

## Gibberellin - as a determinant factor of grape's quality of Codreanca (Black Magic) variety

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### ABSTRACT

The vine area and volumes of production of table grapes in the country are not stable. In the last 15 years the vineyards decreased by 8 thousand ha (from 28 thousand to 20 thousand ha). The harvest and total production of grapes decreased too. The quality of grapes and the structure of assortment are unsatisfactory. The technological methods, which have a substantial contribution to improving the quality of table grapes, represents: foliar fertilizer use; removal cauliflowers; growth regulators use, which are used little or not use in the vineyards. Growth regulator use in the vineyards is used to improve the appearance of the grapes, increasing the productivity of plants and improve their taste. The purposes of investigations include the identification of the influence of the treatment period, the optimal dose of gibberellin on the quantity and quality of grapes and efficiency of table grapes of Codreanca (Black Magic) variety.

### INTRODUCTION

Many authors have reported the influence of gibberellin on the growth of clusters, peduncle length and thickness of all grape varieties. There are formed the clusters with a high number of mechanical tissues by the gibberellin treatment. There has been rapid growth and lignification of tendrils, intense twisting them (Manankov, 1981).

The effect of gibberellin on generative sphere of grape plants so far poorly understood. At the same time found that, the number of berries is changed under the action of gibberellin treatment. Depending on the particularities of varieties, as well as the conditions of the ensuing impact gibberellin berries may not only increase but also decrease (Muromcev, 1973).

The seed varieties under the influence of gibberellin treatment can formed deteriorates berries usually (Manankov, 1981). How to improve things and the bad form of berries to a large extent determined dosages of gibberellin. The positive effect is enhanced with increasing concentration to the optimum, which is different for different varieties. Excessively high concentrations of gibberellin less effective, because increase its negative effect on fruiting.

Batukajev AA (1987, 1996) found that the higher seed index (ratio of the pulp weight to the seeds weight), the quantity of seedless berries are formed is greater, under the action of gibberellin treatment. Moreover, the increase in seed index is not only from the increased flesh weight, but also by reducing the seeds weight.

The purpose of our researches was to study the influence of inflorescences treatment with gibberellin (GA<sub>3</sub>) on the productivity of Codreanca (Black magic) table grapes variety in the Republic of Moldova

### MATERIALS AND METHODS

Studies performed in 2007-2009 at the experimental station with table grape variety: Codreanca (Black magic), in The Central part of the Moldova Republic. We used the methods recommended for this type of research in viticulture. During the period of vegetation we

studied the agrobiological properties of varieties. The inflorescences were treated with gibberellin: 25, 50 and 100 ppm.

## RESULTS AND DISCUSSION

**Codreanca** (Moldova x Marshal) [Moldova] Synonym: Black Magic - super-early table grape variety, with high resistance to disease. From blooming buds to maturity are needed 110-118 days. Bushes are high vigour of growth. Weight of bunch are 400-600 g, some up to 1,5 kg. The berries are very large (31 x 19 mm), dark-violet. The taste is simple, but due to the dense pulp, a small number of easily separates seeds, skins are not perceived when eating - taste good. The sugar content is 18-19%, but the acid content is 6-7 gr/l. The variety was much inclined to shattering of flowers, ovaries and formed small berries in some years with unfavorable weather conditions during the flowering period. Consequently, reduced the marketability of variety, the yield is high. Устойчивость к милдью у сорта 2,5-3,0 балла, к морозу -22°C. The resistance to mildew is appreciated with 2,5-3,0 points, to frost -22 ° C.

The results of our researches are shown in the Tables 1 and 2, as well as in the Fig. 1.

In the control variant the average weight of bunches are 390,2 gr. and berries – 383,4 gr. The bunches size are: length - 24,2 cm, width: top 13,7 cm, medium – 7,2 cm and bottom – 5,5 cm.

Established that under the action of gibberellin is an increase in bunches weight with 21,7 (GA<sub>3</sub>-25 mg/l), 31,4 (GA<sub>3</sub>-50 mg/l) and 30,4% (GA<sub>3</sub>-100 mg/l), the berries weight in clusters, compared with the control. The result is a decrease the bunch structure on 1,35; 1,26 and 1,88 times, respectively.

Economic benefit analysis showed that the highest level of profitability – 611,66%, obtained in the variant GA<sub>3</sub>-50 mg/l, which is 82,96% higher compared with control.

## CONCLUSIONS

The gibberellin test on the seed table grapes varieties, it was found that the gibberellin treatment's effect depends by the biological characteristics of the varieties and concentration of physiological substances.

The gibberellin treatment on seed varieties - Codreanca (Black magic) leads to increase bunches weight, the berries weight in bunches, and decrease clusters structure rate. The optimum concentration of the gibberellin is GA<sub>3</sub>-50mg/l. Yield increases on 21,7-31,4%. In the clusters reduces the number of substandard berries and increasing the seed rate index;

Increasing the number of seedless berries in the bunch of the seed varieties of table grapes under the action of gibberellin treatment, increase the sugar content, accelerate ripening, which is an important factor for the early varieties such as Codreanca (Black magic).

## ACKNOWLEDGEMENT

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 \*\*\* Contract no. 59/ind (2008).  
 \*\*\* Contract no. 13/ind (2009).

**TABLES**

**Table 1.** The reaction of Codreanca (Black magic) variety for treatment of cauliflowers with gibberellic acid (GA<sub>3</sub>) on the stage after fecundation period

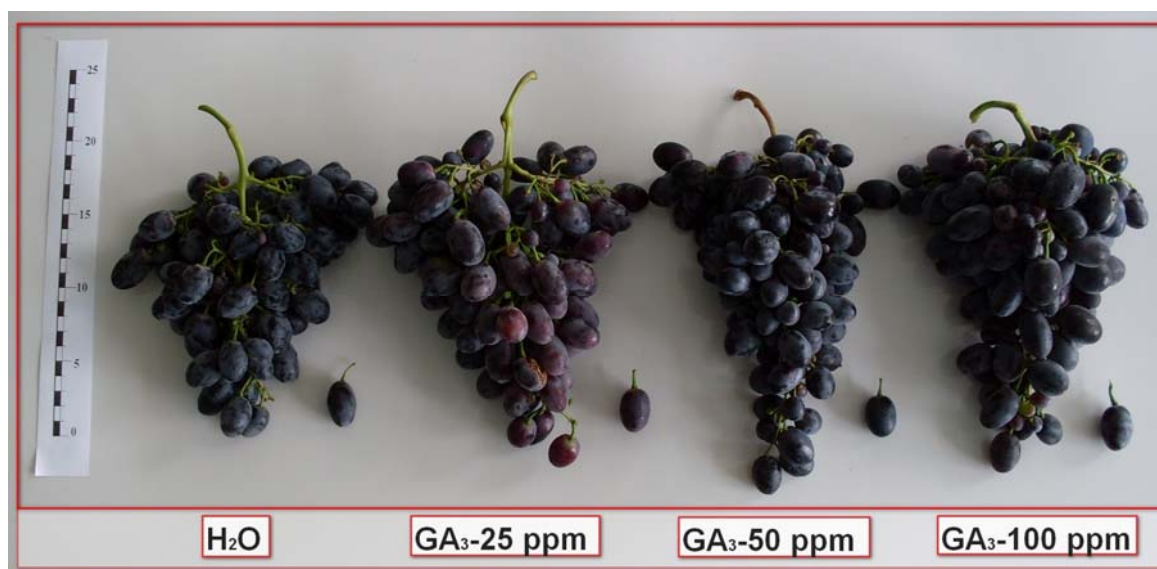
Indicators	Variants								DL <sub>0,95</sub>
	Control - H <sub>2</sub> O		GA <sub>3</sub> -25 ppm		GA <sub>3</sub> -50 ppm		GA <sub>3</sub> -100 ppm		
	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%	
Weight of bunches, g	378,3	100,0	460,3	121,7	496,9	131,4	493,2	130,4	-
berries, g	371,8	-	449,5	-	486,1	-	477,3	-	-
Bunches size, cm									
- Length	20,3	-	22,3	-	21,1	-	24,0	-	-
- Width/top	17,0	-	17,7	-	17,3	-	19,7	-	-
mid	11,6	-	11,6	-	10,1	-	10,8	-	-
bottom	8,0	-	6,3	-	5,6	-	6,4	-	-
Peduncle size, mm	11,8 ± 1,1	100,0	14,0 ± 1,0	118,0	14,2 ± 0,8	120,6	14,4 ± 0,4	122,3	-
The number of berries in the bunch, (normal / abnormal), pieces	74,0 58,0	100,0 -	119,0 42,0	160,8 -	139,7 42,0	188,7 -	130,7 46,0	177,6 -	- -
Berry size, mm									
- length	30,5	100,0	31,1	102,0	27,6	90,6	29,2	95,9	1,04
- width	20,6	100,0	20,3	98,5	20,0	97,3	19,8	96,1	0,64
Weight of 100 berries, g	632,0 ± 19,6	100,0 -	557,7 ± 47,2	88,2 -	516,3 ± 7,0	81,7 -	512,3 ± 38,6	81,1 -	- -
The index composition of berries (pulp weight/skin weight)	18,32	-	16,32	-	14,82	-	15,56	-	-
The number of seeds per 100 berries	135,0	100,0	165,0	122,2	130,0	96,3	100,0	74,1	-
Indicator seed index (weight of pulp / weight of seed)	124,6	-	100,7	-	100,8	-	132,3	-	-
The strength of the berries on the crushing, g	1517	100,0	1529	100,8	1487	98,0	1621	106,9	-
Yield, kg per vine	5,67	100,0	6,90	121,7	7,45	131,4	7,40	130,5	0,11
Content of sugars	145	-	139	-	142	-	138	-	-
content of acids	7,1	-	7,0	-	6,5	-	7,9	-	-

**Table 2.** The economic efficiency of Codreanca (Black magic) grapes production for gibberellic acid treatment

<i>Indicators</i>	<i>Variants</i>			
	<i>Control - H<sub>2</sub>O</i>	<i>GA<sub>3</sub>-25 ppm</i>	<i>GA<sub>3</sub>-50 ppm</i>	<i>GA<sub>3</sub>-100 ppm</i>
The costs during the growing season without gibberellic acid, MDL	12000	12000	12000	12000
The costs of closure and opening of the vines, MDL	3000	3000	3000	3000
Yield, tones per hectare	12,60	15,33	16,55	16,44
The costs for harvesting of grapes, MDL	5039,496	6132,72	6621,56	6577,12
The cost for the treatment with gibberellic acid, MDL	-	1370,28	1202,53	1489,339
The total cost, MDL	20039,5	22647,35	23261,13	23467,14
The cash proceeds from the sale of grapes, MDL	125987,40	153318,00	165539,00	164428,00
The profit, MDL	105947,90	130670,65	142277,87	140960,86
The profitability, %	528,70	576,98	611,66	600,67

Note: 1 USD ≈ 11,5 MDL

### **FIGURE**



**Fig. 1.** Effect of gibberellin (GA<sub>3</sub>) on the appearance of bunches and berries of Codreanca (Black magic) variety