

INFLUENCE OF GROWTH REGULATOR ASFAC BCO-4[®] IN CHASSELAS DORÉ VARIETY

INFLUENȚA APLICĂRII BIOSTIMULATORULUI ASFAC BCO-4[®] LA SOIUL DE VIȚĂ DE VIE CHASSELAS DORÉ

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Abstract: *The quality of table grapes is the result of combining superior physical properties (firmness, structure, weight) and the chemical composition and their functional properties, such as their main products of metabolism (sugars and organic acids) and secondary metabolites represented mainly by phenolic and aromatic compounds, and the ratio in which they are found in the fruit. Growth biostimulators are substances, which applied in small quantities and at the optimum time, increase grape production due to berry elongation, increase the sugar content of grapes and help in maintaining a good aspect. In countries with a tradition in producing table grapes, treatments with stimulators are often used due to a higher production and commercial aspect of the treated grapes. The application of treatment with ASFAC BCO-4[®] resulted in a larger production (6.825 kg compared to 5.67 kg). The commercial production percentage has also been improved (83% versus 75% in the variant without biostimulator treatments). An increased production per hectare was also observed (4.3 tons).*

Key words: Chasselas doré, grapevine variety, growth biostimulator, production

Rezumat. *Calitatea strugurilor de masă este rezultatul îmbinării superioare a însușirilor fizice (fermitate, structură, masă) și a compoziției chimice și funcționale ale acestora, redată prin produși principali de metabolism (glucide și acizi organici) și de metabolizii secundari reprezentați în principal de compușii fenolici și aromatici, precum și de raportul în care aceștia se regăsesc în fruct. Biostimulatorii de creștere sunt substanțe care în cantități reduse și aplicate la momentul optim măresc producția datorită elongației boabelor, sporesc conținutul de zaharuri din struguri și imprimă acestora un aspect plăcut. În țările cu tradiție în producerea strugurilor de masă tratamentele cu biostimulatori sunt des utilizate datorită sporului de producție ridicat și aspectului comercial plăcut pe care-l dobândesc strugurii tratați. Aplicarea tratamentelor cu ASFAC BCO-4[®] a dus la obținerea unei producții de struguri de 6,825 kg, comparativ cu 5,67 kg. De asemenea, s-a îmbunătățit și procentul de producție marfă, care a fost de 83%, față de 75% la varianta fără tratamente cu biostimulator. Sporul de producție calculat pe hectar a fost de 4,3 tone de struguri.*

Cuvinte cheie: Chasselas doré, soi de viță de vie, biostimulator de creștere, producție

INTRODUCTION

Grapes have always been considered a valuable source of minerals, aminoacids, vitamins etc, in raw form but also as processed goods (juice, jams,

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preserves), while also using their subproducts, compounds with antiscavenging properties in the pharmaceutical or cosmetic fields (Alexandru, 2015).

Therefore, a higher and higher quantity of grapes with affordable prices and approved characteristics is becoming more and more necessary. This can be achieved by using bio-stimulative hormonal treatments during the normal vine growing activities, obtaining remarkable yields and an increase in the production's quality (Coțovanu Filimon, 2014). At the same time, the use of biostimulative substances in vineyard management cultures is also encouraged by many more advantages like increasing the plants' resistance to drought or to many pests or diseases, favoring the development of the root system, decreasing the quantity of chemical fertilizers etc. (Ziozou *et al.*, 1999).

At present, when proof of the positive influence of biostimulative substances is very visible, this technology is being widely used in all countries that have a tradition in producing table grapes (China, South Africa, Italy etc) (Rotaru *et al.*, 2011).

MATERIAL AND METHOD

The commercial ecological product ASFAC BCO-4[®] was used. This can be widely used by vine growers, in the sustainable culture of vine. This product was created at S.C. ROMCHIM PROTECT S.A. Bacău, by Oniscu Corneliu, PhD, from the Faculty of Chemical Engineering and Environmental Protection Iași.

The product is a clear, colorless or very slightly coloured liquid, with bio-stimulative growth effect, the main component being potassium 4-cloro-2 amidosulfonil-fenoxiacetat with addition of microelements and other substances: clor-sulfonic acid:0.05%; potassium hydroxide -0.016%; 2-(dimethyl-amino)-ehtanol:0,02%; cloro-acetic acid -0.005%; 4-clor-phenol -0.01%. Dry matter content – 12.5+/-0.05g/L (<http://www.asfac.ro/>).

The biostimulative substance was used in 2015, on Chasselas doré grape variety, cultivated in Iași vineyard, on a 5% slope cambic chernoziom, as graft being used Berlandieri x Riparia Kober 5 BB. Planting distances: 2.2/1.2 m, three wire trellissing system, an average of 3700 trunks /ha yield bearing. The trunk's height is 0.75 m, bilateral cordons, pruning done at spurs and canes (4-7 buds), leaving in total 40-42 buds/trunk, ca. 14-16 buds/m².

The biostimulative treatment was used as solution of 30 ml/10 litres of water and was applied a few days before flowering (2nd of June), at grape berry setting (5th of July) and grape veraison (10th of August). 20 vine trunks have been treated, in 3 repetitions. The treatment was foliar, with a manual spraying machine.

RESULTS AND DISCUSSIONS

Growth is the process of stable and irreversible enlargement of volume and weight of plant cells, tissue and organs, due to a continuous increase of the quantity of dry matter, following biosynthetic processes of transformation and deposit of specific organic compounds. The average and total length of shoots on the trunk was measured when grapes entered veraison and the intense growth of shoots stops. The shoots of five trunks within each repetition were measured, an average of each repetition was calculated, and the average of repetitions was done, finally.

It can be seen, that in the case of each treated variant, the average length of a shoot was higher (118 cm), compared to the not treated sample (105 cm). AT

the same time, the number of leaves/shoot was higher (17), fact that allows the larger foliar surface to have a higher photosynthetic ratio and thus higher productions (fig. 1). The treated variant had an average of 697 leaves/trunk compared to 585 leaves in the control sample, with an increase of 112 leaves.

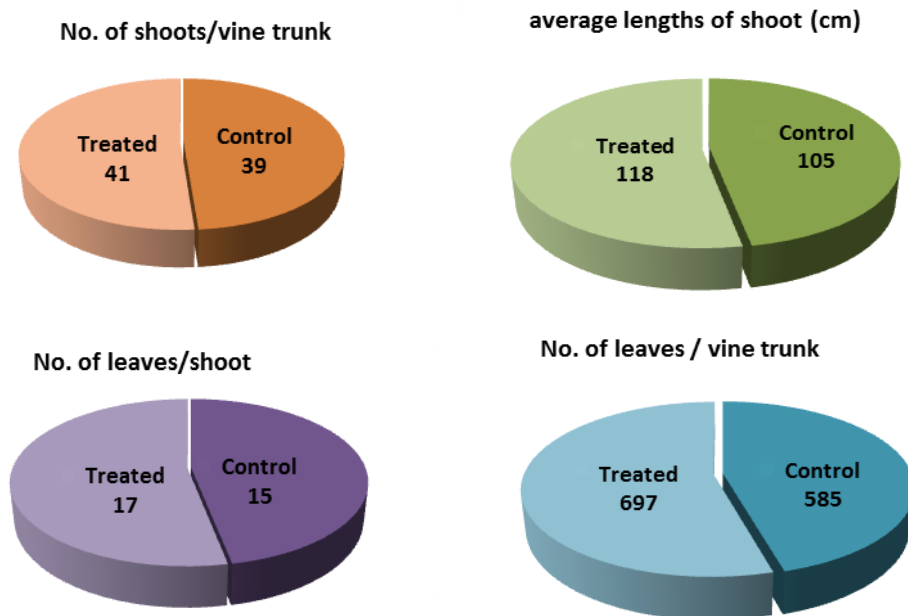


Fig. 1 Average values of vegetative growth

The area, length, width and perimeter of leaves were determined periodically, by direct scanning of 10 leaves/trunk. The leaves were chosen from the middle part of the shoot and scanned using a portable instrument ADC BioScientific AM 300 Area meter (non-destructive method). The data were automatically collected in the internal memory of the device and processed with the specific software. The below data also show higher values in the case of the treated variants (tab. 1).

Table 1

Evolution of main biometric parameters of Chasselas doré leaves

Parameter	Shoot growth		Flowering		Berry set		Veraison		Maturity		Leaf fall	
	T	C	T	C	T	C	T	C	T	C	T	C
Area (mm ²)	4196	4083	6861	6769	12794	12709	12740	12679	12691	12591	12633	12583
Width (mm)	86.1	85.1	91.4	88.3	139.4	135.8	133.4	129.0	131.7	128.2	127.3	126.2
Length (mm)	83.1	79.3	117.9	114.0	150.25	141.7	148.2	142.0	149.5	141.7	143.5	138.9
Perimeter (mm)	594.3	588.2	759.0	743.3	1128.2	1106.1	1008.2	1001.5	991.7	979.2	982.9	966.4

T-treated with biostimulator C- not treated with biostimulator

The average mass of one grape is higher with ca. 6 grams in the variant where a biostimulative treatment was applied (195 grams compared to 189 grams). The average number of grapes per trunk was of 35 grapes/ trunk in the treated variant and only 30 grapes/trunk in the control (tab. 2).

The average grape production/ trunk was of 6.825 kg in the treated variant and only of 5.670 kg/trunk in the control. It must be mentioned that the production/ha was calculated to surpass 25 t/ha when treating with biostimulative surfaces, with an increase of 4.3 t/ha compared to the control (tab. 2).

The percent commercial production reached 83% when ASFAC-BCO-4 was used, considered as a very good value for a grape variety with mixed functions. In the control variety, the percentage was of only 75%. The berries were uniform, without showing signs of poor grape set, allowing thus for a higher commercial production in the treated variant.

Table 2

Main production elements for Chasselas doré grape variety

Variant	Average mass of a grape (g)	Average numbers of grapes per trunk	Production per trunk (kg)	Production per ha (t)	% commercial production
Treated	195	35	6.825	25.2	83
Control	189	30	5.670	20.9	75

CONCLUSIONS

Obtaining a higher production, that can be commercialized even at a small fee of 1 leu/kg, ultimately leads to ca. additional 1000 euro / ha financial gain, confirming that the application of biostimulative treatment ASFAC BCO-4 can increase production and also the revenue in viticulture.

The recorded experimental data justifies the use of treatments with biostimulating substances within the cultural technologies for table grapes grown in Iasi vineyard, while taking into account the peculiarities and restrictions mentioned in the article.

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