



## Botrytis suppression in Grapes: high CO<sub>2</sub> versus SO<sub>2</sub>

The growth of the fungus *Botrytis cinerea* is a key post-harvest challenge for the grape industry. Although SO<sub>2</sub> treatment is effective, it has several downsides. Substituting 12% CO<sub>2</sub> (for SO<sub>2</sub>) appears promising, considering SO<sub>2</sub> treatment might soon be prohibited. This is the outcome of a research project, by Wageningen Food & Biobased Research, conducted within the GreenCHAINge project.

The growth of *Botrytis cinerea* in table grapes is a significant post-harvest issue. SO<sub>2</sub> is a very effective fungicide and slow-release SO<sub>2</sub> systems are routinely used in reefer-container grape transport. However, the negatives of SO<sub>2</sub> as a fungicide are serious: it accelerates corrosion, bleaches the fruit and certain consumers are allergic to the sulphite deposits. Crucially, SO<sub>2</sub> is legally forbidden for transport of organic grapes; good reason to search for alternatives. Explored within GreenCHAINge, an atmosphere of 12% CO<sub>2</sub> seems the most promising alternative to SO<sub>2</sub>. Transport under higher CO<sub>2</sub> percentages would further suppress *Botrytis* growth, but would also increase the risk of adverse effects on quality such as off-tastes and browning.

### Effects on grape quality

Wageningen scientists performed repeated lab experiments and field trials transporting grapes from South Africa to the Netherlands to determine if 12% CO<sub>2</sub> could be a viable alternative to SO<sub>2</sub>. It is, and caused no damage or off-tastes.

### Dry ice for atmosphere regulation

Controlled Atmosphere units cannot supply CO<sub>2</sub>, and grape-respiration rates are low. So the container must be air-tight, or an additional source of CO<sub>2</sub> provided. Experiments proved that dry ice is a suitable source of CO<sub>2</sub>. A patent application on this innovation has been filed.

### Future perspective

The first commercial high-CO<sub>2</sub> shipments of organic grapes have occurred. For non-organic grapes SO<sub>2</sub> remains financially more attractive than CO<sub>2</sub>. However, it is expected that measures will be taken to discourage, or even ban, the use of SO<sub>2</sub> as a (transport) fungicide. That would open a much broader application area for the use of dry ice as a source of CO<sub>2</sub> to prevent *Botrytis* growth during longer-duration grape transport.



Example of dry ice as a source of CO<sub>2</sub>.



Assessing quality of grapes after transport from South Africa to the Netherlands (upon arrival at WFBR).

For detailed information about this project result please visit [www.wur.eu/greenchainge](http://www.wur.eu/greenchainge).





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