SUGARS METABOLISM UNDER PESTICIDES TREATMENTS AND PEST ATTACKS IN GRAPEVINE VARIETIES AT COTNARI VINEYARD

METABOLISMUL GLUCIDIC LA SOIURI DE VIȚĂ DE VIE DIN PODGORIA COTNARI, SUB EFECTUL TRATAMENTELOR CU PESTICIDE ŞI ATACUL DĂUNĂTORILOR

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Abstract. *Plants have in generally, mechanism of degradation and store of the most commercial pesticides, even if the compositions of these products are unknown for them. Plants store the pesticides and metabolic products for a long time (Ferre, 1998). Our researches concentrated upon the behaviour of the some varieties of grapes and their physiological response at influence of pesticides, as well as attack of pest and phytopatogens. This work is concerning about the modifications of the parameters of sugars metabolism.*

Rezumat. *Plantele au in general, mechanisme de degradare si de depozitare ale celor mai multe din pesticidele comerciale folosite in combaterea bolilor si daunatorilor. Plantele descompun si depoziteaza produsii metabolici ai ale acestora, desi nu aceste produse nu sunt recunoscute de plante(Ferre, 1998). Cercetarile noastre s-au axat pe studiul raspunsului fiziologic a unor soiuri de vita de vie supuse actiunii bolilor si daunatorilor, in formula de combatere efectuata asupra podgoriei Cotnari.*

Plant metabolism could divide in three phases: transformation, conjugation and storing of some metabolic products. The first metabolic pathway known as enzymes of cytochrome P 450 catalyze the phase one reactions, decomposing pesticides through different mechanisms of transformations. Plants absorb systemic insecticides through phloemic flow when these are sprinkled over the leaves surface and the aphides die when they feed with the sap plant. The problems of pesticides are bioaccumulation and biomagnifications *(6, 8).*

MATERIAL AND METHODS

Physiological researches have taken the four varieties of grapevine from two farms in Cotnari vineyard. The varieties are: Feteasca alba, Tamaioasa Romaneasca, Grasa de Cotnari and Francusa (farm 4) and Feteasca alba and Francusa(farm 7).Sugars dosing in dry material were made by combined Bertrand with Borel methods. The investigations were performed in all important phenophases such as: blossoming, grapes growing and ripening.

RESULTS AND DISCUSSIONS

Monosaccharides

The greatest quantity of monosaccharides are observed in the phenophase of growing in Francusa, with 7.4 g % variety of grapes from farm 4 and the all the analyzed varieties of farm 7, probably because the intensive metabolism of the younger vineyard. In 2005, during the grapes growing are observed the decreasing of the monosugars, especially in Tamaioasa Romaneasca, as it is shown in fig. 2.

The same behaviour are observed next year during the phenophesis of fruit growing and ripening (fig. 4 -5).

Disaccharides

The most frequently in vineyard metabolism is sucrose. Some authors (Stoev, 1979) are the most important soluble carbohydrate contented in leaves and concluding, even the sucrose would be the first assimilate in photosynthesis(8). Sucrose is the transport form of the assimilated to the consumptions organs.

Our researches on the leaves content in disaccharides have shown that this parameter has a large register. Analyses performed on July, 2005 at Grasa de Cotnari-Paraclis (farm 4) cultivar, has the great concentration in disaccharides, which was of 10 g %. All others varieties leaves have not practically the disaccharides, composed mostly in sucrose in this phenophase of growth grapes. This phenomenon could be explained because the attack of the *Phylloxera* at leaves level. In this period when the leaves in chloroplasts synthesized in dark phase of Calvin Cycle the highest quantity of monosaccharides, Grasa de Cotnari cultivar concentrated the great amount of disaccharides, but the monosaccharides not decreasing considerable, in comparison with the others varieties(fig.2).

In 2006,the great quantity of disaccharides are observed in Feteasca alba variety (farm 4)-10.256 g %, followed by the Francusa and Feteasca alba varieties –appreciatively 7 g %(farm 4). All those highest values observed in blossoming phenophasis. At the following period, in grapes growing the disaccharides have a smaller variation, between 3.4 g % (Grasa-farm 4, Francusa-farm 7) until 5.167 g % (Tamaioasa-farm 4), as is showed in fig.4-5.

Insoluble polysaccharides

Insoluble polysaccharides are insoluble in water and in this category are the starch, celluloses, hemicelluloses and other. Insoluble sugars have a variation between 4.55 g % (Tamaioasa-farm4) until 2.06 g %(Grasa-farm 4). The greatest values are obtained in blossoming values. In grapes ripening, quantity of insoluble sugars registered the variations, relatively constant, between 1.683 g %(Feteasca alba-farm 7) descending to the 1.05 g % (Francusa-farm 4), as is shown in fig 5. Insoluble polysaccharides decreased in 2006, at fruit ripening, comparatively with 2005 (fig.3, 5).

In 2006 **soluble polysaccharides** varied to the 4.68 g % (Francusa-farm 4) to the 9.91 g %(Tamaioasa-farm 4) to 5.433 g % (Feteasca alba-farm 4), in blossoming phenophasis. The greatest values are around 9 g % found it in the

sweet varieties (Feteasca alba and Tamaioasa romaneasca). In phenophasis of grapes growing, the soluble sugars have a little variation. If the insoluble polysaccharides decreased, the soluble one increased in 2006, comparatively with the values registered in 2005(fig.3, 5).

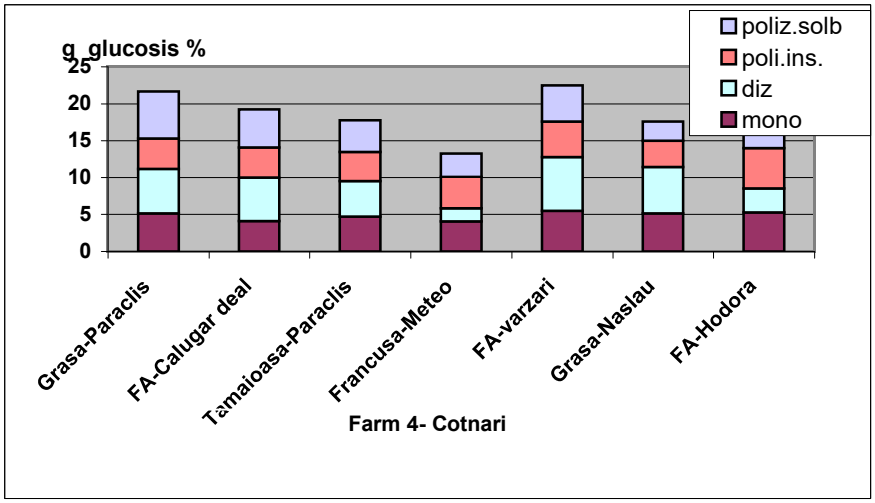

Fig.1 - Sugars metabolism on 2005.at different varieties of grapevine at blossoming phenophase after pesticides treatments

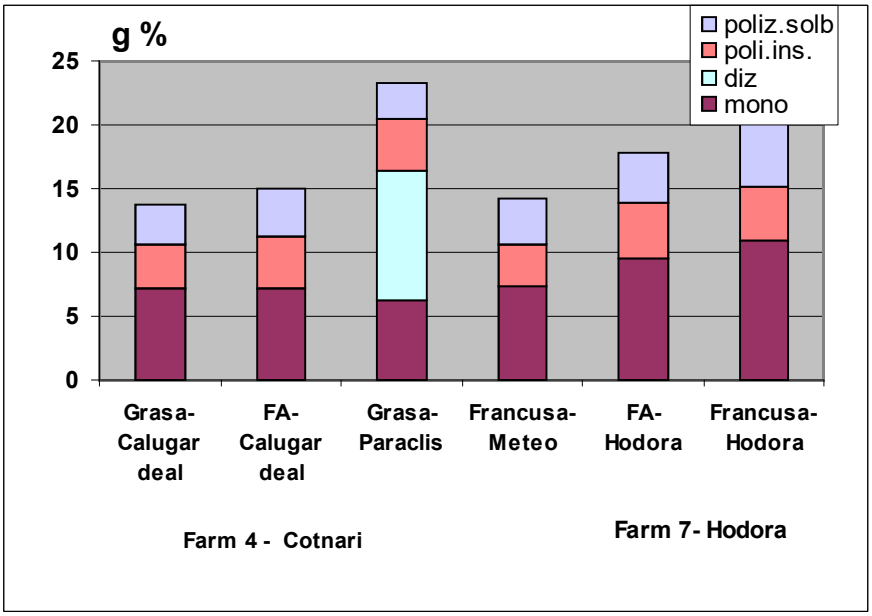

Fig.2 - Sugars metabolism on 2005 at different varieties of grapevine at growing grapes phenophase after pesticides treatments

Total sugars

The greatest values observed just before and during blossoming. Total quantity of sugars varied between 28.987 g %(Feteasca alba-farm 4) until 17 g % (Feteasca alba-farm 7and Francusa –farm 4). Great values are observed in varieties of Tamaioasa -23.76 g %, Grasa-20 g %, both from the farm 4, and in Francusa- 20 g %, farm7. The values are comparable with the following phenophasis, grapes growing.

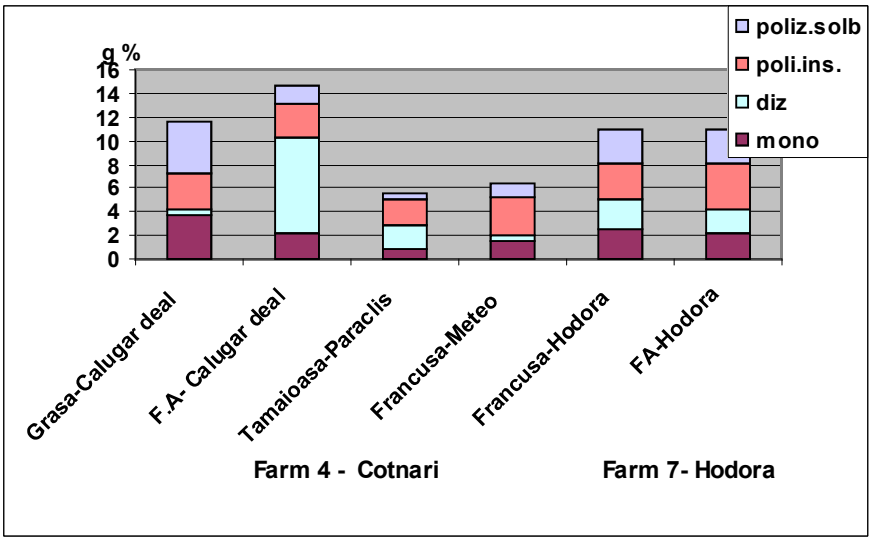

Fig.3 - Sugars metabolism on 2005 at different varieties of grapevine at ripening phenophase after pesticides treatments

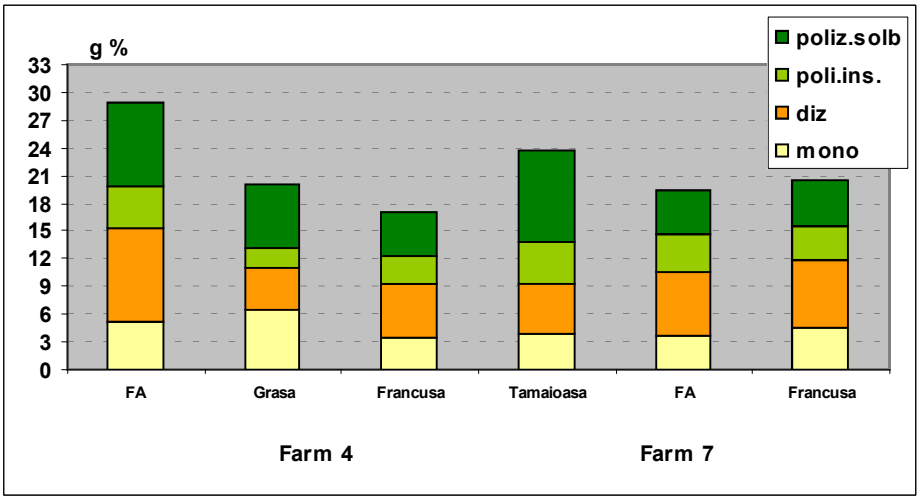

Fig.4 - Sugars metabolism at different varieties of grapevine at growing grapes phenophase after pesticides treatments on 2006

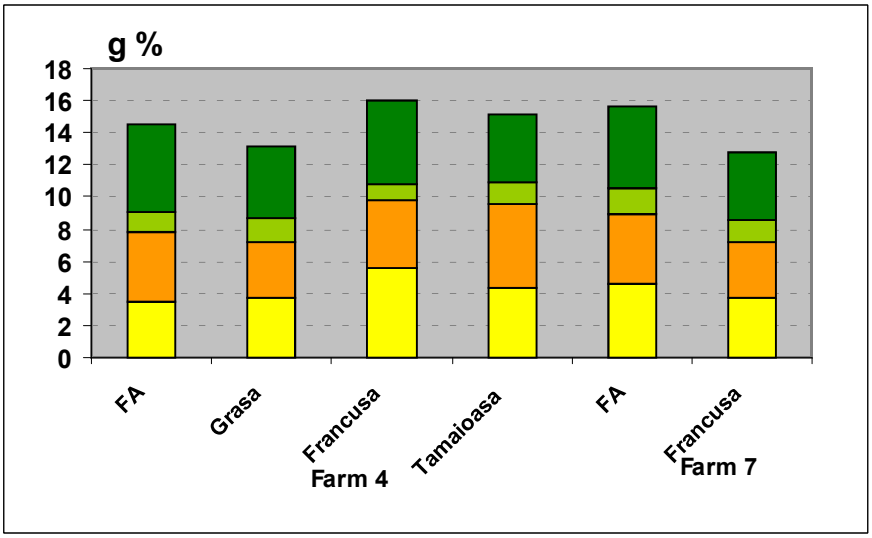

Fig.5 - Sugars metabolism at different varieties of grapevine at ripening phenophase after pesticides treatments on 2006

During year 2006, has observed the increasing total contents in sugars of leaves in blossom of vineyard, comparatively with last year, 2005. The greatest growing has observed in Feteasca alba variety-farm 4 which have 28 g %, with 10 times higher than last year(18 g %). This phenomenon happened because the increasing of the quantity of disaccharides and polysaccharides. In grapes growing, in 2006, the variety of Grasa de Cotnari has with 10 % more less total sugars in leaves. The total content of sugars in leaves has grown in this phenophasis in Francusa-farm 4 and Feteasca alba-farm 7 varieties.

The other varieties observed have the closed values of the total sugars during the two years of vegetations. In year 2006 we remarked the changing rapport between polysaccharides soluble and insoluble an increasing the quantity of those soluble in both phenophase. Our research have shown that after blossoming the sugars biosynthesis decreased until after grapes growth, as it is described in scientific literature (Stoev,1979).

CONCLUSIONS

The physiological researches have observed the behavior of the four parameters of sugars metabolism (mono-, di and polysaccharides) of some varieties of grapes.

Anlyses performed showed that in 2005, Grasa de Cotnari - Paraclis variety, have the great concentrations of disaccharides, in values of 10 g percentage

glucosis, because of some consumptions of plants (attacks of pests, such as *Phylloxera* in leaf level).

In the 2006, are observed the increasing the total amount of sugars during the flowering. The spectacular growth takes place in leaves of Feteasca alba (28 g %), with 10 times higher than last year (18 g %).

Physiological responses are given by the modifications of sugars, especially disaccharides amount is an important parameter of evaluation of stress plants, in case of attacks of pests.

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