RESEARCH PAPER

INTERNATIONAL JOURNAL OF PROCESSING AND POST HARVEST TECHNOLOGY
Volume 2 | Issue 1 | June, 2011 | 40-43

Effect of pre-harvest spray of growth regulators on organoleptic evalvation of seedless grape genotypes

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SUMMARY : The present study was carried out to know the response of seedless grape genotypes to growth regulators at the Main Campus, University of Agricultural Sciences, Dharwad during 2002-2003. Three genotype with two growth regulators were tried. Application of GA_3 50 ppm + BR1 ppm twice after fruit set stage was more effective on general appearance,firmness,taste and flavor and overall acceptability in Thompson seedless fallowed by Sharad seedless and Arka Neelmani

How to cite this paper: Padashetti, B.S. Angadi, S.G. and V. Pattepur, Sateesh (2011). Effect of pre-harvest spray of growth regulators on organoleptic evalvation of seedless grape genotypes, *Internat. J. Proc. & Post Harvest Technol.,* **2** (1) : 40-43.

Research chronicle : Received: *01.04.2011;* **Sent for revision :** *12.05.2011;* **Accepted :** *26.05.2011*

KEY WORDS : Genotypes, *Vitis vinifera* L., Growth regulators

Grape (*Vitis vinifera* L.) belonging to family vitaceae, perhaps the most widely cultivated fruit crop of the world in varying climatic zones is extending from the temperate to the tropics. It is one of the most delicious, refreshing and nourishing subtropical fruits. The berries are good source of minerals and vitamins.

The organoleptic characters like general appearance, firmness, taste and flavour and overall acceptability are depend upon growth of the berry. The orgenoleptic characters (scores) depends on physical and chemical characters which is influenced by use of growth regulators during fruit development stage. With this, present study was undertaken to evaluate the effect of pre harvest spray of growth regulators on orgenoleptic evaluation of grape genotypes.

EXPERIMENTAL METHODS

The investigation was carried out on four year old seedless grape genotypes from November, 2002 to March 2003 using uniform vines. The vines planted 1.8 x 1.20 meters were used for this study. A set of three uniform bunches were randomly selected in each genotypes and considered as one treatment with three replications. Totally 108 bunches were selected and labeled before imposing the treatments. The experiment was laid out in a split plot design with three genotypes in main plot and two growth regulators or growth regulator like substances in sub plot treatment.

Main treatments (genotypes)

G_1 – Thompson seedless
G_2 – Sharad seedless
G_3 – Arka Neelamani

Sub-treatments (growth regulators):

T_1 – Gibberellic acid (GA_3) – 50 ppm
T_2 – Brassinosteroid (BR) – 1 ppm
T_3 – Gibberellic acid (GA_3) – 50 ppm + Brassinosteroid (BR) 1 ppm
T_4 – Untreated (control)

The vines were sprayed with growth regulators at the time of fruit set stage and repeated the same spray after one week.

EXPERIMENTAL FINDINGS AND ANALYSIS

The organoleptic characters like general appearance, firmness, taste and flavour and overall acceptability are considered as market indices for selection of good quality grapes. The organoleptic characters (scores) depends on

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physical and chemical characters.

The organoleptic evaluation of different seedless grape genotypes was recorded on the day of harvest by a panel of 10 judges, which is expressed in terms of scores on a 10 point scale.

General appearance:

The data pertaining to general appearance of different seedless grape genotypes as influenced by pre-harvest treatments are presented (Table 1).

Table 1 : Effect of pre-harvest spray of growth regulators on the organoleptic evaluation (general appearance) of seedless grape genotypes

Treatments	Genotypes			
	G_1	G_2	G_3	Mean
T_1	8.13	6.23	6.79	7.05
T_2	6.78	5.81	6.12	6.24
T_3	8.37	6.82	7.42	7.54
T_4	6.12	5.23	5.92	5.76
Mean	7.35	6.02	6.56	6.64
			SEm±	CD (5%)
Genotypes (G)			0.08	0.34
Treatments (T)			0.13	0.40
G x T – between two genotypes means at same growth regulators			0.22	NS
T X G – between two growth regulators means at same genotypes			0.23	NS

G_1 – Thompson seedless
G_2 – Sharad seedless
G_3 – Arka neelamani
NS – Non significant

T_1 - GA_3 – 50 ppm
T_2 - Brassinosteroid – 1 ppm
T_3 - GA_3 + BR
T_4 - Control

Among the grape genotypes, Thompson seedless had good appearance with significantly maximum (7.56) rating followed by Arka neelamani (6.56).

Among the pre-harvest treatments, maximum (7.54) score for appearance was recorded in T_3(GA-50PPM+Brassinosteriod-1PPM) rated with good appearance followed by T_1(GA-50PPM) (7.05). The least (5.76) rating was observed in control which had fair appearance.

Significant differences in general appearance were noticed among pre-harvest treatments. Pre-harvest spray of GA_3 (50 ppm) + BR (1 ppm) has recorded significantly the highest rating in terms of good appearance. Similar results were reported by Kumar *et al.* (1990).

Firmness:

The data on effect of pre-harvest treatments on firmness of different seedless grape genotypes were recorded (Table 2).

Table 2 : Effect of pre-harvest spray of growth regulators on organoleptic evaluation (firmness) of seedless grape genotypes

Treatments	Genotypes			
	G_1	G_2	G_3	Mean
T_1	7.43	7.03	6.49	6.98
T_2	6.53	6.12	5.68	6.11
T_3	7.58	7.18	6.77	7.18
T_4	6.12	5.71	5.30	5.71
Mean	6.91	6.51	6.06	6.49
			SEm±	CD (5%)
Genotypes (G)			0.04	0.15
Treatments (T)			0.21	0.62
G x T – between two genotypes means at same growth regulators			0.32	NS
T X G – between two growth regulators means at same genotypes			0.36	NS

G_1 – Thompson seedless
G_2 – Sharad seedless
G_3 – Arka neelamani
NS – Non significant

T_1 - GA_3 – 50 ppm
T_2 - Brassinosteroid – 1 ppm
T_3 - GA_3 + BR
T_4 - Control

Considering the seedless grape genotypes significantly the highest (6.91) score was recorded in Thompson Seedless rated with firm texture followed by Sharad Seedless (6.51).

Among the growth regulators treatments significant difference was recorded in T_3 (GA-50 PM + Brassinosteriod -1PPM)(7.18) with firm texture, followed by T_1(GA-50PPM) (6.98). The least (5.71) rating was observed in control with soft texture.

With respect to firmness, maximum score was noticed in Thompson seedless while the least score was recorded in Arka Neelamani. The least score in Arka Neelamani might be due to its pulp which is not crisp but is more juicy. Among pre-harvest spray of growth regulators, GA_3 (50 ppm) + BR (1 ppm) has recorded significantly the highest rating with firm texture when compared to control. Similar observations regarding firmness were reported by Daulta *et al.* (1983). The firm texture may be attributed to increased firmness and reduced senescence by these growth regulators (Kumar and Chharia, 1990).

Taste and flavour:

The data regarding taste and flavour of different seedless grape genotypes as influenced by pre-harvest treatments are presented in Table 3.

Table 3 : Effect of pre-harvest spray of growth regulators on organoleptic evaluation (taste and flavour) of seedless grape genotypes

Treatments	Genotypes			
	G_1	G_2	G_3	Mean
T_1	6.69	6.19	4.18	5.69
T_2	5.98	5.21	3.52	4.90
T_3	7.38	6.42	4.82	6.21
T_4	5.49	4.69	2.85	4.34
Mean	6.38	5.63	3.84	5.28
			SEm±	CD (5%)
Genotypes (G)			0.06	0.23
Treatments (T)			0.14	0.41
G x T – between two genotypes means at same growth regulators			0.22	NS
T X G – between two growth regulators means at same genotypes			0.24	NS

G_1 – Thompson seedless
G_2 – Sharad seedless
G_3 – Arka neelamani
NS – Non significant
T_1 - GA_3 – 50 ppm
T_2 - Brassinosteroid – 1 ppm
T_3 - GA_3 + BR
T_4 - Control

The results indicated that the highest (6.38) score was recorded in Thompson Seedless with good taste and flavour followed by Sharad Seedless.

Among the pre-harvest treatment T_3 (GA-50 ppm+Brassinosteriod-1pmm) recorded significantly the highest (6.21) rating with good taste and flavour. Taste and flavour was poor (4.34) in control treatment.

Organoleptic evaluation regarding taste and flavour revealed that, there were significant differences among the seedless grape genotypes. Good taste and flavour score was recorded in Thompson Seedless while least was noticed in Arka Neelamani. This may be due to variation in total soluble solids (TSS).

The effect of pre-harvest treatments of growth regulator on taste and flavour revealed that, application of GA_3 (50 ppm) + BR (1 ppm) has recorded the highest rating with good taste and flavour. This indicates that, these growth regulators might have increased total soluble solids (TSS) and titratable acid content causing acceptable taste and flavour (Dass *et al.*, 1974).

Overall acceptability:

The data on effect of pre-harvest treatments on overall acceptability of different seedless grape genotypes were recorded (Table 4).

Table 4 : Effect of pre-harvest spray of growth regulators on organoleptic evaluation (overall acceptability) of seedless grape genotypes

Treatments	Genotypes			
	G_1	G_2	G_3	Mean
T_1	6.82	6.21	5.61	6.21
T_2	6.19	5.43	4.83	5.48
T_3	7.58	6.89	5.82	6.76
T_4	5.43	4.82	4.21	4.82
Mean	6.50	5.84	5.12	5.82
			SEm±	CD (5%)
Genotypes (G)			0.06	0.23
Treatments (T)			0.17	0.50
G x T – between two genotypes means at same growth regulators			0.26	NS
T X G – between two growth regulators means at same genotypes			0.29	NS

G_1 – Thompson seedless
G_2 – Sharad seedless
G_3 – Arka neelamani
NS – Non significant
T_1 - GA_3 – 50 ppm
T_2 - Brassinosteroid – 1 ppm
T_3 - GA_3 + BR
T_4 - Control

Among the seedless grape genotypes, Thompson seedless recorded significantly the highest (6.50) score with good overall acceptability followed by Sharad seedless (5.84) and Arka neelamani (5.12).

Considering the sub-treatments significantly maximum (6.76) rating was observed with T_3 (GA-50 ppm + Brassinosteriod-1ppm) with good quality and remained acceptable. The next highest rating was recorded in T_1(GA-50 ppm) (6.21).The lowest (4.82) rating was observed with control which had fair quality.

The interaction effect between the pre-harvest treatments and genotypes was found to be non-significant in all the organoleptic characters *viz.,* general appearance, firmness, taste and flavour and overall acceptability.

Significant differences were noticed between the grape genotypes with respect to overall acceptability. Thompson seedless has recorded significantly maximum score while least score was noticed in Arka Neelamani. This might be due to the genetic character.

Pre-harvest treatments with growth regulators were also found to be significant. Among the different treatments application of GA_3 (50 ppm) + BR (1ppm) has recorded maximum rating with good acceptance. Similar trend of observations were reported by Kumar and Chharia (1990). The higher rating of acceptance may be due to increased quality attributes by reducing enzymatic activity responsible for degradative changes (Singh *et al.*, 1990). However, for export market ideal sugar : acid blend is essential than plain sweetness of berries.

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