





**Table 3:** Effect of some biofertilizer on the relative/percentage of protein fractions of wheat grains

varieties	Treatments	Protein soluble fractions					Insoluble protein
		Albumins	Globulins	prolamins	Glutelins	Total	
Gimmaza10	1-control	15.02	18.66	1.42	18.40	53.50	46.46
	2-power max	17.28	22.44	2.65	10.39	52.76	47.24
	3-citreen	14.11	15.78	3.28	9.88	43.05	56.95
	4-Ectavol	15.28	13.85	1.22	8.26	38.61	61.39
Gimma11	1-control	13.46	16.67	1.35	17.52	49.00	51.00
	2-power max	16.24	15.11	3.11	10.65	45.11	54.89
	3-citreen	16.85	12.82	4.22	8.96	42.85	57.10
	4-Ectavol	17.16	10.68	1.16	7.82	36.82	63.18
Sides12	1-control	14.28	17.75	1.44	16.45	49.92	50.08
	2-power max	16.16	20.85	3.66	13.82	54.49	45.51
	3-citreen	16.85	16.82	4.54	12.22	50.43	49.56
	4-Ectavol	17.88	14.75	1.25	11.84	45.52	54.48

Data presented in table (4) illustrated that, the amino acids content of wheat grains were affected by some biofertilizers; power max, Citreen and Ectavol. It can be seen that power max treatments generally increased the content of amino acids, except that the Sulphur amino acids which slightly decreased. On the other hand, spraying of wheat plants with citrine and Ectavol treatments decrease the most of amino acids. Also, it can be easily seen from the same table, aliphatic amino acids were increased by foliar application of power max treatments, but in this group alanine represented

comparatively the highest amount. In acidic amino acids group, it can be noticed that, aspartic acid and glutamic amino acids were decreased by spraying of Ectavol treatments. Also, from the same Table, the results showed that all treatments decreased the Sulphur amino acids. In addition, the difference in the amino acids in wheat grains as affected by biofertilizer treatments seems to be trivial within every cultivar. Generally, it can be noticed that all

**Table 4:** Effect of some biofertilizer on the content of amino acids in wheat grains (gm/100gm).

varities	treatments	Aliphatic A.A				Acidic A.A			Basic A.A			Aromatic A.A			Hetero A.A			Sulphur A.A		
		Glycine	Alanine	Valine	total	Aspartic	Glutamic	Total	lysine	Arginine	pTotal	Tyrosine	Phenyl alanine	Total	proline	HHistidine	TTTotal	Methionine	eystein	Total
Gimmaza 10	1-control	2.27	2.61	1.07	5.95	3.75	5.96	9.71	2.17	3.43	5.06	1.99	3.91	5.90	1.71	1.83	3.54	1.61	1.47	2.68
	2-power max	2.53	2.71	1.61	6.85	3.97	6.28	10.25	2.31	3.51	5.82	1.53	4.07	5.60	1.77	2.19	3.94	1.49	1.03	2.52
	3-citreen	2.11	2.01	1.40	5.52	3.91	5.96	9.87	2.39	3.43	5.82	1.59	4.00	5.59	1.69	1.83	3.52	1.54	1.00	2.54
	4-Ectavol	1.73	2.07	1.29	5.09	3.51	5.69	9.20	2.29	2.97	5.20	1.41	3.81	5.22	1.53	1.99	3.52	1.40	0.94	2.34
Gimmaza 11	1-control	2.42	2.76	1.62	6.80	3.88	6.12	10.00	2.32	3.58	5.90	2.04	4.06	6.10	1.86	1.44	3.85	1.76	1.22	2.98
	2-power max	2.68	2.86	1.76	7.30	4.12	6.43	10.55	2.46	3.66	6.12	1.68	4.22	5.90	1.92	2.22	4.14	1.64	1.18	2.82
	3-citreen	2.26	2.56	1.55	6.35	4.06	6.11	10.17	2.54	3.58	6.12	1.74	4.15	5.84	1.74	1.98	3.72	1.86	1.18	2.86
	4-Ectavol	1.88	2.22	1.44	5.54	3.65	5.84	9.49	2.44	4.02	6.46	1.56	3.96	5.52	1.68	2.04	3.72	1.55	1.09	2.64
Sides 12	1-control	2.28	2.68	1.78	6.54	3.52	5.72	9.24	2.35	3.66	6.01	1.74	4.06	5.80	2.02	1.86	3.39	1.67	1.32	2.99
	2-power max	2.58	3.01	1.84	7.43	3.78	5.94	9.72	2.44	3.82	6.26	1.85	4.24	6.09	1.98	1.76	3.74	1.64	1.18	2.82
	3-citreen	2.42	2.84	1.65	6.91	3.74	5.55	9.29	2.18	3.82	6.00	1.88	3.96	5.84	1.74	1.68	3.42	1.58	1.14	2.72
	4-Ectavol	2.64	3.01	1.78	7.43	3.88	5.72	9.60	2.22	4.19	6.41	1.48	4.15	5.63	2.08	1.76	3.84	1.64	1.14	2.78

Treatments improved the contents of some amino acids which are important in some bioprocess. This increase may be due to the increase in amino acyl transfer RNA synthesis and to the increase in content and activity of enzymes. These results are in agreement with those stated by [27], who found that, wheat grains content from total amino acids, protein and total indoles were increased due to the biofertilizer treatments in all wheat cultivar

It can be observed in table(5) that there was a decreasing effect of biofertilizer treatments on the reducing sugars a decreasing wheat grains met by a parallel increasing effect on the non-reducing sugars. This may lead to a conclusion that biofertilizer might have affected the synthesis of the

oligosaccharides. The total soluble sugar content was also increased by biofertilizer treatment revealing that the decrease in the reducing sugars content, because of biofertilizer inhibitory effect on the synthesis of the monosaccharide's, but stimulating effect on oligosaccharides synthesis.

**Table 5:** Effect of some biofertilizer on the content of carbohydrate fractions of wheat grains (gm/100gm).

Verities	Treatmens	Sugars fractions			Carbohydrates		Starch
		R.S	N.R.S	T.S	Insoluble	Total	
Gimmaza	1-Contrl	1.25	1.72	2.97	58.65	61.82	51.75

10	2- power max	1.10	2.08	3.18	59.50	62.68	52.55
	3- Citrine	1.08	2.17	3.25	60.03	63.28	53.42
	4-Ectavol	1.04	2.28	3.32	60.66	63.98	55.11
Gimmaza 11	1-Contrl	1.32	1.82	3.14	58.80	61.94	52.13
	2- power max	1.21	2.12	3.33	58.65	61.98	52.64
	3- Citrine	1.11	2.06	3.17	60.51	63.68	53.43
	4-Ectavol	1.18	2.16	3.34	60.78	64.12	55.82
Sides 12	1-Contrl	1.28	1.89	3.17	58.71	61.88	52.26
	2- power max	1.16	2.03	3.19	58.47	61.66	52.82
	3- Citrine	1.10	2.11	3.21	60.33	63.54	53.18
	4-Ectavol	1.08	2.18	3.26	60.88	64.14	53.92

A similar effect might be concluded for biofertilizer on the synthesis of polysaccharides since there were generally pronounced increase in the insoluble carbohydrates and starch content of wheat grains of plants treated with biofertilizer regards of the cultivars. These increase resulted in enhancing the total carbohydrates content of wheat grains. Comparing the three cultivars shows that, all variety of wheat were at the same highly responsive level. Also, from

the same table showed that spraying of Ectavol treatments induced the highest increase in total carbohydrate and starch content, while the power max treatments caused a reducing effect when compared with other treatments. The biofertilizers favorable effect on the synthesis of polysaccharides was previously reported on the other plants [28], who found that a combination of organic and biofertilizer treatments increased chlorophyll, growth, carbohydrates content compared with control.

The chemical analysis of grains showed the presence of four sugars as shown in table (6). The percentage of disaccharides relatively increased by spraying all treatment and the highest increase of disaccharides resulted by Citreen and Ectavol treatments. Whereas the lowest values recorded by spraying power max treatments. On the other hand the percentage of monosaccharides relatively decreased by adding of all biofertilizer treatments and the highest decrease of monosaccharides resulted by citrine treatments, the positive effect of biofertilizer treatments on sugars were previously reported [29], who found that, wheat grains content from total sugars were increased due to biofertilizer treatments in both wheat grains.

**Table 6:** Effect of some biofertilizer on the percentage of free sugars in wheat grains.

varieties	Treatmnts	Mono saccharides			Disaccharides			Mon / Di ratio
		Glucose	fructose	Total	Maltose	sucrose	Total	
Gimmaza10	1-control	0.085	0.145	0.230	1.110	0.190	1.300	0.177
	2-power max	0.072	0.135	0.207	1.140	0.190	1.337	0.155
	3-citreen	0.075	0.130	0.205	1.160	0.240	1.400	0.146
	4-Ectavol	0.075	0.136	0.211	1.215	0.210	1.425	0.148
Gimmaza11	1-control	0.075	0.139	0.214	1.120	0.195	1.315	0.163
	2-power max	0.075	0.135	0.210	1.235	0.205	1.440	0.146
	3-citreen	0.064	0.135	0.199	1.300	0.214	1.514	0.131
	4-Ectavol	0.064	0.130	0.194	1.250	0.205	1.455	0.133
Sides 12	1-control	0.080	0.142	0.222	1.125	0.195	1.320	0.168
	2-power max	0.075	0.135	0.210	1.310	0.186	1.496	0.140
	3-citreen	0.070	0.138	0.208	1.325	0.195	1.520	0.137
	4-Ectavol	0.079	0.135	0.210	1.300	0.190	1.490	0.141

Ferinograph data presented in Table (7) show some Physical properties namely, the adsorption percentage of dough consistency, dough development, dough stability and weakening of the gluten. It can be clear that all treatments have a little decreasing effect on the water adsorption percentage, the dough development and the stability time of dough as compared with control. Also, it can be noticed the power

max treatment increased the weakening of gluten (B.u), but spraying Ectavol treatments slightly decrease the weakening of gluten as compared with control. These results are nearly similar to the previous results obtained when used all cultivars of wheat grains.

**Table 7:** Effect of some biofertilizer on some physical properties of wheat flour

Varieties	Treatments	Adsorption%	Time of dough development	Dough of stability time(Min)	Weaking of gluten(B.u)
Gimmaza10	1-control	66.8	3.00	2.25	125
	2-power max	66.2	2.50	2.00	130
	3-citreen	66.0	2.00	1.50	120
	4-Ectavol	66.2	2.25	1.25	120
Gimmaza11	1-control	65.4	3.25	2.50	130
	2-power max	65.0	2.75	2.00	135
	3-citreen	65.2	2.25	1.50	130
	4-Ectavol	65.4	2.50	2.00	120
Sides 12	1-control	65.8	3.25	2.50	120
	2-power max	65.4	3.25	2.25	135
	3-citreen	65.0	2.50	2.25	125
	4-Ectavol	65.0	2.75	2.00	125

Data in Table (8) show the percentage of P, K, Ca, and Mg in wheat grains. The all minerals percentage of wheat grains were increased by all treatments and the increase was greater

in Ectavol treatment than other treatments. These results are in agreement with those obtained by [30].

**Table 8:** Effect of some biofertilizer on the content of P, K, Ca and Mg of wheat grains.(gm/100gm).

Varieties	Treatments	phosphorus	potassium	calcium	Magnesium
Gimmaza10	1-control	0.56	1.58	0.84	0.51
	2-power max	0.59	1.62	0.84	0.55
	3-citreen	0.59	1.64	0.82	0.52
	4-Ectavol	0.62	1.71	0.86	0.57
Gimmaza11	1-control	0.55	1.54	0.83	0.50
	2-power max	0.58	1.58	0.84	0.52
	3-citreen	0.55	1.62	0.86	0.54
	4-Ectavol	0.60	1.72	0.86	0.57
Sides 12	1-control	0.58	1.59	0.84	0.53
	2-power max	0.59	1.61	0.85	0.53
	3-citreen	0.61	1.61	0.87	0.55
	4-Ectavol	0.64	1.78	0.88	0.57

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