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A SUMMARY OF FACTORS INFLUENCING THE SUSCEPTIBILITY OF COLD STORED RED GLOBE TABLE GRAPES TO SO_2 DAMAGE

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INTRODUCTION

Of all the table grape cultivars currently exported from South Africa, Red Globe is by far the most susceptible to SO_2 damage (Figure 1). Compared to other post storage disorders that manifest on Red Globe grapes, SO_2 damage typically has the highest occurrence. The determination of those factors influencing the occurrence of this disorder, will contribute to improving Red Globe's post storage quality.

During the 2003 and 2004 seasons, the following factors were investigated to establish the influence on Red Globe's susceptibility to SO_2 damage: (a) harvest maturity, (b) application of gibberellic acid (GA_3), (c) type of outer bag used for storage of GA_3 treated grapes, (d) wetters used with GA_3 applications, (e) berry colour and (f) packing after rain. In all trials, Red Globe's quality was evaluated after eight weeks storage at -0.5°C and four days at 7.5°C.

Figure 1: *Red Globe berries showing surface SO_2 damage, with and without berry split.*

EFFECT OF HARVEST MATURITY ON SO_2 DAMAGE

In both seasons, Red Globe grapes were harvested at three harvest dates, with biweekly intervals between them. In both seasons the occurrence of post storage berry split decreased significantly with increased maturity. This could possibly be attributed to a more advanced epidermis and cuticle development, which would enhance the resistance of the grapes to splitting. Typically all split berries exhibit SO_2 damage, and therefore SO_2 damage associated with split berries can be reduced with increasing harvest maturity. In 2003, the more mature grapes showed significantly more stem desiccation and SO_2 damage around the pedicel end of berries than less mature grapes. SO_2 damage confined to the pedicel attachment area is most probably related to moisture loss in this area.

EFFECT OF GA3 APPLICATIONS ON SO_2 DAMAGE

In 2003, GA_3 applications significantly increased berry mass. However, in 2004, GA_3 applications resulted in no significant increase in berry length, diameter or mass. In both seasons, grapes subjected to GA_3 applications had more SO_2 damage than untreated grapes, and in most cases it was significant. In 2003, grapes treated with 20 ppm GA_3 at 12-14 mm berry diameter exhibited 22.2% SO_2 damage, whereas untreated grapes had 8.6%.

In 2004, grapes treated with 20 ppm GA_3 at 12-14 mm berry diameter exhibited 61.8% SO_2 damage, whereas untreated grapes had 45.3%.

EFFECT OF BAG TYPE ON SO_2 DAMAGE

The level of SO_2 damage was reduced by approximately 25% if GA_3 treated grapes were stored in perforated instead of non-perforated outer bags.

EFFECT OF WETTERS ON SO_2 DAMAGE

In both seasons, the use of a wetter with GA_3 applications had no significant effect on the occurrence of SO_2 damage, compared to GA_3 applications without a wetter.

Figure 2: *Dark red versus pink coloured bunches.*

EFFECT OF BERRY COLOUR ON SO_2 DAMAGE

Pink and dark red coloured bunches were packed separately for quality evaluation after cold storage (Figure 2). Although it was endeavoured to harvest different coloured bunches of the same maturity, it was practically impossible. Significant differences in total soluble solids (TSS) occurred between the dark red and pink coloured bunches. The dark red bunches, that were more mature in terms of TSS, had a significantly higher level of desiccated stems than grapes from pink coloured bunches, albeit that the absolute difference was small. Pink coloured bunches had significantly higher levels of SO_2 damage (16%) than dark red bunches (11.6%).

EFFECT OF PACKING DATE AFTER RAIN ON SO_2 DAMAGE

Grapes packed one, three or five days after rain (8 mm rain occurred) exhibited no differences in levels of SO_2 damage. However, the risk for decay development during storage decreased as the days after rain increased before packing commenced. If packing is resumed three days after rain, the use of the 54 x 2 mm perforated bag, as opposed to a non-perforated bag, may increase the levels of decay development significantly during storage.

In conclusion, since the use of GA_3 on Red Globe grapes can increase the levels of SO_2 damage during storage, it should be applied with great care. If used, it should be restricted to a single application. The use of a perforated bag is strongly recommended for GA_3 treated Red Globe stored for a maximum of eight weeks at -0.5 °C plus four days at 7.5 °C. If rain occurs, adhere to a minimum of three days before packing is resumed. If packing is resumed three days after rain, it is preferable to pack in non-perforated instead of perforated bags until conditions favourable for decay have passed, to reduce the risk of decay development during storage. If pink coloured bunches of the required harvest maturity are packed, it is preferable to pack in perforated instead of non-perforated bags, to reduce the occurrence of SO_2 damage during storage. In addition, vineyard cultural practices to ensure good colouration should be practiced.

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