477	1.544	-	-	LSD M * N = 0.0415		
				-		LSD OM * M * N =0.0719		

reached 3.27 %, that may be contains high amount of material and elements of organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ at 3.50 %. that because affectivity of nano fertilizer and contained high levels of Macro and Micronutrients. soil

application affected significantly for 3.03 %. Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (3.85 %). 4:1 with foliar application affected significantly for 3.13 %. Nano fertilizer and two methods of application are equal

Table 9 : Effect of levels and methods of application for abstract of organic matter and nano fertilizer on N uptake kg h⁻¹.

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M		
		M				2:1	Soil	Foliar
		Soil	Foliar					
2 : 1 Water : organicmatter	0	88.25	88.80		3:1	106.32	107.16	
	2gL ⁻¹	105.56	99.63		4:1	123.83	120.50	
	4gL ⁻¹	125.85	136.31		Range	158.91	147.74	
3 : 1	0	94.32	91.08		N	Soil	Foliar	
	2gL ⁻¹	116.37	112.57		0	128.59	124.85	
	4gL ⁻¹	165.96	163.02		2gL ⁻¹	130.60	122.11	
4 : 1	0	103.96	97.75		4gL ⁻¹	165.14	165.04	
	2gL ⁻¹	174.60	157.44	-	-	-	-	
	4gL ⁻¹	208.00	197.58	-	-	-	-	
OM	Nanofertilizer	-	-	-	-	LSD OM=10.58		
	0	2 g L ⁻¹	4 gL ⁻¹	Range	-	LSD N = 10.58		
2 : 1	88.74	102.58	131.20	106.60	-	LSD M = 7.04		
3 : 1	92.83	114.41	165.26	122.52	-	LSD OM * N = 19.89		
4 : 1	100.49	165.24	202.90	153.36	-	LSD OM * M = 16.56		
Range	94.37	126.58	165.20	-	-	LSD M * N = 16.56		
				-		LSD OM * M * N =26.59		

Table 10 : Effect of levels and methods of application for abstract of organic matter and nano fertilizer on P uptake kg h⁻¹.

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M		
		M				2:1	Soil	Foliar
		Soil	Foliar					
2 : 1 Water : organicmatter	0	11.69	11.69		3:1	13.76	13.41	
	2gL ⁻¹	13.46	12.92		4:1	15.88	16.48	
	4gL ⁻¹	16.16	15.91		Range	20.58	19.87	
3 : 1	0	13.36	12.95		N	Soil	Foliar	
	2gL ⁻¹	15.95	14.59		0	16.62	16.16	
	4gL ⁻¹	18.58	19.12		2gL ⁻¹	12.89	12.77	
4 : 1	0	13.45	12.51		4gL ⁻¹	16.90	16.06	
	2gL ⁻¹	21.83	21.16	-	-	20.61	20.47	
	4gL ⁻¹	27.72	27.39	-	-	-	-	
OM	Nanofertilizer	-	-	-	-	LSD OM=6.57		
	0	2 g L ⁻¹	4 gL ⁻¹	Range	-	LSD N =6.57		
2 : 1	11.72	13.17	16.07	13.57	-	LSD M = 4.22		
3 : 1	13.23	15.31	18.92	15.74	-	LSD OM * N = 12.97		
4 : 1	12.98	21.38	27.56	20.26	-	LSD OM * M = 10.86		
Range	12.62	16.50	20.63	-	-	LSD M * N = 12.97		
				-		LSD OM * M * N =15.93		

significant effect at 4g L⁻¹ soil (3.59 %) and 4g L⁻¹ foliar (3.41 %). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar and soil (3.70 and 4.00 %).

Percentage of P in seed %

A results in table7 showed significantly differences on percentage of N in seed at 4:1 abstract of organic matter reached 0.432 %, that may be contains high amount of phosphorous in organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ at 0.437

Table 11 : Effect of levels and methods of application for abstract of organic matter and nano fertilizer on K uptake kg h^{-1} .

Abstract of OM OM	Nano fertilizer N	Method of application			OM	M	
		M				Soil	Foliar
		Soil	Foliar				
					2:1	50.91	50.08
2 : 1 Water : organicmatter	0	46.45	45.28		3:1	59.87	59.94
	2gL ⁻¹	51.65	49.19		4:1	77.31	75.94
	4gL ⁻¹	54.79	56.13		Range	62.27	61.65
3 : 1	0	52.78	51.48		N	Soil	Foliar
	2gL ⁻¹	60.34	58.25		0	50.86	49.65
	4gL ⁻¹	67.44	70.64		2gL ⁻¹	64.82	62.79
4 : 1	0	53.70	52.39		4gL ⁻¹	72.17	73.57
	2gL ⁻¹	84.54	83.00	-	-	-	-
	4gL ⁻¹	96.88	96.12	-	-	-	-
OM	Nanofertilizer	-	-	-	-	LSD OM=9.31	
	0	2 g L ⁻¹	4 gL ⁻¹	Range	-	LSD N = 9.31	
2 : 1	45.83	50.43	55.56	50.50	-	LSD M = 7.65	
3 : 1	52.22	59.38	69.31	60.08	-	LSD OM * N = 18.45	
4 : 1	52.98	83.35	96.55	76.63	-	LSD OM * M = 16.74	
Range	50.26	63.81	72.88	-	-	LSD M * N = 16.74	
				-	-	LSD OM * M * N =23.76	

%. that results because affectivity of nano fertilizer and contained high levels of P. soil application affected significantly for 0.393 %. Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (0.423 %). 4:1 with soil application affected significantly for 0.442 %. Nano fertilizer and two methods of application are equal significant effect at 4g L⁻¹ soil (0.448 %) and 4g L⁻¹ foliar (0.423 %). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar and soil (0.533 and 0.513 %).

Percentage of K in seed %

A results in table 8 showed significantly differences on percentage of K in seed at 4:1 abstract of organic matter reached 1.634%, that may be contains high amount of potassium in organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ at 1.544 %. that results because affectivity of nano fertilizer and contained high levels of K. soil application affected significantly for 1.472 %. Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (1.832 %). 4:1 with soil application affected significantly for 1.342 %. Nano fertilizer and two methods of application is significant effect at 4g L⁻¹ soil (1.569 %). the third interaction affected significantly on 4:1 * 4g L⁻¹ * soil application (1.863 %).

Up take of N

A results in table 9 showed significantly differences

on up take of N at 4:1 abstract of organic matter reached 153.36 kg h^{-1} , that may be high amount of nitrogen in organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ at 165.20 kg h^{-1} . that results because affectivity of this nano fertilizer and contained high levels of N, this results was in contrast with Prem (2015) that showed for Nano fertilizer increasing elements uptake. soil application affected significantly for 128.59. Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (202.90 kg h^{-1}). 4:1 with soil application affected significantly for 158.91 kg h^{-1} . Nano fertilizer and two methods of application are equal significant effect at 4g L⁻¹ soil (165.14 kg h^{-1}) and 4g L⁻¹ foliar (165.04 kg h^{-1}). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar and soil (197.58 and 208 kg h^{-1}).

Up take of P

A results in table (10) showed significantly differences of P up take at 4:1 abstract of organic matter reached 20.26 kg h^{-1} , that may be contains high amount of phosphorous in organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ at 20.63 kg h^{-1} . that results because affectivity of nano fertilizer and contained high levels of P. soil application affected significantly with 16.62 kg h^{-1} . Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (27.56 kg h^{-1}). 4:1 with soil application affected significantly with 20.58 kg h^{-1} .

Nano fertilizer and two methods of application are equal significant effect at 4g L⁻¹ soil (20.61 kg h⁻¹) and 4g L⁻¹ foliar (20.47 kg h⁻¹). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar and soil (27.39 and 27.72 kg h⁻¹).

Up take of K

A results in table 11 showed significantly differences on up take of N in seed at 4:1 abstract of organic matter reached 76.63 kg h⁻¹, that may be contains high amount of potassium in organic matter and provided it to plant. Nano fertilizer affected significantly on 4g L⁻¹ at 72.88 kg h⁻¹. that results because affectivity of nano fertilizer and contained high levels of K. soil application affected significantly with 62.27 kg h⁻¹. Interaction between abstract of organic matter and nano fertilizer are significantly on 4:1 and 4g L⁻¹ (96.55 kg h⁻¹). 4:1 with soil application affected significantly with 77.31kg h⁻¹. Nano fertilizer and two methods of application are equal significant effect at 4g L⁻¹ soil (172.17 kg h⁻¹) and 4g L⁻¹ foliar (173.57 kg h⁻¹). The third interaction affected significantly on 4:1 * 4g L⁻¹ * foliar and soil (96.88 and 96.12 kg h⁻¹).

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