



TECHNICAL HARVEST NEWSLETTER

FERMENTATION PROBLEMS: STUCK/SLUGGISH FERMENTATIONS

At present, a problem fermentation is only recognized once it has arisen, but it's easier to prevent than to treat. Steps can be taken to restore yeast vitality; the success of such efforts depends on correct diagnosis of the root cause of the problem and adopted wine treatment.

HOW TO DIAGNOSE

Careful analysis of fermentation conditions provides key information on the reasons for fermentation problems. Enartis Vinquiry offers a **Fermentation Assessment Panel (Panel 9)** that provides essential analysis to determine the cause of the problem and the degree of completion of fermentation. It includes: Alcohol, Acetic Acid, Glucose, Fructose, Malic Acid, Lactic Acid, and a Microscopic Scan.

PRINCIPAL CAUSES OF STUCK/SLUGGISH FERMENTATIONS

The conditions of fermentation, such as temperature, pH, aeration, level of solids and inoculation practices can all impact fermentation and lead to incompleteness.

- **Nutrient deficiency:** YAN, vitamins and salts determine the yeast biomass population and their activity. Proper analysis of juice composition and careful attention to yeast nutritional and physiological needs reduce the risks of fermentation arrest. Long lag phase, due to a low yeast biomass, is generally a consequence of nutrient deficiency. See our [Yeast Nutrition](#) newsletter.
- **Survival factors deficiency:** Sterols and Fatty acids improve yeast cell resistance to stress conditions and increases their viability. Difficulty in maintaining viable biomass is usually due to a deficiency of survival factors. See our [Yeast Nutrition](#) newsletter.
- **High alcohol content:** Alcohol participates in the degradation of the cell membrane and reduces yeast viability. Brix adjustment and a proper yeast choice are necessary to deal with high Brix juices.
- **Spoilage microbes** can inhibit yeast growth and activity that leads to a stuck fermentation and wine spoilage. Lactic Acid bacteria can be removed by using **Enartis Zym Lyso** combined with SO₂. For a wider spectrum of action, **Enartis Stab Micro** reduces populations of spoilage yeast, lactic acid bacteria and acetic acid bacteria in wine.
- **Toxins**, such as residual pesticides, medium chain fatty acids, acetic acid, acetaldehyde, higher alcohols, components released from yeast or spoilage microbes, inhibit the metabolic activities of yeast.
- **Traumatic temperature shocks** can be responsible for an abrupt stop or sluggish late fermentation. Yeast are frequently able to recover from a cold shock while it is more difficult to re-start a fermentation stopped by heat.
- **Unbalanced sugar ratio:** some yeasts have more affinity toward fructose than others. When the stuck wine has a high fructose content, the restart needs to be done with a fructophilic yeast, **Enartis EZ FERM 44**.

Regardless of the cause of the stuck/sluggish fermentation, it is necessary to detoxify and treat wine before attempting to re-inoculate the fermentation. Some types of arrested fermentations may restart without addition of yeast following this treatment.

HOW TO PREPARE THE 'STARTER' FOR RE-INOCULATION

Successful restarting of a stuck fermentation depends upon two critical factors: proper pre-conditioning of yeast to be used as the inoculum and knowledge of the cause of the fermentation arrest

- Choose an adapted yeast, vigorous fermenter, resistant to high alcohol, high VA with low nutrition needs, and high implantation: **Enartis EZ FERM 44**.
- The nutrient content in a stuck wine is inadequate to support yeast growth. Adding an appropriate yeast nutrient, such as **Nutriferm Energy** during starter preparation improves yeast activity and facilitates acclimation to the potentially hostile wine conditions.
- Acclimation by steps: follow the Enartis [Method to Restart a Stuck Fermentation](#).



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HOW TO PREVENT A STUCK FERMENTATION

Observation of fermentation kinetics is indispensable to understand yeast development and activity. It allows the winemaker to identify the problem early and prevent the complete arrest of fermentation.

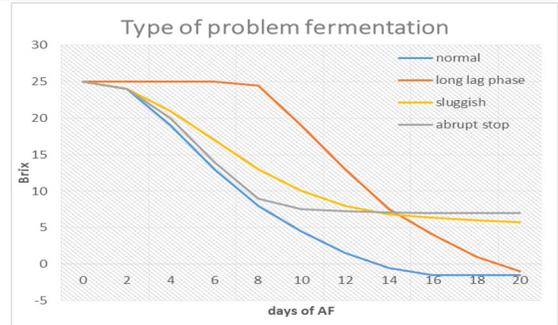


Table 1: principal diagnosis of sluggish fermentation and actions to take before re-inoculation

Phase	Analysis	Diagnosis	Actions
Long lag phase	Cell count: 48-72h after inoculation ~ 10^7 - 10^8 cells/mL with >80% viability	Poor yeast development	Re-inoculate
	YAN, Brix	Nutrient deficiency	1. Add yeast nutrients (Nutriferm Energy) if the fermentation didn't start 2. Add Nutriferm Advance at 1/3 fermentation
	Total SO ₂ , Cu, Fe	Toxins: SO ₂ , pesticides	Fining with bentonite, yeast hulls or Enartis Celferm
	Microscopic Scan	Development of spoilage organisms	Inhibit spoilage microbes with: <ul style="list-style-type: none"> Lysozyme (ENARTIS ZYM LYSO) for Lactic Acid Bacteria SO₂ (~20-30 ppm) for wild yeast and bacteria
Abrupt stop	Cell count: ~ 10^5 - 10^6 cells/mL with ~ 80 % viability	Temperature shock	1. Adjust temperature to 68-78°F 2. Suspend cells by circulating wine
Late sluggish fermentation		Survival factors deficiency	1. Add Nutriferm Advance at 1/3 fermentation 2. Aerate during fermentation
	Ethanol, VA, acetaldehyde	Toxins: ethanol, VA, acetaldehyde, higher alcohols	Reduce toxins by fining with bentonite, yeast hulls, Enartis Celferm or using Reverse Osmosis
	Microscopic Scan, Malic Acid, Acetic Acid	Development of spoilage organisms	1. Reduce spoilage microbes population with: <ul style="list-style-type: none"> Lysozyme (Enartis Zym Lyso) for Lactic Acid Bacteria SO₂ (~20 ppm) for bacteria Chitosan (Enartis Stab Micro) for any spoilage microbes Filtration 2. Remove metabolites produced by spoilage microbes with yeast hulls or Enartis Celferm
	Fructose, Glucose	Unbalanced sugar ratio	Re-inoculate with fructophilic yeast: Enartis EZ FERM 44

We hope that this information helps you in managing your fermentation. If you have any questions, please give us a call at (707) 838-6312.