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# Waste from the wine industry: an alternative to soil remediation in arid regions

Organic waste and effluents generated by agro-industrial activities can be reused as a source of organic matter and nutrients in arid areas. This study explores the feasibility of the efficient use of waste from Argentine viticulture to grow plant biomass in these arid regions (sorghum or perennial grass), thereby contributing to the principles of the circular bioeconomy.

View of the different plots cultivated in field trials using sorghum and perennial grass from effluents from the wine industry.

Agro-industrial activities generate significant quantities of organic waste and a variety of effluents, which pose significant environmental challenges, especially when they are not properly managed. But at the same time, these materials are a valuable source of organic matter and nutrients in arid areas with poor or impoverished soils.

In particular, Argentine viticulture, which in 2023 covered a total of 204,847 ha of agricultural land, faces water scarcity and soil impoverishment as limiting factors that condition the overall production in an important industrial sector. This industry produces, in turn, large volumes of grape residues, especially sediments and vine pruning waste, which can be valorised into products such as alcohol, tartaric acid, and compost, among others. However,

these valorisation processes generate effluents with a high organic load and salinity, further stressing water resources.

This study explores the potential of using these effluents to grow plant biomass in arid regions (sorghum or perennial grass), which could serve as a source of bioenergy, for animal feed or as co-substrates in the composting process, thus contributing to the principles of the circular bioeconomy.

The combined use of these materials as a water resource for planting sorghum and grass increased the organic matter content of the soil and led to a slight reduction of pH. Specifically, sorghum showed better tolerance to saline soils and high salinity effluents, in line with previous studies. Although the grass had a lower biomass yield, it was more efficient in nutrient uptake, concentrating more NPK (nitrogen-phosphorus-potassium), ash and soluble salts. These results suggest that the final choice between plant biomass alternatives to be produced depends on the preferred objective: biomass generation or nutrient capture.

In conclusion, the study confirmed the feasibility of the efficient use of effluents from the recovery of wine-producing waste and its valorisation through the generation of biomass for different purposes.

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## References

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