EFFECT OF TECHNOSOL APPLICATION WAY ON CHEMICAL QUALITY OF PERCOLATED LEACHATES FROM SULFIDE-RICH TAILING

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OBJECTIVES

- Evaluate the efficiency of a designed Technosol, based on application mode, in the chemical quality of leachates from sulfide-rich tailing
- Explore designed Technosols as a cost-effective alternative to conventional closure systems of sulfide mine tailings

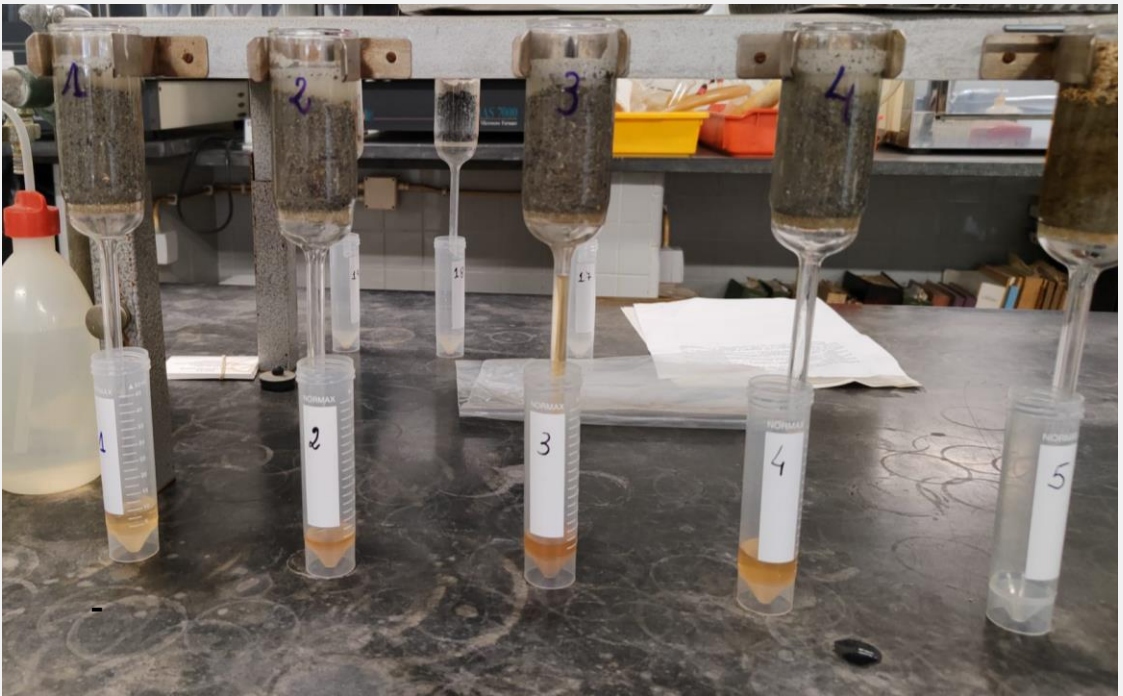
MATERIALS & METHODS

Column assay in semi-continuous (Irrigation with 20 ml/day)

Materials

Sulfide rich tailing - pH ≈2.5, high total amounts: 104-110 g Fe/kg, 60.0-67.5 g S/kg

Technosol with alkaline and eutrophic properties



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Treatments:

Control

TEC1 - Technosol mixed with tailing material

TEC2 - Technosol applied superficially

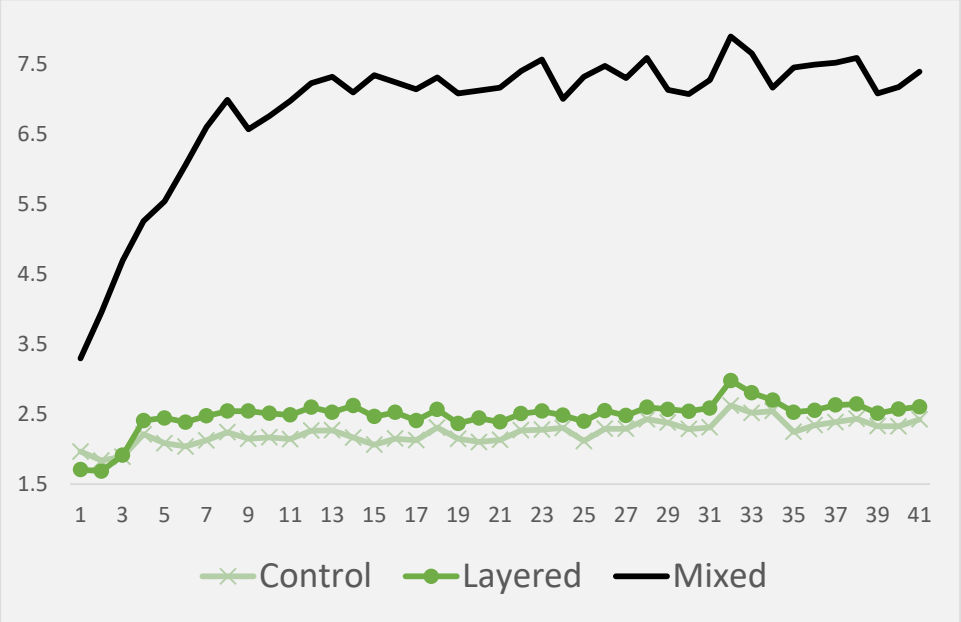
Evaluation:

Chemical quality of percolated leachates for 6 weeks

pH, CE, Eh, Fe and SO4 concentrations

RESULTS

Evolution of pH

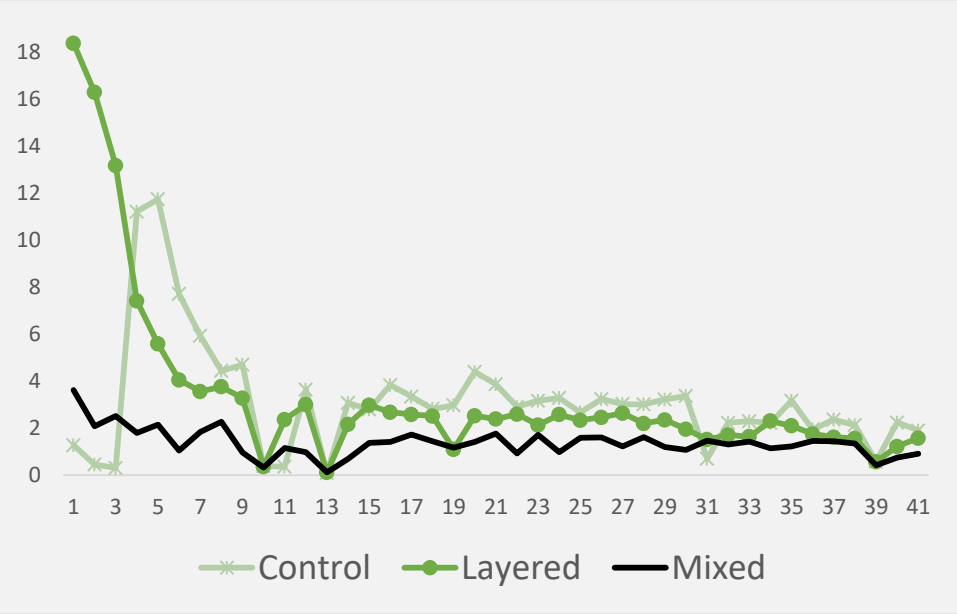


Control: 1.73 - 2.68

Technosol mixed with taling (TEC1) increase significantly pH

Lasting effect of the Technosol

Evolution of Electrical conductivity (mS/cm)



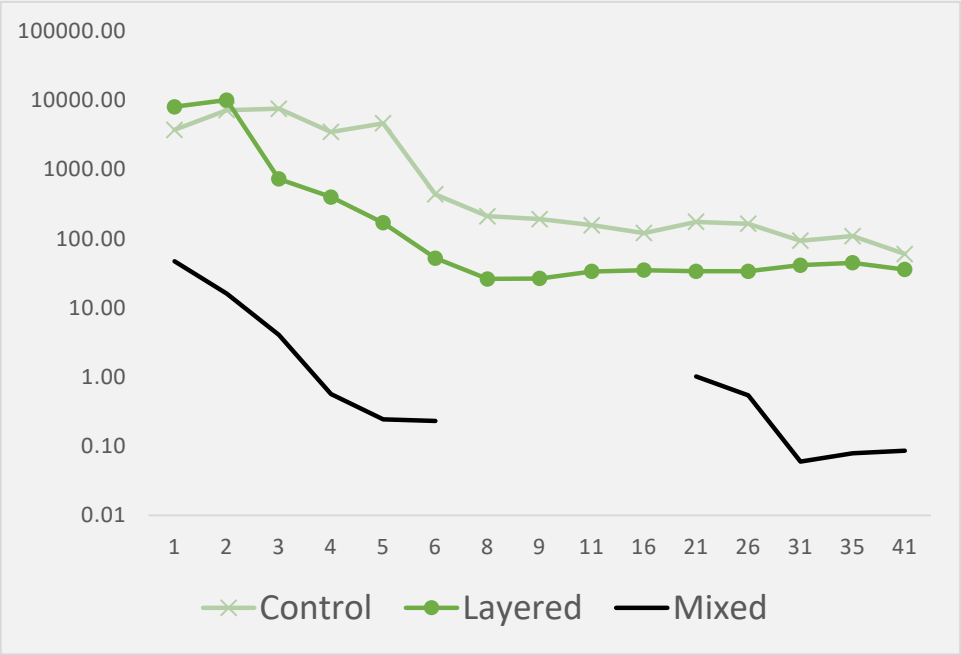
Control: 4-14 mS/cm

Tecnosol: decreased EC → First week: 73% (TEC1 - Mixed) and 81% (TEC2 - Layered) compared to control

TEC1: <1.6 mS/cm

RESULTS

Evolution of Fe concentration (mg/L)



Evolution of sulfates concentration (mg/L)

Control: High concentrations

Technosol decreased the Fe and SO4 concentrations independently of application type

TEC1 (Mixed): The highest effect in the diminution

CONCLUSIONS

- We can turn the acidity of sulfide mine tailings from a challenge into an opportunity for valorization along with several wastes through the Technosol elaboration

- Both application modes contributed to improvements in the chemical leachates' quality compared to control

- Application of the **Technosol mixed with tailing material improved** (quickly, during all assay period and in higher intensity) the chemical quality of the leachates compared to the layered Technosol

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