

## CITOGROWER® IMPROVES SETTING AND FRUIT QUALITY IN STRAWBERRY PLANTS UNDER CONTROLLED CONDITIONS

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### INTRODUCCIÓN

In 2007, the production of strawberries in Spain was around 263,900 Tons, which placed this country as the second largest producer just behind the USA (FAO, 2009). Huelva region concentrates more than 65% of national production of this crop. The high quality of fruits is due to favourable soil conditions, weather and quality of water used for irrigation in this region.

The optimum temperature for a good strawberry production is between 15 and 20°C. Temperatures below 12°C during fruit-setting lead to cold-deformed fruits while a warm weather may cause an early ripening and colouring, and consequently fruits fail to get a minimum commercial size (Crane, 1964). The large dependence on abiotic factors makes plant nutrition a critical issue in strawberry cropping.

Use of plant growth hormones such cytokinins, auxins and gibberellins, is becoming popular in fruit cropping. Cytokinins are compounds that stimulate cell division or cytokinesis. A proper regulation of cell division also requires auxin, which is needed to synthesize DNA before cell division. Traditional fertilization accomplished by introduction of small quantities of plant growth regulators allows increasing both quality and yield of harvest. However, precaution should be taken as addition of phytohormones may lead to abnormalities on fruits.

CITOGROWER® is a foliar fertilizer containing phosphorous, potassium, L-free amino acids and adenine-derived compounds with activity equivalent to cytokinins. Application of this product in flowering stage, besides stimulate vegetative growth of plants, cell division and flower differentiation, improves setting and quality of fruits. When applied in combination with gibberellic acid, stimulate berries growth (in table grapes), improving homogeneity, colour and pulp consistency (field trials in Australia, 2008 with "Red Globe" grapevine, personal communication).

The objective of this study was to check the effects of applications of CITOGROWER® in strawberry plants, specifically on setting and quality of fruits, even in optimum growth conditions (under simulated climatic conditions of southern of Spain, Huelva region)

### MATERIALS AND METHODS

Strawberry plants (*Fragaria x Ananasa*) with 5 to 6 leaves were transplanted into 1.2 L pots containing a substrate consisting of a mixture of sand, perlite and peat (4:1:1) and pH=6.3. Plants were kept in a climatic chamber (Aralab Clima Plus 400) programmed with conditions similar to that of Huelva region (temperature, dark: light periods). Plants were watered three times a week.

The assay consisted of two treatments with 8 plants each (a plant was considered as a repetition):

- CONTROL plants treated with tap water
- Plants treated with CITOGROWER® at a rate of 0.2% (suggested commercial dose)

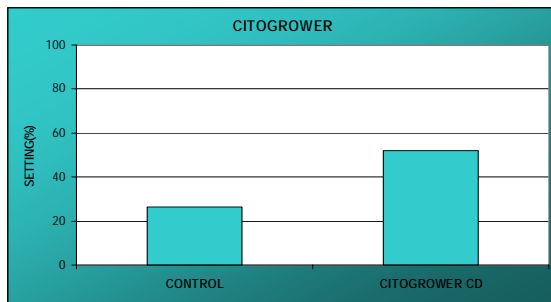
The product was applied three times using a manual sprayer (MATABI®, 3 atmospheres work pressure). First application (T<sub>0</sub>) was done at the beginning of flowering stage and then repeated 10 (T<sub>10</sub>) and 20 (T<sub>20</sub>) days after.

The assay was repeated two times.



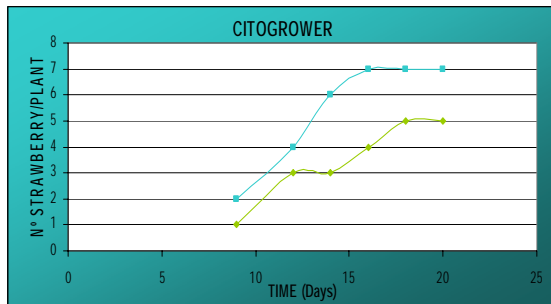
## RESULTS

Fruit-setting 20 days after the third application ( $T_{20+20}$ ) was 54% in plants treated with CITOGROWER® while in CONTROL (untreated), it was only 20% (Graphic 1).



Graphic 1. Percentage of of fruit-setting 20 days after third application ( $T_{20+20}$ ).

Yield in terms of fruit-setting was 15% higher in plants treated with CITOGROWER® respect to control (more fruits in less time).



Graphic 2 Evolution of number of strawberries / plant.

Organoleptic properties were also assessed and resulted in better colour and more intense odour in fruits from treated plants with CITOGROWER®. Furthermore, no abnormalities were seen in plants treated with the product.



Figure 2. Strawberry plants treated with CITOGROWER®

## CONCLUSIONS

Under the conditions of this trial, treatments with CITOGROWER® proved to increase number of fruits in strawberry plants

Fruits from plants treated with CITOGROWER® had better colour and odour

When CITOGROWER® is applied correctly, it does not produce abnormalities in fruits.

## REFERENCES

J C Crane. 1964. Growth Substances in Fruit Setting and Development. Annual Review of Plant Physiology, Vol. 15, Pages 303-326

Food and Agriculture Organization (FAO) of the United Nations. 2009. <http://faostat.fao.org/site>