



agriculture, forestry & fisheries

Department:
Agriculture, forestry & fisheries
REPUBLIC OF SOUTH AFRICA

GUIDELINES TO DETERMINE THE EFFECT OF FUNGICIDAL AGRICULTURAL REMEDIES ON FERMENTATION PROCESSES AND WINE QUALITY

**Issued by the Registrar: Act No. 36 of 1947, Private Bag
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Scope

These guidelines describe the procedure to evaluate the unintentional effects of fungicidal and including bio-fungicides products, on the fermentation processes and final wine quality in accordance with Act No 36 of 1947 as issued by the Registrar (2016), Department: Agriculture, Forestry & Fisheries of the Republic of South Africa. These guidelines supersede any guidelines published before by the office of the Registrar and shall be implemented effective from the 1st of September 2018.

Trials are required for a product containing an active substance known to have caused unintentional effects, or chemically similar to one known to cause unintentional effects on fermentation processes and final wine quality and refer to the following categories of plant protection products intended for application on wine grapes after flowering:

- any fungicide containing a new active ingredient that is not yet registered for use on winegrapes.
- any new formulation(s) or a generic of a registered product(s) where the PHI is 7 days or less.

1. Experimental field trial design

Experimental field trials should be designed as set out in the “Guidelines on residue study requirements for registration of agricultural remedies and setting of maximum residue limits (MRL’s) in South Africa” in Act No 36 of 1947 as issued by the Registrar (2016), Department: Agriculture, Forestry & Fisheries of the Republic of South Africa, except that treatments must be replicated as indicated herein.

2. Grape cultivars

Experimental trials should be performed on commonly grown *Vitis vinifera* crops, from both white and red varieties from any winemaking region. All field trials should be conducted on healthy grapes. It is not advised to use fragrant cultivars such as Bukkettraube, Muscat d’Alexandrie and Gewürtztraminer as these cultivars could mask possible negative effects of the chemical agent on the wine quality.

2.1. White cultivars that can be used are: Chenin Blanc, Cape Riesling, Colombar or Clairette Blanche.

2.2. Any red cultivars can be used.

Optimum ripeness or degree of ripeness of the grapes can be ascertained by sending samples to a laboratory capable of analysing the sugar and total acidity content prior to harvesting.

3. Sample requirements

Each experiment must include a control / reference sample and a treatment:

- 3.1. The control must be untreated or treated with a known / registered agent.
- 3.2. The treatment must be applied at the highest rate and the maximum number of applications with the shortest application intervals and up to the shortest pre-harvest interval indicated on the product label (cGAP).
- 3.3. Each treatment, as well as the control, must have at least three (see Annex A).
- 3.4. A random sample of minimum 2 x 22 kg healthy grapes for each replicate must be taken, i.e. a total mass of 44 kg grapes per replicate and 264 kg per treatment used for the wine making.

4. Vinification process

Wine quality must be monitored by a suitably qualified laboratory.

- 4.1. Grape must from the different treatments must be analysed for Sugar, pH, Total Acidity (TA).
- 4.2. White and red wines must be made according to a standard winemaking protocol using commercial active dried wine yeast (ADWY) *Saccharomyces cerevisiae* such as VIN 7, VIN 13 for white and WE372 red wines, respectively.
- 4.3. The progress of the alcoholic fermentation must be monitored throughout the fermentation process until fermentation is complete.
- 4.4. Malo-lactic fermentation status in red wines must be measured using paper chromatography.
- 4.5. The bottled wines made from the different treatments must be analysed for the following parameters:
 - Total sugar
 - Alcohol concentration
 - pH
 - TA
 - Volatile acidity (VA)
 - SO₂
 - Optical Density 420, 520, 620 ()

5. Laboratory-scale fermentations

Laboratory-scale fermentation studies must be conducted on grape must from one white and one red grape variety using 4 representative yeast strains (for example: VIN13 plus 3 other appropriate strains for white and WE372 plus 3 other appropriate strains for red wines).

- 5.1. Two litres of grape must from the control/reference and the treatments must be divided into 250 mL aliquots.
- 5.2. The ADWY should be rehydrated and inoculated according to the manufacturer's instructions.
- 5.3. The fermentations should be monitored by weighing the bottles every second day to determine the CO₂ weight loss and continued until there is no further weight loss.

6. Sensory evaluation

The sensory quality of the wines produced must be evaluated by a panel of between 6-10 judges 4-5 months after bottling. The treated wines must be compared to the control/reference wine with regards to any "off-odours", "wine foreign" or "chemical taint" attributes. The intensity of the detected attributes will be further assessed by making use of a 10 cm unstructured line-scale where the type of differences will be quantified.

7. Results

The results should be reported in a systematic format which includes the analyses and evaluations conducted.

References

Anonymous (2016). Act No. 36 of 1947, Department of Agriculture, Forestry and Fisheries of the Republic of South Africa, pg 1 – 36.

Anonymous (2002). Methods of analyses for wine laboratories. South African Wine Laboratories Association (SAWLA).

OEPP/EPP (2010). EPPO Standard PP 1/268 (1) Study of unintentional effects of plant protection products on fermentation processes and characteristics of wine. Bulletin OEPP/EPPO Bulletin 40, 260–265.

OEPP/EPP (2014). EPPO Standard PP 1/242 (2) Taint tests. Bulletin OEPP/EPPO Bulletin 44(3), 284–291.

OEPP/EPP (2014). EPPO Standard PP 1/243 (2) Effects of plant protection products on transformation processes. Bulletin OEPP/EPPO Bulletin 44(3), 292–293.

ANNEX A

Fermentation trial layout

White cultivar

Untreated control #applications)

Rep 1 2 x 22 kg grapes
Rep 2 2 x 22 kg grapes
Rep 3 2 x 22 kg grapes

Treatment (at HRR /

Rep 1 2 x 22 kg grapes
Rep 2 2 x 22 kg grapes
Rep 3 2 x 22 kg grapes

Red cultivar

Untreated control #applications)

Rep 1 2 x 22 kg grapes
Rep 2 2 x 22 kg grapes
Rep 3 2 x 22 kg grapes

Treatment (at HRR /

Rep 1 2 x 22 kg grapes
Rep 2 2 x 22 kg grapes
Rep 3 2 x 22 kg grapes

HRR = highest recommended rate and total number of applications

- A total of 6 samples (bottles) of wine per cultivar should be prepared.
- Tasting should be conducted in an identical manner for each cultivar