Remediation of Copper-Contaminated Soils in a Closed-Loop Process as a Sustainable Solution in Viticulture

The long-term and intensive use of copper-based fungicides in European viticulture – particularly in organic production systems where effective alternatives remain limited – has resulted in significant Cu accumulation in vineyard topsoils. Although vineyards cover only 3.3% of Europe's agricultural land, they account for approximately 86% of all fungicide use. In response to such environmental challenges, the European Union launched the Farm to Fork strategy in 2020, setting an ambitious goal to reduce the use of chemical pesticides in agriculture by 50% by 2030 (EC 2020).

Despite current regulations limiting Cu application to 4 kg ha^{-1} yr^{-1} (Regulation EU 2018/1981), legacy contamination from decades of overuse – often exceeding tenfold the current limits – persists in many vineyard soils. As a result, total Cu concentrations frequently surpass 100 mg kg^{-1}, with extreme values reaching up to 1500 mg kg^{-1} reported in France, where copper fungicides have been used for more than 140 years.

This project demonstrates the on-site application of ReSoil®, a closed-loop soil remediation technology engineered to remove copper and other toxic elements from contaminated vineyard soils. Using a mobile pilot unit, ReSoil® efficiently extracts harmful metals while maintaining essential soil functions and fertility, supporting continued agricultural productivity post-treatment.

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