



# Effectiveness of Brassinolide and Dry Yeast Extract Spraying on Growth Parameters and the Chemical Content of the Grape Seedlings

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**Abstract:** The study was conducted to identify the physiological effect of spraying with Brassinolide and addition methods of active dry yeast on growth parameters and the chemical content of the grape seedlings (Summer Royal CV). The factor is spraying with Brassinolide with three levels (0, 4, 8  $\text{gm l}^{-1}$ ), while the sub factor include four methods of spraying with dry yeast extracts is (spraying with water only, spraying on leaves, soil, leaves and soil). The spraying with Brassinolide showed a significant influence on all characters studied (seedling length, stem diameter, leaves number, leaf area, chlorophyll content in leaves, dry weight of shoot and root system and nutrient concentration (NPK) in leaves. The 8  $\text{gm l}^{-1}$  gave a significant increase in all studied characters as compared to the control. However, the addition of dry yeast extract showed a significant influence on all characters spraying on leaf and soil gave a significant increase. The interaction 8  $\text{gm l}^{-1}$  with leaf and soil spraying was effective combination.

**Keywords:** Grape, Summer royal, Brassinolide, Dry yeast extract

Grapes, *Vitis vinifera* L. is grown extensively in the tropical to temperate area (AL-Saidi 2000). The world's cultivated area is estimated at 8.8 million hectares, and the global production is 6.89 million tons (FAO 2012). Grapes nutritional value extracted from juice, containing vitamins, mineral, sugars, organic acids, salts, proteins, fats, etc. in addition to its importance in medical uses in the treatment of many diseases (Chevalieh 2010). Samar Royal is a seedless seed early maturity needs 200 hours of coolness at a temperature of 7°C. In order to increase the value of this product spraying plant growth regulators is of great importance in improving the growth parameters and increase the quantity and quality (Rajni and Deol 2015). Brassinosteroids a growth regulator known as a raw fatty extract extracted from *Brassica nupus*, as detected in pollen, another, seeds, leaves, stems, roots and flowers of other plants, are also available in plants on the free form or linked with sugars or fatty acids were extracted about 70 steroid compounds from plants. (Al-Hadethi 2015) found that the spray of growth regulator Brassinolide had a significant effect in increasing the vegetative growth characteristics of apricot trees. (Al-Jumaily and Al-esawi 2016) found that Brassinolide has a significant effect on vegetative growth of apple trees. Biofertilizations is one of the topics that had received great attention in recent years due to its similar effect to organic fertilizers in reducing environmental pollution and health damage to humans and animals (Dilpreet et al 2016). The yeast (*Saccharomyces cerevisiae*) of the fungi (Ascomycota) of the family Saccharomycetaceae, and the dry yeast is a living organism, fungi (Lateifa 2012). This study was

conducted to investigate the physiological effect of the growth regulator of Brassinolide, addition method of dry yeast extracts and its interaction with the vegetative and root growth parameters and the chemical content of the Summer Royal grape seedlings.

## MATERIAL AND METHODS

This research was carried out at Horticulture Station and Forestry Ministry of Agriculture, Al-Mahaweel, Babylon in season 2016 on the Summer Royal grape seedlings, 180 seedlings were selected, one year old and homogeneous as possible in size, vegetative growth and growing in sandy loam soil, planted with black plastic bags made of polyethylene with a capacity of 1.75 kg, it was transferred on 10/2/2016 to bags measuring 30 \* 25 cm and a capacity of 5.25 kg and was filled with sandy loam soil (Table 1). The research was carried out as a factorial experiment with two factors and three replicates, the first factor was the spraying of the growth regulator Brassinolide at three levels (0, 4, 8)  $\text{mg l}^{-1}$  the second factor was four methods to add the dry yeast extract (spraying the vegetative with water only, spraying on the vegetative, spraying on the soil surface, spraying on the vegetative + the soil surface  $\text{gl}^{-1}$ ). The dry yeast extract produced by Turkish company Lesaffre was prepared by taking 8g dry yeast per liter of warm water with 1: 1 sugar addition to activate and double dry yeast, kept for 24 hours and mixed for 5 minutes (EL-Tohamy et al 2009), and filtered and use the leachate to spray the seedlings until the full wet (Table 2). Brassinolide was four sprayed on April 1, 20 and

May 10 and 30/T The dry yeast extracts was sprayed after 5 days from each date of spraying with Brassinolide using a 2 liter hand spray and added. The measurements of the straits were taken, and the data was analyzed using the Genestate statistical program.

**First vegetative characteristics include:** High seedling, stem diameter, leaf area  $\text{dm}^2$ , chlorophyll content of the leaves SPAD unit according to the method in (Felixloh and Bassuk 2000), total leaves number seedling<sup>-1</sup>, dry weight of vegetative and root groups were measured.

**Table 1.** Physical and chemical property of soil

Parameter	Result analysis
Electrical conductivity EC (extract 1-1)	1.22 DSm <sup>-1</sup>
Soil reaction pH (Extract 1-1)	6.9
Sand	870 g kg <sup>-1</sup>
silt	43 g kg <sup>-1</sup>
Clay	87 g kg <sup>-1</sup>
Soil texture	Sandy loam
Nitrogen	24.79 mg kg <sup>-1</sup> soil
Phosphorus	0.47 mg kg <sup>-1</sup> soil
Potassium	29.90 mg kg <sup>-1</sup> soil

**The percentage of NPK was estimated in leaves using standard method.** The N was estimated by method of Haynes (1980), P by Page et al (1982) and K by flame photometer by method (Erwin and Houba 2004).

## RESULTS AND DISCUSSION

**Vegetative characteristics:** The Brassinolide at 8 mg l<sup>-1</sup> caused a significant increase in seedling height, stem diameter, leaf area, leaves number, leaf content of chlorophyll and dry weight of shoot and root (Table 3) as compared to 0.4 mg l<sup>-1</sup>, which gave the lowest rate, the growth regulator Brassinolide has a similar effect to the auxins, gibberellins and cytokinins this regulates many cellular and physiological processes that occur in plants such as cell elongation and division, resistance to stress and bio-processing of cell wall components, manufacture of nucleic acids DNA, RNA and various proteins, nitrogen fixation, differentiation of vascular system, adventitious roots, etc. (Al-Khafaji 2014), which caused an increase in the characteristics of vegetative growth above. The increase in chlorophyll leaf content may be due to inhibited action of chlorophyllase enzyme responsible for the degradation of chlorophyll, which led to the accumulation of chlorophyll in

**Table 2.** Bread yeast components *Sacchomyce cervisiae*

Seq.	Amino Acids (mg. g <sup>-1</sup> )	0.2	K %	0.18
0.1	Glycine	0.103	0.3	Na %
0.2	Alanine	0.132	0.4	Mg %
0.3	Valine	0.312	0.5	Ca %
0.4	Leucine	0.067	0.6	$\mu\text{gg}^{-1}\text{Mn}$
0.5	Isoleucine	0.421	0.7	$\mu\text{gg}^{-1}\text{Zn}$
0.6	Aspartic acid	0.274	0.8	$\mu\text{gg}^{-1}\text{Cu}$
0.7	Glutamic acid	0.367	0.9	$\mu\text{gg}^{-1}\text{Fe}$
0.8	Serine	0.523	Seq.	Vitamins (mg g <sup>-1</sup> )
0.9	Threonine	0.206	0.1	Vit. B1
0.1	Tyrosine	0.031	0.2	Vit. B2
0.11	Phenyl alanine	0.116	0.3	Vit. B6
0.12	Proline	0.041	0.4	Pantothenic acid
0.13	Arginine	0.073	0.5	Biotin
0.14	Lysine	0.089	0.6	Niacin
0.15	Cysteine	0.025	7	Inositol
0.16	Methionine	0.012	Seq.	Other ingredients (%)
17	Histidine	0.078	1	Total Nitrogen
0.18	Tryptophan	0.02	0.2	Carbohydrate
Seq.		Metal structure	3	Ash
0.1	P %		0.4	Water

\* The yeast components were analyzed at the Central Laboratory of the Bio Sciences University of Poland (Lublin)

the leaves (Fariduddin et al 2003). The dry weight gain may also be due to the potential impact of BRs on the CO<sub>2</sub> fixation in photosynthesis, which increases the CO<sub>2</sub> net represented in the leaf, which increases the efficiency of photosynthesis (Sadeghi and Shekafandeh 2014). These results are consistent with Al-Jumaily and Alesawi (2016) on apples, Al-Hadethi and AL-Dujaili (2015) on apricots, and Al-Dulaimy and Alrawi (2010) on pomegranates that the spraying of the Brassinosteroid positively affects in the vegetative characteristics of the fruit trees. The method of adding dry yeast extracts significantly affected the growth. The treatment of seedling spray with the yeast extracts on vegetative group and soil surface caused a significant increase in the above characteristics. These were compared to the spraying of the vegetative with water only. This is due to the effect of the dry yeast extract on the metabolic and biological processes of photosynthesis pigments (chlorophyll) and the effectiveness of photosynthesis enzymes, which causes the conversion of large amounts of light energy into chemical energy, producing larger amounts of carbohydrates and stimulating plant organs, especially leaves that store and distribute to

the rest of the plant parts (El-Sherbeny et al 2007). Interaction treatments had a significant effect on the above characteristics, 8 mg l<sup>-1</sup> yeast extracts spraying on vegetative group and soil surface caused a significant increase for the same characteristics, the increase may be due to the impact of combined factors.

**Nutrients (NPK%) in leaves:** Spray of Brassinolide had a significant effect on the percentage of NPK nutrients in leaves with 8 mg l<sup>-1</sup> treatment caused a significant increase (2.233%, 0.560%, 1.761%) respectively (Table 4). This may be due to the effect of Brassinolide, which is similar to auxins, gibberellins and cytokinins. This may also be due to increase the water transport and necessary nutrients for plant growth. This in turn increases the content of leaves of nutrients. Ruiz et al (2000) found that there is a close relationship between the amount of chlorophyll in the leaves and the accumulation of N in the dry matter. The results were agreed with AL-Ahbab (2010) on grapes, Abubakar et al (2013) on pomegranates and Al-Hadethi (2015) on apricots. The table showed that the yeast extracts spraying on vegetative group and soil surface was significantly affected in the above

**Table 3.** Effect of spraying with Brassinolide and method of adding dry yeast extracts on vegetative characteristics

Brassinolide mg l <sup>-1</sup>	Yeast extract g l <sup>-1</sup>	Plant height (cm)	Stem diameter (mm)	Leaf area (dsm <sup>2</sup> )	Leaves number	Leaves chlorophyll content SPAD	Dry weight of vegetative groups	Dry weight of root groups
B0 :0	Y0	81.12	8.7	30.33	11.28	28.12	21.22	10.42
	Y1	95.3	10.14	56.35	19.85	31.88	25.63	11.62
	Y2	86.22	9.13	45.31	16.41	30.45	23.61	12.53
	Y3	101.55	10.35	59.37	25.71	33.18	29.14	13.24
B1 :4	Y0	90.56	8.81	48.3	15.21	33.53	26.13	11.33
	Y1	110.11	10.25	60.36	22.68	35.77	29.52	12.49
	Y2	98.32	9.96	62.33	19.86	34.67	28.45	14.62
	Y3	118.23	11.43	90.05	28.6	36.8	31.47	15.42
B2 :8	Y0	120.22	9.55	50.39	18.37	35.16	30.42	13.46
	Y1	134.44	11.71	76.47	27.93	38.61	35.64	15.59
	Y2	127.65	10.74	69.33	24.6	37.32	33.69	17.79
	Y3	141.65	12.17	88.46	33.15	39.25	37.75	19.65
LSD at 5%		8.1	1.95	5.13	8.26	1.98	1.36	1.2
Brassinolide mg l <sup>-1</sup>	B0 :0	91.05	9.58	47.84	18.31	30.91	24.9	11.95
	B1 :4	104.31	10.11	65.26	21.59	35.19	28.89	13.47
	B2 :8	130.99	11.04	71.16	26.01	37.59	34.38	16.62
LSD at 5%		3.12	0.14	2.16	2.49	0.5	0.59	0.49
Yeast extract g l <sup>-1</sup>	Y0	97.3	9.02	43.01	14.95	32.27	25.92	11.74
	Y1	113.28	10.7	64.39	23.49	35.42	30.26	13.23
	Y2	104.06	9.94	58.99	20.29	34.15	28.58	14.98
	Y3	120.48	11.32	79.3	29.15	36.41	32.79	16.1
LSD at 5%		4.01	1.02	2.49	5.7	0.73	0.75	0.77

**Table 4.** Effects of spraying with Brassinolide and method of adding dry yeast extract in percentage of some nutrients in the leaves

Brassinolide mg l <sup>-1</sup>	Yeast extract g l <sup>-1</sup>	N%	P%	K%
B0 :0	Y0	1.624	0.302	1.262
	Y1	1.873	0.483	1.493
	Y2	1.885	0.461	1.461
B1 :4	Y0	1.831	0.404	1.453
	Y1	1.945	0.523	1.574
	Y2	1.925	0.494	1.594
B2 :8	Y0	1.981	0.544	1.483
	Y1	2.246	0.553	1.884
	Y2	2.242	0.543	1.773
LSD at 5%	Y3	2.017	0.606	1.904
	Y0	0.034	0.032	0.025
	Y1	1.905	0.442	1.47
Brassinolide mg l <sup>-1</sup>	B0 :0	1.905	0.442	1.47
	B1 :4	2.021	0.496	1.593
	B2 :8	2.233	0.56	1.761
LSD at 5%	Y0	0.017	0.016	0.012
	Y1	1.812	0.416	1.399
	Y2	2.021	0.52	1.65
Yeast extract g l <sup>-1</sup>	Y0	2.017	0.499	1.609
	Y1	2.362	0.563	1.773
	Y2	2.362	0.563	1.773
LSD at 5%	Y3	0.019	0.018	0.014

characteristics (2.362%, 0.563% and 1.773%, respectively). The results were agreed with Al-Dulaimy and Alrawi (2010) on pomegranate and with Hafez et al (2013) on olives and Al-Dulaimy (2012) on grapes. Interaction 8 mg l<sup>-1</sup> with yeast extracts spraying on vegetative group and soil surface caused a significant increase of 2.466%, 0.606%, 1.904%, respectively. This may be due to the positive effect of Brassinolide and yeast extract in the increased vegetative growth indicators shown above and reflected in the increased N, P and K content of the leaves.

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