OLIVE MILL WASTEWATER STORED IN EVAPORATION PONDS: INTEGRAL ASSESMENT OF IN SITU BIOREMEDIATION STRATEGIES (COMPOSTING vs VERMICOMPOSTING)

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Background & Objetives

- **Olive mill wastewater (OMW) is a polluting liquid residue resulting from the olive oil extraction. Its accumulation in large evaporation ponds lead to a sediment/sludge concentrates, increasing antimicrobial and phytotoxic characteristics.**
- **This study aims to assess *in situ* bioremediation strategies for the treatment of OMWW based on composting and compo-vermicomposting.**

Materials & Methods

Affected area (8 Ponds- 25000 m²) Located in Mora (Toledo)

4 Plot (49m²) were delimited for *in situ* Research activities

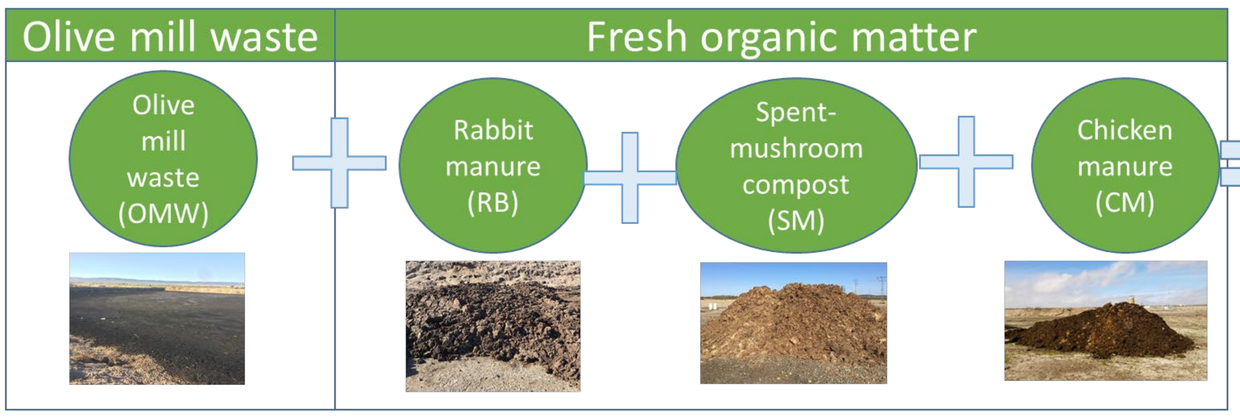
Bioremediation Treatment

COMPOSTING and COMPO-VERMICOMPOSTING

Total treatment time 266 days

183 days

Worms inoculated at day (2500 worms/m³)



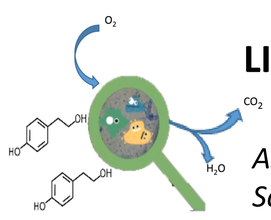
	OMW	RB	SM	CM	Mixture
Moisture (%)	58,2	73,3	70,2	53,8	49,9
pH	6,3	8,4	8,0	6,4	7,5
EC (dS/m)	8,7	8,6	4,9	6,7	4,9
OM (%)	72,2	73,7	78,3	29,7	37,3
TN (%)	2,05	2,82	0,93	1,66	1,51
Ratio C/N	22,6	13,2	40,5	9,37	17,91
Phenols (mg/kg)	27.508	4.809	2.008	3.356	6.086

1º Variable (Treatment)

- Composting
- Composting combined with Vermi

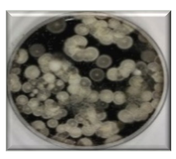
2º Variable (Bioaugmentacion)

- With Fungi inoculated (BIOAUGMENTATION)
- Without Fungi inoculated



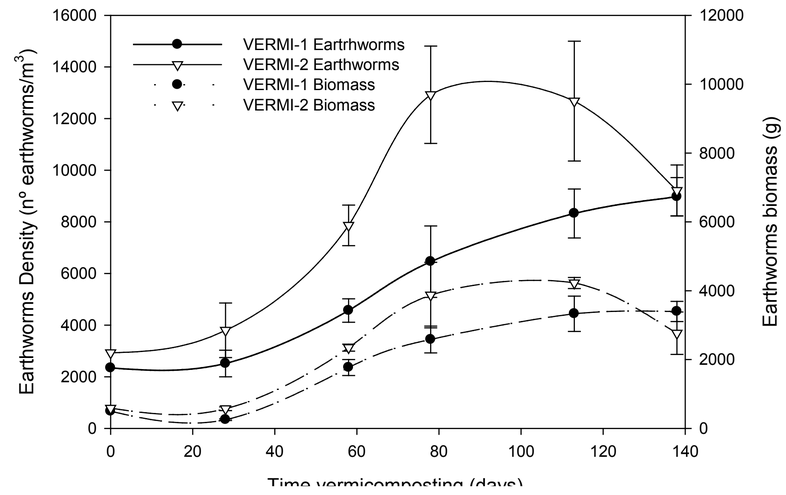
LIFE +REMOV

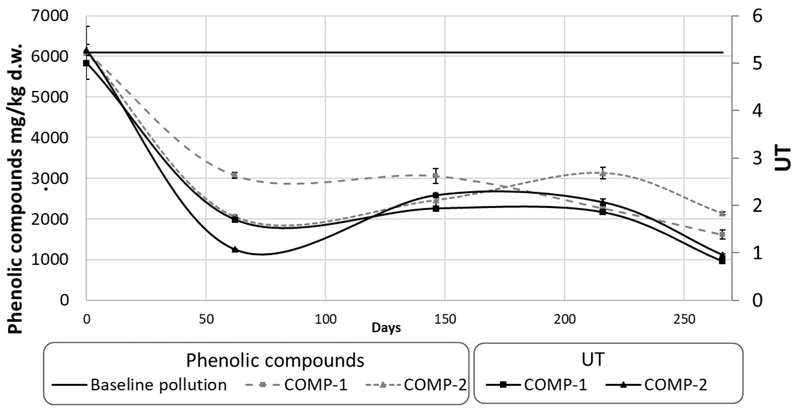
Asperigllus ochraceus H2
Scedosporium apiospermum H16

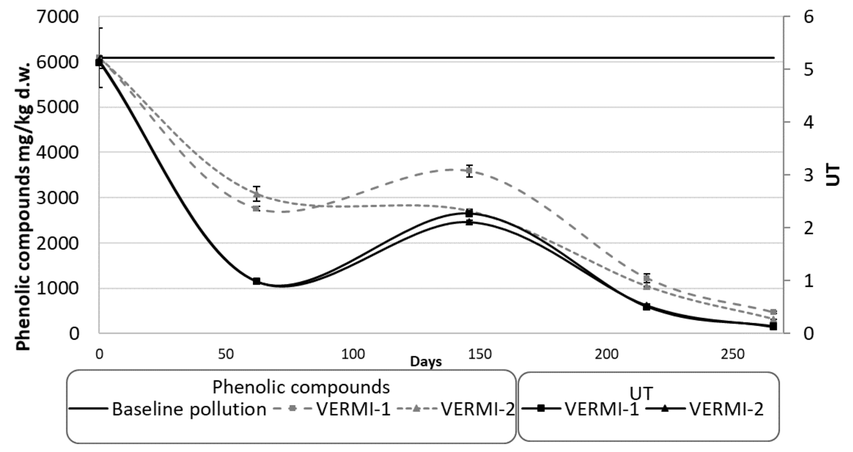


Results & Discussions

- Found a initial significant increase of earthworms density
- In addition the biomass of earthworms increase until 90 days
- Final products present 7% of humic like susbtances. These indicate that biotransformation ocurring during treatment







- The OMW present toxic values (<5 UT)
- The treatment applied reduce the fitotoxicty and ecotoxicity in OMW, specially in Vermicomposting pile

Conclusions

- Bioremediation strategies *in situ,* **composting and composting combined with vermicomposting** were effective to **solve the environmental issues associated with OMW toxicity**
- Both **treatments** proved to be successful **recycling the OMW into a well balanced products** for their safe use in agriculture
- The **inoculation improved** the **efficacy** of the cascade treatments in **OMW bioremediation**

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