

# INTEGRATED APPROACH FOR THE VALORISATION OF WINE INDUSTRY RESIDUES: PRODUCTION OF XYLITOL AND BIOETHANOL

## Environmental and industrial biotechnology (Bioenergy, bioremediation)

### PO - (780) - INTEGRATED APPROACH FOR THE VALORISATION OF WINE INDUSTRY RESIDUES: PRODUCTION OF XYLITOL AND BIOETHANOL

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#### Body

The wine industry is known to generate large volumes of by-products and residues that are not properly treated, representing an environmental problem (1). Vine pruning, wine lees, and grape must offer significant potential to serve as a sustainable source for the production of fuels and chemicals. Metabolic engineering strategies have been establishing *Saccharomyces cerevisiae* as a cell factory for biorefineries (2). For being sustainable, these biorefineries will require bioethanol and high-value chemical coproduction (2). In this work, an integrated approach was used for the valorisation of hydrothermally pre-treated vine pruning, using the xylose-rich hemicellulosic fraction for xylitol production (3) and the cellulosic fraction to produce bioethanol using genetically modified *S. cerevisiae* strains. Furthermore, wine lees were explored as nutritional supplements and grape must, rich in fermentable sugars, as both nutrient and carbon source. The xylitol production was optimized using different enzyme loading and inoculum size in a simultaneous saccharification and fermentation (SSF) process. Additionally, the production of bioethanol from the glucan enriched solid fraction was evaluated with the supplementation of wine lees and/or grape must, resulting in ethanol production higher than the critical threshold for distillation economic feasibility. This integrated multi-feedstock approach represents a possible solution for disposal problems of wine-producing industry, meeting the demands for the establishment of a circular economy.

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