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## **THE ROLE OF MICROBIAL DIVERSITY IN SUSTAINABLE VITICULTURE: A STUDY OF ARGENTINIAN VINEYARDS**

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The grapevine is one of the most widely cultivated fruit crops in the world. It is estimated that 66% of the world's grape production is dedicated to wines and musts. A diverse, complex, and not fully characterized community of microorganisms lies at the heart of wine. These microorganisms play key roles at all stages of the viticulture and vinification processes, from helping the plants access nutrients from the soil, driving the plants' health through protection against pathogens, to the fermentation process that transforms the must into wine. Given this importance, an improved understanding of the microbial community and its interplay will have significant effects on the wine industry. Given the diverse and complex factors involved in the structuring of soil microbial communities, our objective was to evaluate how external factors such as harvest year, vineyard location, cultivar, and soil characteristics can affect the diversity of the present microbial communities. To achieve this, samples were taken from two cultivars from different vineyards in Argentina. One of the studies involved examining the microbiome at a single site over 3 years, while the other focused on studying the variations in the microbiome present in the main wine producing regions of Argentina. Differences in the microbiome were observed between vintages and vineyard locations, with soils showing variations in pH, organic matter, and content of carbon, nitrogen, and available phosphorus. On the other hand, the main challenge for the wine industry lies in maintaining high levels of productivity while ensuring product quality, consumer safety, environmental sustainability, and the health and safety of workers in the sector. In this context, sustainable agriculture aims to provide environmentally friendly solutions by reducing dependence on fertilizers, pesticides, and other agrochemicals. We characterized bacteria associated with the rhizosphere and phyllosphere of different vineyards. The in vitro analysis showed that a significant number of isolates from our collection have plant growth promoting activities. Additionally, biocontrol assays demonstrated that some isolates had the ability to inhibit important grapevine pathogens. This supports the hypothesis that plants influence the composition of their associated communities by 'selecting' microorganisms that enable them to adapt to various types of stress, both biotic and abiotic.

Palabras clave: palabras\_clave