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Reducing sulphite consumption in wines by applying bioprotective yeasts
Reducerea consumului de sulfit în vinuri prin aplicarea drojdiilor bioprotectoare

Consumer demand for "low-sulfite" wines requires alternative microbiological preservation strategies. Non-Saccharomyces yeasts (Metschnikowia pulcherrima and Torulaspora delbrueckii) suppress spoilage organisms through bioprotection (iron chelation, nutrient competition, oxygen depletion) without compromising fermentation. Bioprotective yeasts operate through an elegant ecological principle: inoculated directly into fresh grape must at the prefermentation stage, they rapidly colonize the available microbial niche before indigenous spoilage organisms can establish themselves. Operating at low prefermentation temperatures (10-16°C), these non-Saccharomyces yeasts competitively consume fermentable sugars and nutrients, produce inhibitory metabolites, trigger oxygen-dependent stress responses that suppress acetic acid bacteria and lactic acid bacteria, and establish mechanisms of cell-contact inhibition. Essentially, they perform this protective action without initiating alcoholic fermentation – a role reserved for later inoculated Saccharomyces cerevisiae strains, which take over once the ethanol concentration exceeds the ethanol tolerance threshold (~5% v/v) of the bioprotectors. This study

reports the results of field tests conducted under Moldovan conditions, validating the efficacy of bioprotector yeasts on white grape musts from the Codru region (Glera and Fetească Regală varieties). The results demonstrated a 32–50% reduction in sulfites compared to traditional methods**.** Volatile acidity levels (0.43–0.44 g/L) remained at approximately 40% of the EU quality threshold, demonstrating the successful suppression of acetic acid bacteria and other spoilage microorganisms during the critical pre-fermentative stage.

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