

## **A sustainable solution for wine protein-stabilization - replacing bentonite with cellulose**

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Wine clarity is a critical aspect in the commercialization of white wines. The formation of wine haze is primarily attributed to aggregation and precipitation of heat-unstable wine proteins. The main solution for protein haze in the winemaking industry is the use of bentonite, a montmorillonite clay which removes proteins based on charge interactions and physical absorption. While bentonite is a natural clay material, it must be mined from special deposits which limits the sustainability of the application. The use of bentonite also presents some disadvantages: i) the handling of dust before the application due to the health hazard associated with it, ii) the disposal of used bentonite and iii) the direct absorption of aroma compounds on the bentonite clay that severely affect the sensory profile of the wine. By these reasons there is a significant focus on developing alternative economical practices to replace bentonite as wine stabilizer.

Water-insoluble dicarboxymethyl cellulose (DCMC), a target oriented synthetic objective, was developed by our research group via a catalysed heterogeneous etherification of cellulose by halomalonates resulting in negatively charged materials at wine pH and able to absorb positively charged materials, namely thermally unstable wine proteins.

The application of DCMC in the wine sector shows potential due to its ability to stabilize white wines while preserving their aromatic quality.