

A novel double-layer immobilised biocatalyst for simulated barrel aging production of sweet wine

Vassilios Ganatsios and Spiridon Mammalis
Eastern Macedonia and Thrace Institute of Technology, Greece

The present study was undertaken to assess the simulating barrel aging effects of a novel double-layer immobilised biocatalyst for low temperature wine making. The double-layer biocatalyst consisted of partially delignified and burned oak sawdust (DBOS) with entrapped *Leuconostoc oenos* cells, covered with starch gel containing the alcohol resistant and cryotolerant strain *Saccharomyces cerevisiae* AXAZ-1. The immobilized double-layer biocatalyst was found efficient for high gravity grape must fermentations at low temperature

and high final alcohol concentration. In parallel, this novel biocatalyst was able to convert malic acid to lactic acid and simulating oak barrel ageing through extraction of volatiles of burned oak sawdust producing a sweet wine with higher organoleptic characteristics as shown by GC and SPME GC/MS analysis. Improvement of wine quality compared with wine fermented with free *S. cerevisiae* cells was attributed to malolactic fermentation and lower alcohols production due to the low fermentation temperature. The significance of DBOS is the feasibility of three processes (alcoholic fermentation, malolactic fermentation, oak barrel aging simulation processes) in one batch fermentation reducing the production cost and energy demand in the food industry, giving the opportunity to the consumers to taste an aromatic sweet wine without preservatives.

v.gkanatsios@gmail.com