## Pre-harvest practices to increase the berry adherence

### Do's

i. Treat the clusters with 1-2 ppm CPPU along with $GA_3$ 40-50 ppm to increase the pedicel thickness.

ii. Treat the clusters with 50-100 ppm NAA 10 days prior to harvest to increase the berry adherence to the pedicel.

**Berry Attachment (Strength)**

### Don'ts

i. Do not allow the soil moisture stress prior to harvest. It should be applied at veraison stage in coloured varieties.

ii. Do not spray ethrel in coloured grape varieties prior to harvest.

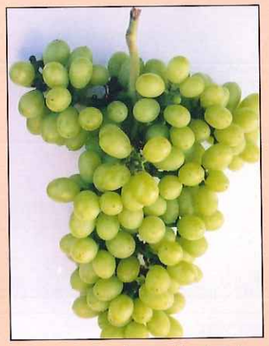
## Minimizing berry drop during transit and storage

### Do's

i. Harvest the bunches in early morning before temperature reaches 20°C.

ii. Harvest only loose bunches with uniform colour.

iii. Always check the maturity before harvest and after confirmation harvest the bunches. To know the maturity, check the TSS and acidity and TSS / acid ratio should be (approximately) 30.



**Bunch-cut above the knot**

iv. Always harvest bunches by retaining knot on the peduncle.

v. Maintain cold storage temperature at 0 ± 0.5°C and relative humidity at 95 ± 2%.

vi. Grapes should be pre-cooled within 6 hrs. after harvest.

vii. Pack the bunches as per the consumers choice.

### Don'ts

i. Don't harvest bunches when temperature rises above 20°C.

ii. Don't harvest the bunches if the dewfall is high at night. Such bunch should be harvested after dew is disappeared.

**Over exposed bunches**

iii. Don't harvest bunches within 3-4 days after rainfall.

iv. Avoid temperature fluctuations during storage.

v. Don't handle grapes roughly.

vi. Don't pack too much compact or too straggly.

vii. Don't harvest the exposed bunches which are having sun scarching symptoms.

viii. Don't remove 'bloom' while handling.


**Extension Folder No. 17**

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# USE OF BIOREGULATORS AND OTHER PRACTICES TO ENHANCE THE SHELF LIFE IN GRAPES


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Grape is one of the major important fruit crop having export potential. However, the proportion of exportable quality grapes is less. This may be attributed to short shelf life of grapes. To increase shelf life, use of growth regulators and other viticultural practices may be the useful tool. In this folder, the information is given on the tips to be followed to increase shelf life of grapes.

**Shelf life is depends on :**

1. Berry attachment (Pedicel thickness)
2. Skin thickness
3. Berry Crispness
4. Berry freshness and bloom

## BERRY ATTACHMENT

Berry adherence with the pedicles and bunch rachis determines the keeping quality of quality grapes. Detachment of

**Bunches with thick pedicels**

berries is generally due to weak and poor attachment to the pedicel. Detachment of their pedicels could be of two types viz; i. Wet drop and ii. Dry drop. In wet drop the brush being pulled out from the berry. In case of dry drop the abscission layer forms at the attachment point of berry to the pedicel. Hence, to reduce the post-harvest berry drop one has to control and implement the good agricultural practices.

## CAUSES OF BERRY DROP

Wet drop is a varietal character, mainly associated with the length and branching of torus. Cultural practices those increase the firmness of pulp and attachment of berries to the torus and brush. Compact packing of the clusters in packing boxes minimizing the shaking of berries during transit and storages help reducing this type of drop.

Brittle and weak pedicel is a characteristic feature of certain varieties. This is common in Sharad Seedless & Thompson Seedless. In the absence of pre-cooling, harvest during hot weather can aggravate this problem. Means to increase the pedicel thickness can reduce the berry drop of this nature.

The factor responsible for dry drop is mainly attributed to the synthesis of high levels of endogenous ABA (Abscissic acid) and other growth inhibitors like ethrel. Soil moisture stress in hot dry weather just before harvest increases the dry drop by increasing higher levels of endogenous ABA and on the contrary, lower levels of auxins or growth promoters are responsible for dry drop.

## MANAGEMENT OF BERRY DROP

NAA application at 8-10 days prior to harvest reduced the post-harvest berry drop appreciably

If the pedicels are thick, it will take some time to dry, which is also responsible for dry drop. The use of growth regulators like $GA_3$ and CPPU at 3-4 and 6-7 mm berry size stage helps in increasing the pedicel thickness and in turn increase the shelf life (Table 1). The application of calcium (nitrate or chloride) @ 0.5 - 1.0% aqueous solution (Dipping of bunch) once at 75 or 90 or 105 days helps in enhancing shelf life by increasing the turgidity of cell walls of berry skin of grapes.

**Table 1.** Use of Bioregulators to enhance the shelf life in grapes.

| Sr. No. | Bioregulator | Concen-tration | Stage of application | Purpose |
|---|---|---|---|---|
| 1 | NAA (Naphthaline acetic acid) | 50–100 ppm | 10 days prior to harvest | To reduce wet drop |
| 2 | $GA_3$ (Gibberellic acid) CPPU (Forechloro-fenuron) In combination | 40–50 ppm $GA_3$ and 1–2 ppm CPPU | 3-4 and 6-7 mm berry size stages | To reduce dry drop |
| 3 | Calcium (Nitrate or chloride) | 0.5–1.0 % | 75 or 90 or 105 DAP (Days after pruning) | To increase the cell wall turgidity |

## SKIN THICKNESS

Thick skin of the berries reduces the loss of water and keep the berries fresh for longer time. The thickness of skin can be increased by using $GA_3$ and CPPU in combination at 3-4 mm and again at 6-7 mm berry size stage. However, care should be taken that the skin should not be so thick which may lead to unfir for eating, hence use of above biregulators should be in optimum concentration (Table 1).

## BERRY CRISPNESS

Berry crispness is depends on pulp content in the berries. If pulp content is more the shelf life will be more. To have more plulp content in the berries, one has to follow proper source-sink relationship and hence the no. of leaves available for a bunch plays a vital role. Moreover the no. of berries in a bunch should be decided based on the no. of leaves available for the nourishment. If this is managed properly it will not only increase the pulp content in the berries but also it will enhance the size of the berry and it will also have enhanced keeping quality.

## BERRY FRESHNESS AND BLOOM

To showcase berry freshness bunches has to be dipped in 0.5-1.0% calcium nitrate or calcium chloride solution during 75 to 105 days once only. This increase the shelf life of the berries. Secondly, whitish portion will be found accumulated on the berry skin and it will mislead to pesticides residue. However, it is a bloom which is very important to prevent water loss from berries. Hence, bloom should not be removed while handling the grapes during harvesting to packing.

## IMPORTANT TIPS TO GRAPE GROWERS

### Minimizing berry shriveling

**Do's**

i. Dip the bunches in 1% aqueous solution of Calcium nitrate / Chloride at any time between 75 to 105 days after pruning.

ii. Adequate leaf / fruit ratio should be maintained to avoid shriveling of the berries.

**Don'ts**

iii. Avoid injury to berries while thinning.