



Effects of the biodynamic preparations 500 and 501 on vine and berry physiology, pedology and the soil microbiome

Authors:

Markus Rienth^{1*}, Frederic Lamy¹, Clément Chessex¹, Thierry Heger¹

¹ University of Sciences and Art Western Switzerland
Changins College for Viticulture and Oenology, Nyon, Switzerland

*Corresponding author: markus.rienth@changins.ch

Abstract:

Context and purpose of the study –

In the pursuit of increasing sustainability, climate change resiliency and independence of synthetic pesticides in agriculture, the interest of consumers and producers in organic and biodynamic farming is steadily increasing. This is in particular the case for the vitivincultural industry in Europe, where more and more producers are converting from organic to biodynamic farming. However, clear scientific evidence showing that biodynamic farming improves vine physiology, vine stress resilience, berry or wine quality, or is more sustainable for the environment is still lacking although this issue has been addressed by several research teams worldwide.

Material and methods –

To investigate whether biodynamic farming methods have an impact on vine physiology, berry quality or the environment, a long-term experiment has been set up in 2016 in a commercial vinery in Switzerland. In this trial the two main biodynamic preparations 500 and 501 were applied and compared to an organic control. Vine and berry physiology (Photosynthesis, vigour, sugar, organic acids, berry weight, yield) were assessed from 2016 to 2020. Soil physical properties (soil bulk density, water holding capacity, soil structural stability, macropore volume) were analysed from 2017-2020, furthermore, soil fungal communities were analyzed by DNA-sequencing in the last year of the experiment (2020).

Results -

All parameters related to vine and berry physiology didn't show any significant differences throughout the duration of the experiments. This was similar concerning the analyzed soil factors, which were not influenced by the application of the two biodynamic preparations in all years. Regarding the soil microbiome, 500 and 501 preparations did not lead to significant differences in fungal diversity and did not seem to impact the soil fungal communities. The present study confirms previous findings of different research teams that didn't observe significant differences between organic and biodynamic farming methods concerning the observed soil and vine parameters.

Keywords: biodynamic viticulture, microbial diversity, organic viticulture, vine physiology, berry quality