

RESEARCH REGARDING THE INFLUENCE OF ASFAC BC04 BIOSTIMULATOR ON CHERRY – TREE NANA VARIETY

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INTRODUCTION

Increased fruit consumption and demand for fruits lead producers to develop production systems with the greatest possible effectiveness. In the case of fruit trees, this translates as development of cultures with maximum productivity at minimum cost. In addition to increased productivity, there should also be considered fruit quality and fruit appearance (Ligia Ion, 2007). Organoleptic properties and nutritional value of fruits are the decisive factors on the consumption market. Also, lately there has been an increasing interest of the population in BIO products (Rati I.V., et al 2008).

To meet these desiderata, manufacturers come up with solutions to fertilize crops with non-toxic stimulants and maximum return. One of these stimulators is ASFAC BC04. This foliar product is non-toxic and of maximum profitability, allowing the successful realization of crops that are superior both in terms of quantity and quality (Rati I.V. et al 2015, www.fertilizator.ro/datacenter/asfac/ICPA.pdf).

Although the amount of nutrients absorbed by leaves in foliar fertilization is not very high, this is compensated by high absorption of nutritious elements, compared to the efficiency of absorbing fertilizers applied to the soil. This is due to different soil conditions, conditions where nutrients can be lost through disintegration, attachment to microorganisms, precipitation or the impact of soil factors. These factors can inhibit the absorption of part of the nutrients and extreme soil conditions can hinder plants from using certain nutrients in the soil (Soare Maria et al 2003, Rati I.V., et al 2008).

Foliar fertilizers can be successfully used both in field crops and orchards, vineyards or vegetable crops. In Romania, over 20% of the areas under wheat were applied foliar feeding in 2012 (Soare Maria et al 2003). Therefore, advanced technologies increasingly promote the application of foliar fertilization, to obtain high yields. The aim of this study is to test the biostimulator ASFAC BC04 and demonstrate its superior qualities in order to

introduce it in organic farming. The tests conducted on bioproductive indicators at the species cherry were: fruit biometric measurements, length and weight of fruit stems, and pulp density. The analysis of phytochemical indicators included determination of dry matter content, sugar content and productivity/ha. Regarding organoleptic appreciation, it was considered the fruit's aspect, namely the shape, size and colour as well as pulp aspect, namely consistency, taste and savour.

MATERIAL AND METHODS

The experimental cherry plot belongs to the company Ceravis from the commune Itești. The trees are 7-year-olds grafted on 29-year-old cherries. The studied variety is the Nana variety. The planting distance is 5 m between rows and 5 m between trees in a row, corresponding to 400 trees/ha. The trees are pruned to grow as a flat belated vessel. The treatment with ASFAC BC04 was performed in two stages: the phenophase of early flowering April 26, 2013 and the phenophase of petal shedding May 4, 2013. The concentration of biostimulator ASFAC BC04 was observed according to the manufacturer's instructions, the concentration of 1l/ha. Harvesting the fruit (Fig. 1 a, b) was achieved in July 10, 2013. The biometric and physicochemical analyses were performed in the laboratories of "Vasile Alecsandri" University of Bacău, with existing substances and equipment.

The biometric measurements for the cherry fruits, the Nana variety, for the untreated individuals and for those treated with ASFAC BC04 were conducted using the electronic callipers Yato YT-7200. These recorded the fruit height (H), large diameter (D), small diameter (d) according to the work method described in Cociu V., et al 1989.

Measurements on the length (mm) and weight (g) of cherry fruit stems from the NANA variety, treated and untreated with ASFAC BC04, were conducted using electronic callipers Yato YT-7200 and the analytical scales AGN200 AXIS.



a



b

Fig 1. Cherry – tree Nana variety: a, b

There was applied a comparative analysis of the indicators with *bioproductive* relevance at the Nana cherry variety, treated and not treated with the product ASFAC 04 – BC, namely: fruit weight (Fw), pulp weight (Pw), kernel weight (Kw), using the analytical scales AGN200 AXIS.

The percentage of dry matter and sugar content in the fruits of the analysed NANA cherry variety was determined by refractometry, with the Portable ATC refractometer that expresses dry matter as percentages and the amount of sugar as Brix degrees.

The acidity was measured according to the method STAS 2213/ 8-68, through titratable methods, the results being expressed as amount of malic acid / 100 ml juice.

The determination of the chlorophyll pigments from samples was made through the Mayer-Bertenrath spectrophotometric method, modified by Știrban and Fărcaș (Artenie V. and Tanase Elvira, 1981). The chlorophyll pigments extraction was made in acetone and the extract was dosed using the spectrophotometer (Libra S 22) with different wavelengths for each pigment: for chlorophyll a 663 nm, for chlorophyll b 645 nm and for carotenoid pigments 472 nm. The results represent the average of three determinations and are reported to the quantity of fresh plant material used.

RESULTS AND DISCUSSIONS

Biometric measurements

It was found an increase of the large diameter (D) of fruits under treatment with ASFAC BC04, recording 74 mm (Table 1). The other parameters, the height (H) and the small diameter (d) of the fruit under absence of treatment recorded higher values than at the treated trees. Fruit height (H) for the untreated is 20.38 mm compared to 20.62 mm for the treated, and the small diameter is 22.16 mm for the untreated compared to 22.06 for the treated. The rise and fall of biometric parameters are, nevertheless, quite limited under conditions of treatment and absence of treatment (Table 1).

Table.1. Measurements of the Nana variety cherry fruits regarding height (H), the large diameter (D) and the small diameter (d) under conditions of absence of treatment and presence of treatment with ASFAC-BC-04

Variety cherry	Measurements (mm)	Untreated (mm)	Treated (mm)	% increase or decrease after treatment
Nana	Height (H)	20,62	20,38	98,83
	Large diameter (D)	19,53	19,74	101,07
	Small diameter (d)	22,16	20,06	99,54

Measurements were also applied to the cherry fruit stems, under conditions of absence of treatment and treatment with ASFAC BC04. There was analysed the length and weight of stems, the finding being that under treatment conditions the stem grew to 3.52 mm compared to 3.44 mm at the untreated individuals. The weight of the fruit stems declined at treated versus untreated individuals (Table.2)

Table.2. Measurements of the fruit stems of the Nana variety cherry regarding the length (mm) and weight (g), under conditions of absence of treatment and presence of treatment with ASFAC BC04

Variety cherry	Measurements	Untreated (mm)	Treated (mm)	% increase or decrease after treatment
Nana	Length of stems (mm)	3,44	3,52	102
	Weight of stems (g)	0,095	0,08	84,21

Bioproductivity indicators.

The monitored parameters showed a rise under conditions of treatment with the biostimulator ASFAC BC04. There was increased fruit and pulp weight with percentages between 103.31% -103.01% under conditions of treatment. A higher percentage under treatment conditions was recorded in the kernel, reaching 109.09% (Table.3).

Table.3. Measurements of the Nana variety cherry fruit regarding fruit weight, pulp weight and kernel weight under conditions of absence of treatment and presence of treatment with ASFAC BC04

Variety cherry	Measurements	Untreated (mm)	Treated (mm)	% increase or decrease after treatment
Nana	Fruit weight (Gf)	6,63	6,85	103,31
	Pulp weight (Gp)	6,3	6,49	103,01
	Kernel weight (Gs)	0,33	0,36	109,09

Quality parameters

The dry matter and sugar content increased with percentages between 102.11% and 101.39% under conditions of treatment with the biostimulator ASFAC BC04. At the same time, the average fruit acidity fell for the treated versus the untreated by 6.7%. Fruits treated with the biostimulator ASFAC BC04 recorded an acidity of 9.33 g malic acid / 100 ml juice compared to 10.00 g / 100 ml juice for the untreated (Table 4).

Table 4. Measurements of the Nana variety cherry fruit regarding dry matter and sugar and acidity under conditions of absence of treatment and presence of treatment with ASFAC BC04

Variety cherry	Measurements	Untreated (mm)	Treated (mm)	% increase or decrease after treatment
Nana	Dry matter (su %)	9,95	10,16	102,11
	Sugar -grade Brix	8,62	8,74	101,39
	Acidity (mg/100g)	10,00	9,33	93,30

Pigment assimilation

Under conditions of treatment with the biostimulator ASFAC BC04, there was recorded increased chlorophyll "a" content by 106.51% and increased chlorophyll "b" content by 104.93% (Table.5).

Table.5. Measurements of assimilating pigments content of the leaves of the Nana variety cherry, under conditions of absence of treatment and presence of treatment with ASFAC BC04

Variety cherry	Measurements	Untreated (mm)	Treated (mm)	% increase or decrease after treatment
Nana	Chlorophyll a (mg/g)	0,875	0,932	106,51
	Chlorophyll b (mg/g)	0,810	0,850	104,93
	Carot. pigments (mg/g)	0,0003	0,0003	0

The measured chlorophyll "a" content in the treated leaves was 0.932mg/ g and chlorophyll "b" content was 0.850 mg / g. The carotenoid pigments recorded the same value under conditions of absence of

treatment and presence of treatment, namely 0.0003mg / g.

CONCLUSIONS

Harvesting of the Nana variety cherry fruit in 2013 was made earlier due to weather conditions which led to lower values of biochemical parameters compared to the variety's normal content under conditions of absence of treatment and presence of treatment with ASFAC BC04.

The foliar fertilization ASFAC BC04 tested on the Nana cherry-tree variety led to valuable qualitative crops productions with greater market demand, but also valuable crops in terms of quantity.

Due to the increasing amount of dry matter and sugar content under treatment with ASFAC BC04, the cherries accumulated biochemical values that recommend them both for industrialization and fresh consumption. The parameters analysed within the bioproductivity indicators recorded growth under treatment with ASFAC BC04. Fruit and pulp weight percentage grew by 103.31% -103.01% under conditions of treatment.

Assimilating pigments (chlorophyll a, chlorophyll b) recorded relevant growth under treatment with the biostimulator ASFAC BC04, between 4.9 and 6.51%, this influencing the general metabolism of the plant with direct repercussions on increasing fruit production.

To establish the actual influence of the product ASFAC BC04 on the physical production per tree, it is necessary to continue investigations, as fruit bud differentiation takes place a year before. The 2013 treatment will influence fruit bud differentiation, and hence production, in the coming year.

ABSTRACT

Nana variety was obtained in Romania from a Crişana clone at the Research and Development Station for Fruit Tree Growing Băneasa. It is a variety with a wide ecological plasticity, cultivated throughout the country. The fruit is red burgundy, medium size, with spherical shape. Harvest at maturity starts at the end of June and lasts until the end of July. The study presents the comparative analysis of Nana cherry-tree variety when applied the biostimulator ASFAC BC04 and in its absence. The aim of the study was to highlight the morphological, biochemical and productivity differences of Nana cherry-tree variety with and without treatment. We determined some morphological parameters of fruits and stems, fruits and stems biomass, some biochemical parameters (dry matter and water content, sugar content, acidity), assimilation of leaf pigment content. After the treatment with the biostimulator ASFAC BC04 there was an increase in some analysed parameters: fruit weight (3.31%); sugar content (1.11° Brix), chlorophyll content (0.057 mg/g).

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