ORIGINAL RESEARCH PAPER

Agricultural Science

EFFECT OF CROPSIL ON THE YIELD OF THOMPSON SEEDLESS GRAPES

KEY WORDS: CropSil, Thompson seedless Grapes, Yield booster, Grapes quality.

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ABSTRACT

Silicon is the second most abundant element in the earth crust after oxygen. (28.8%) and is mostly found as silicon di oxide or as a compound with iron, aluminium or calcium as their silicate. It is also found as Silicon Di Oxide as simple sand. By ashing a number of plant species, we have observed it to be a part of all plant material without exception, not the part contributed by the dirt or dust. All plants up take up silica as silicic acid dissolved in ground water as a complex with Humic acid or fulvic acid. Crops like rice, grass, sugarcane have considerably higher concentration of silica, also varying from part to part. For example, rice husk contains as much as 28% silica, probably the highest in any plant matter. This is the reason for the highest water requirement of rice plantation. Silicon present in the soil is in a polymeric form, which is unavailable form of Silicon for plant uptake. Generally, plants uptake monomeric form of Silica in soil i.e. plant available silica as a complex with humic or fulvic acid, a poly phenolic substance formed by degradation of lignin in the ground. Mono silicic acid (H_4SiO_4) or Ortho silicic acid is the only form of Silicon di oxide that is completely bio-available to the plants. As a salt of sodium, potassium silicic acid is too strongly bonded and can not be picked up by plant matter. There is, therefore a need to stabilize ortho silicic acid in a monomeric form. The acid form of monomeric silicic acid in water is very unstable and results in polymerization. The rate is highest at 7 pH. Acidic solutions are able to retain monomeric form for little longer. *NiChem Solutions, Thane* have developed a new product – CROPSIL based on monomeric silica to fulfil the requirement of Silicon as a beneficiary nutrient in plants, a composition which is highly stabilized in monomeric form. As of writing this, the formulations have been stable for as long as six years with no signs of polymerization or insolubility.

CropSil is a unique formulation of highly stabilized Orthosilisic acid (Monosilisic acid form). CropSil contains 3% Orthosilisic acid which is 99.9% available form of Silicic acid. It has an alkaline pH. CropSil acts as a plant stress manager, immunity booster, yield improver and a bio stimulant. It is a residue free, non-toxic and eco-friendly product. It has a good stability compared to any other preparation in market and does not gel on shelf when stored in air-tight conditions away from direct sunlight. (Patent for the product is pending in India and US. The International Publication number of CropSil is WO2016/135752 A2.)

Grape is a very sensitive crop in terms of atmospheric conditions, water availability and sugar content. Any biotic or abiotic stress would affect the quality and quantity output of grapes. Optimum berry size and sugar content are key factors for grapes to be acceptable especially in export market. Silica is known to help plants combat any kind of stress and boost productivity. We, thus, conducted an experiment of CropSil on Thompson Seedless Grapes to study the grape quality parameters and increase in yield.

This experiment was conducted at Khedgaon (Nasik) during 2016-2017. Three foliar applications of CropSil were taken after pruning at 15 days interval @1.5ml/lit of dose.

Morphological characters were recorded after 2nd spray of CropSil. Berry quality, size and yield increase (%) were recorded at harvest. At the end of the experiment, we found that in CropSil treated plants, berry weight increased by 37.05%, bunch weight by 28.58%, berry diameter by 8.17%, berry length by 9.92% and Brix increased by 1.8 unit as compared to Control. Additionally, we observed that Copper toxicity was also reduced in treated plots as compared to control.

INTRODUCTION

Grape is one of the most commercial fruit in India as well as in world. Thompson seedless grape is a popular variety consumed in India and globally. The growers are always interested to enhance the yield and quality of the grapes using different plant regulators such as NAA, Gibberellic acid, CPPU. The positive effect of GA3 and CPPU on berry size, berry length, acidity of various grapes variety has been reported by different scientists. (References?)

CropSil is plant yield booster and growth enhancer having unique molecule of highly stabilized Orthosilisic acid (OSA) which was used as foliar application in Grapes. In the official trial at NRCG, Pune-India, CropSil has shown an yield improvement of about 77 % in Thompson Seedless Grapes. Scientists have reported positive effect of Silicon in yield and quality of various crops, vegetable, cereals, rice and sugarcane etc and this data is well documented. We performed a field trial to demonstrate the positive effect of CropSil on Thompson seedless grapes (references?).

MATERIALS AND METHODS

The experiment was conducted at Khedgaon (Nasik) during 2016-2017. Spacing of grape plants was 9' x 6' m. Standard cultural practices were followed during experimentation. CropSil was sprayed at 15, 30 and 45 days after pruning; water was used in same quantities for control and treated plots. Blowers were used for spraying.

Berries were harvested in April. At harvest, a randomly selected 40 bunch weight was measured of each treatment. Total 1000 berries were taken for the berry weight (g) measurement and 40 berries' size of each treatment were measured with the stainless-steel scale and average was calculated in millimetre.

Total soluble sugar was measured using hand held refractometer and expressed as Brix, acidity (%) was measured by titration method by using Phenolphthalein indicator and titrated against 0.1N NaOH.

RESULTS AND DISCUSSION

The result of CropSil on berry quality, yield, size and sugar content is presented in Table 1, 2 and 3 respectively. The data of randomly selected 40 bunch weight and 1000 berries weight is shown in Table 01. Berry diameter and berry length data is reported in Table 02. Effect of CropSil on total soluble solids and acidity is presented in Table 03.

Table 01: Effect of CropSil on Bunch weight and 1000 berry weight on Thompson seedless grape

Treatment	40 bunch weight (Avg) in Kg	% increase over control in bunch weight (Kg)	1000 berries weight (Avg) in Kg	% increase over control in berries weight (Kg)
Control	16.550		3.500	
CropSil	21.280	28.58	4.797	37.057

Table 02: Effect of CropSil on 40 berry diameter and berry length in mm on Thompson seedless grape

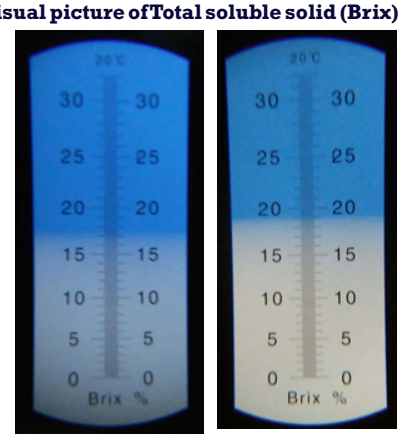
Treatment	Berry diameter (Avg) in mm	% increase over control in berry diameter (mm)	Berry length (Avg) in (mm)	% increase over control in berry length (mm)
Control	171.2		211.5	
CropSil	185.2	8.17	232.5	9.92

Table 03: Effect of CropSil on acidity and Total soluble solid (Brix) on Thompson seedless grape

Treatment	Acidity (%)	TSS (Brix)
Control	0.75	17.2
Cropsil	0.62	19.0

Fig 01 highlights the visible Sugar content in the Grapes.

Fig 01: Visual picture of Total soluble solid (Brix)



17.2 Control **19.0 CropSil**

The results were superior in CropSil treated plot as compared to control for all parameters tested. Due to increase in quality of berries it can be suggested that CropSil acts as a yield booster and growth enhancer in Thompson seedless grapes. Maximum TSS (19.0 Brix) was observed in CropSil treated plot and lowest acidity (0.62%) was recorded as compared to control. These findings indicate that CropSil can be used to convert the acid to sugar (TSS) and as a result berry quality was enhanced in Thompson seedless grapes.

SUMMARY AND CONCLUSION

The increased yield is due the increased bunch weight, berry weight and berry size as seen from the experiment. Hence, it can be concluded that the three applications of CropSil @ 1.5ml/lit seem to be beneficial to increase the quality and yield of Thompson seedless grapes.

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