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# DATA EXTRACTION OF SIGNIFICANT SOIL CHEMISTRY MARKERS FOR SUSTAINABLE VITICULTURE

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## INTRODUCTION

21st Century soil science must deeply grapple with the enormity of the agricultural impact on soils, and the complex ways in which this impacts soil sustainability.

There are several risks associated with unbalanced soil management, such as compaction, pollution, soil erosion, soil organic matter (SOM) depletion, and loss of biodiversity, that lead to a drop in vine quality and quantity [1].

**Soil management in viticulture and sustainable strategies assumes greater significance to improve the quality of modern viticulture.**

**Soil chemistry** and sustainable **soil management** in vineyard are directly correlated with wine grape quality. A critical component of this approach is the thorough understanding of soil chemistry. Soil health and composition directly impact vine growth, grape quality and overall vineyard productivity. Vineyard soil management includes diverse agricultural practices that all influence soil functioning [2].

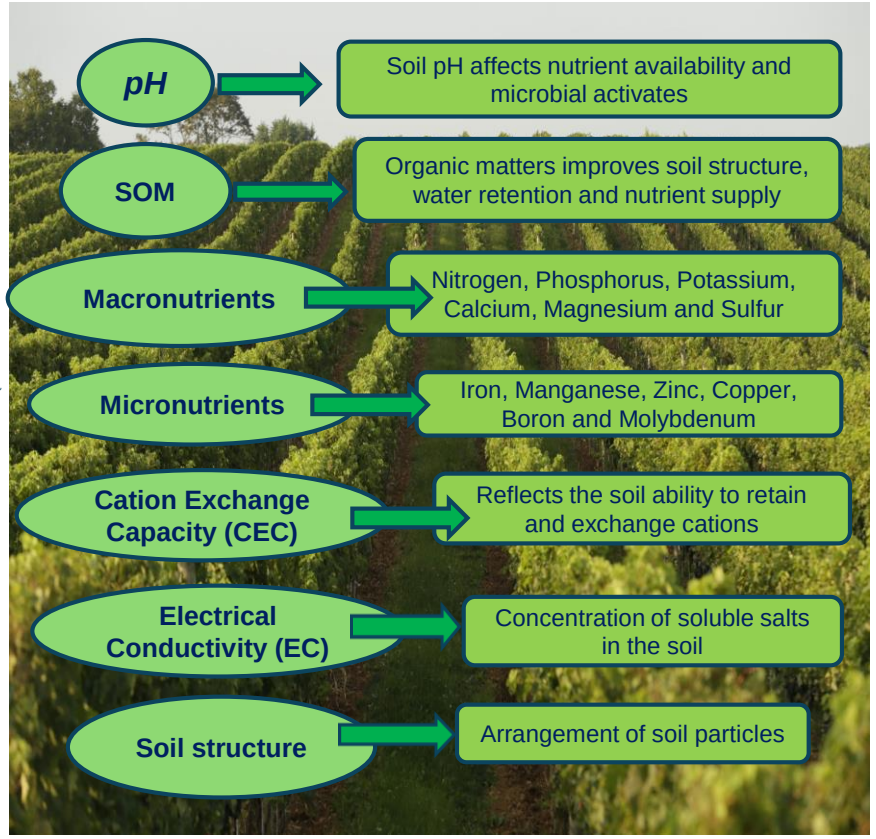
Chemical, physical, or biological indicators generally evaluate soil quality. Soil quality can be evaluated for agro-ecosystems in terms of providing baseline soil chemistry markers [3].

This study provides an overview of **baseline soil chemistry markers** that are essential for sustainable viticulture. Improvement of these soil chemistry markers helps in the development of better soil management practices [4].

Climate change impacts, showed doubts about its long-term sustainability in vineyard soil management.

**In fact, soil represents a non-renewable resource, and it is an open system in dynamic equilibrium with the other environmental components and in continuous evolution [5].**

## BASELINE SOIL CHEMISTRY MARKERS




## CONCLUSION

Maintaining an optimal pH value, balanced levels of micronutrients and micronutrients and a high content of organic matter significantly contribute to healthier vines and better grapesquality. Regular control and monitoring of sustainable chemical markers can reduce the unnecessary use of chemical fertilizers, encouraging a more sustainable and ecological approach to viticulture.

## INDICATING OPTIMAL RANGES in soil baseline markers

| Chemical indicator | Critical range |
|---|---|
| pH | 5.5-6.5 |
| Organic Matters | 2 – 4 % |
| Cation Exchange Capacity | 3.5 – 6.0 cmol/kg |
| Electrical Conductivity | 4 - 8 µS/cm |

| Macronutrients | Low | Medium | High |
|---|---|---|---|
| Phosphorus ($P_2O_5$) | < 50 mg/kg | 80 – 120 mg/kg | > 200 mg/kg |
| Nitrogen (N) | < 0.1 % | 0.1 – 0.2 % | > 0.2 % |
| Potassium ($K_2O$) | < 70 mg/kg | 150 – 120 mg/kg | > 350 mg/kg |
| Sulphur (S) | < 100 mg/kg | 100 – 200 mg/kg | > 200 mg/kg |
| **Micronutrients** | **Low** | **Medium** | **High** |
| Zinc (Zn) | < 0.2 mg/kg | 0.2 – 1,5 mg/kg | > 1.5 mg/kg |
| Iron (Fe) | < 2.5 mg/kg | 2.5 – 4.5 mg/kg | > 4.5 mg/kg |
| Copper (Cu) | < 0.2 mg/kg | 0.2 – 5.0 mg/kg | > 5.0 mg/kg |
| Boron (B) | < 0.5 mg/kg | 0.5 – 1.0 mg/kg | .> 1.0 mg/kg |
| Molybdenum (Mo) | < 0.2 mg/kg | 0.2 – 0.4 mg/kg | > 0.4 mg/kg |

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