



STERILITY TESTING: WHY, WHEN AND HOW MANY IS TOO MANY?

Sterility tests are designed to test the effectiveness of a sterile filtration at bottling so that the wine is microbiologically stable in the bottle. A sterile filtration for wine is an 'absolute' 0.45micron filtration, usually through a membrane filter. 0.45micron is sufficient to remove all microbes that can potentially grow in wine. Wines with residual sugar and residual malic acid should always be sterile filtered to prevent refermentation in the bottle.

In addition to testing the effectiveness of the filtration, a sterility test should also verify that there have been adequate sterilization and sanitation measures in place at bottling. Inadequate sterilization/sanitation measures could result in microbiological contamination and potential microbiological instability.

A sterility test is not appropriate for wines that are not sterile filtered as there will often be growth from microbes in the wine. These microbes do not represent contamination from the bottling process.

The sterility test is a rapid 3-day test for the growth of any microbes that will grow in 3 days. Results are reported as cfu (colony forming units)/100ml.

- Results > 1 cfu/100ml can indicate potential filtration issues and possible sterilization and sanitation problems.
- Results of 0 cfu/100ml indicates that sanitation protocols are being correctly implemented.

A sterility test measures the presence of the following microbes:

- **Normal wine yeast (e.g. Saccharomyces) and bacteria (e.g. Acetobacter)** that have passed through an ineffective filtration.

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- **Contamination yeast, moulds and bacteria that are alcohol-intolerant** and cannot grow in wine. These microbes could be hiding in the bottling line and when the wine contacts them they pass through into the bottle.

A sterility test does **not** measure the following:

- Any microbes that take longer than 3 days to grow. These include wine-tolerant microbes like the **MLF bacteria** (*Oenococcus*, *Lactobacillus*, *Pediococcus*) and the yeast **Brettanomyces**.

Where sterility test results are > 1 cfu/100ml, an alcohol-tolerance test may be performed.

This will test whether the microbes in the sample can potentially grow in wine or not:

- Alcohol-tolerant microbes may indicate that the wine is at risk, especially if there is residual sugar and residual malic acid in the wine. Further testing and risk assessment should be done.
- Alcohol-intolerant microbes indicate contamination from the bottling process. These microbes will die off in the presence of alcohol and SO₂ after some weeks. Alcohol-intolerant microbes are unable to grow in wine and are not a risk for the wine.

How many is too many?

- **Dry wines with residual sugar < 3 g/L, malic acid < 0.2 g/L, molecular SO₂ > 0.6 mg/L, and with no past history of any microbiological spoilage (low VA, lower pH, no off-odours):** These wines are at very low risk for microbiological instability. Growth in these wines, especially if the microbes are alcohol-intolerant, is probably OK. Although it does indicate insufficient sterilization/sanitation measures on the bottling line, the wine is not likely to be affected. Dry wines, where growth is reported, should be retested for growth after a week or two and all risks should be assessed before the wine is released.

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- **Wines with residual sugar > 3g/L and residual malic acid > 0.2g/L:** These wines are high risk for microbiological instability. Any growth > 1cfu/100ml could potentially indicate microbiological instability issues, especially if they are alcohol-tolerant microbes.
- **TNTC (too numerous to count) cfu/100ml:** It is not always possible to do an accurate alcohol-tolerance test on samples with these results. This is because there are often many more than one species of microbe involved. This makes selecting a representative sample for the alcohol-tolerance test difficult. TNTC samples should always be retested. If the microbes are contamination microbes, a retest should come out clean (0 cfu/100ml) and the wine can be considered microbiologically stable. If growth persists in the retests, further analysis should be done before releasing the wine.
- **Sporadic growth on different samples over a long period of time:** This can indicate bottling line contamination and sanitation issues. Even where the microbes are found to be alcohol-intolerant, there is always a risk that alcohol-tolerant microbes could be present if sanitation is inadequate.

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