



# **Yeast cell death caused by nutrient disequilibrium during alcoholic fermentation is impacted by nitrogen sources**

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## PROCEEDINGS BOOK





## Yeast Cell Death Caused by Nutrient Desequilibrium During Alcoholic Fermentation is Impacted by Nitrogen Sources

POSTER PRESENTATION ID: 220

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Nutrients availability is a key factor for controlling wine alcoholic fermentation. Among them, nitrogen has been identified as an essential parameter, controlling both the fermentation rate and the duration of the fermentation. However, nitrogen is not sufficient to ensure a correct fermentation and other nutrients such as vitamins and lipids, present in lower quantities, are required. Furthermore, we showed in a previous study that an excess of nitrogen combined with a depletion in certain micronutrients can lead to cell death and sluggish or stuck fermentation. In this study, we provide evidence of the mechanism controlling cell death and we show that all the nitrogen sources are not equivalent in the initiation of this phenomenon.

Fermentations limited in oleic acid, pantothenic acid and nicotinic acid showed yeast cell death linked to a high nitrogen content. In each case, lowering the nitrogen level restored yeast viability. We evidenced that yeast cell lack of a correct stress response to those micronutrient starvations in presence of high levels of nitrogen. A transcriptional analysis showed a correct stress response suggesting that the lack of resistance originates from a post-transcriptional control mechanism. We then provide evidence that the nitrogen Tor/Sch9 signaling pathway is involved in triggering cell death.

Yeast cell viability was then monitored and compared during fermentation starting at different nitrogen levels, with the addition of different nitrogen sources (19 amino acids and NH<sub>4</sub><sup>+</sup>) and two different timing of NH<sub>4</sub><sup>+</sup> addition. We observed that cell death was triggered with different intensities.

Yeast cell death associated to disequilibrium between micronutrients and nitrogen has been evidenced and its implication on fermentations highlighted. We showed a strong impact of both the nature of the nitrogen source and time of addition on yeast cell death and fermentation outcome.

**Keywords:** Wine yeast, Nitrogen, Cell death