The risk of **yeast propagation** or **'mother tanking'**

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Wine yeast is vital for initiating and achieving alcoholic fermentation in winemaking.

Quality active dry yeast (ADY), when properly rehydrated and inoculated, ensures efficient fermentation and reveals the grapes' full sensory potential.

There are **significant differences** between the commercial manufacturing of yeast and propagation by wineries of yeast:

1. The Yeast Manufacturers production processes allow for biomass increase via respiration.
2. Winery propagation practices increase biomass through fermentation due to the Crabtree Effect. Even when propagation tanks are aerated the process is still predominately fermentation.
3. Respiration only occurs when the glucose concentration is kept low (approx. 0.1 w/v) and continuously fed in. In a winery situation there is no way to ensure this.
4. Winery-propagated yeast can differ from manufacturer-supplied ADY.
5. Oxygen, necessary for lipid and sterol production, can become limiting towards the end of fermentation, affecting alcohol tolerance. Thus, winery-propagated yeast may be less alcohol tolerant and have a higher chance of leading to a stuck fermentation.

Microbial quality of propagated yeast.

Some wine producers choose to multiply active dry yeast (ADY) in wineries using yeast propagation systems, **despite potential quality issues**.

The Propagation process multiplies all microbes, **not just the desired yeast**.

Even with purified cultures, and high levels of sterility, yeast manufacturers still end up with some background microbes.

According to OIV specifications, ADY must have below $1x10^5$ CFU/g of Lactic acid bacteria and below $1x10^4$ CFU/g of Acetic acid bacteria, to prevent quality issues such as high volatile acid (VA) production.

Not all yeast manufactures are equal, and most producers' background microbial contamination is just below the OIV specification, while others strive to be as far below the OIV specifications as possible. When you multiply your own yeast, you will inevitably multiply all these background bacteria as well!

Also, if your substrates are not completely sterile this could lead to a higher microbial background.

Therefore, the **selection of the yeast manufacturer** that your starter culture originates from becomes **very important**. It is wise to choose a yeast manufacturer with **consistently low microbial levels** for propagation. This can be determined by looking at the yeast COA's (Certificate of Analysis).

Winery propagation trials have shown that yeast cultures obtained through multiplication have high levels of bacterial contamination well above the OIV specifications.

This **poses a huge risk of high levels of VA production**.

The perceived benefit of propagation, on the next page...

Cost is one of the major perceived benefits of propagation, so is propagation cheaper?

Determining the true cost of yeast propagation isn't straightforward.

Often, it's **not cheaper** when taking hidden costs into account.

These costs are typically overlooked as they are usually classified as "overheads," not directly attributed to yeast propagation.

Examples of some of the **hidden costs** of propagation...

Remember: A single fermentation falling out of specification can potentially negate all the perceived savings for the year!

Infrastructure

Specialised tanks, pumps, compressors and **air filters** are essential for this process, which requires a significant initial capital investment.

QA (Quality Assurance)

The propagation process requires substantial **time commitment from QA** teams for testing and monitoring, necessitating a **high level of expertise**.

Space

Space is required to house the propagation system.

Refrigeration/ Heating

Effective temperature control is crucial during propagation, which often requires refrigeration. **Refrigeration** represents one of the most significant ongoing expenses in a winery.

Cleaning and Sanitizing

Maintaining **clean and sanitised** equipment is crucial for yeast propagation. This represents a significant and ongoing cost, underscoring the importance of proper hygiene practices in the process. **Costs include Chemicals, Caustic Soda, Citric Acid, Equipment, Energy, hot and cold water, Steam, Waste Treatment and Labour.**

Flexibility

Wineries often use a variety of wine yeast for different wine styles. Managing multiple grape arrivals at the cellar can be challenging. As most older propagation systems can only multiply one yeast at a time, extensive cleaning is required **between each yeast batch** to ensure the correct yeast is used.

Nutrients

The topic of yeast propagation and nutrient supply can be complex and multifaceted. It's not uncommon for equipment suppliers to offer incentives such as equipment discounts to promote a specific yeast nutrient. These nutrients are frequently yeast-based and may be rebranded versions of products already available on the market. It's important to note that there are often comparable alternatives available which can be more cost-effective. Furthermore, it's crucial to understand that yeast nutrients inherently have a microbial background.

In summary: The risk of yeast propagation

- **Higher Contamination Risk:** Yeast propagation in wineries can elevate microbial contamination, raising bacterial levels and increasing the risk of issues like high volatile acidity (VA).
- **Reduced Alcohol Tolerance:** Propagated yeast may have lower alcohol tolerance due to insufficient oxygen for lipid and sterol production, heightening the risk of stuck fermentations.
- **Signifcant Hidden Costs:** Substantial hidden costs arise for infrastructure, quality assurance, and cleaning, which can negate any perceived financial savings.
- **Operational Changes and Flexibility:** Managing different yeast strains demands significant effort, including extensive cleaning between batches, leading to operational inefficiencies and potential fermentation failures.

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