ONEforest

# WP5: Perspectives of forest operations and revitalization of degraded forest
# Task 5.3 Topsoil cover engineering & Task 5.4 Planting with topsoil cover

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## Introduction

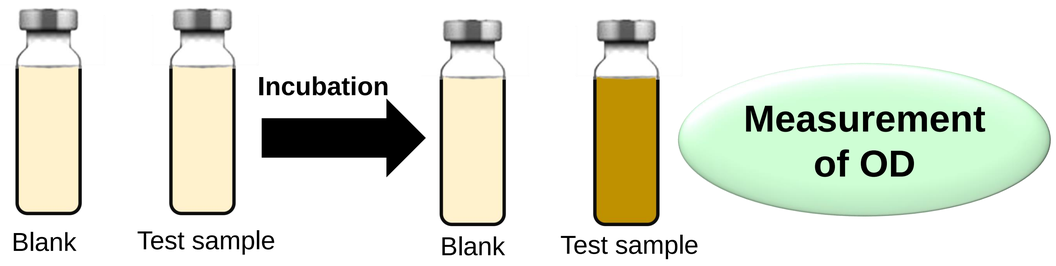
- **Top Soil Cover (TSC)** and **Soil Conditioner (SC)** were prepared with different compositions according to the previous WP5 tasks
- Laboratory experiments showed good water retention by **TSC** and **SC**
- Amendments can alter soil health

**Objectives:**

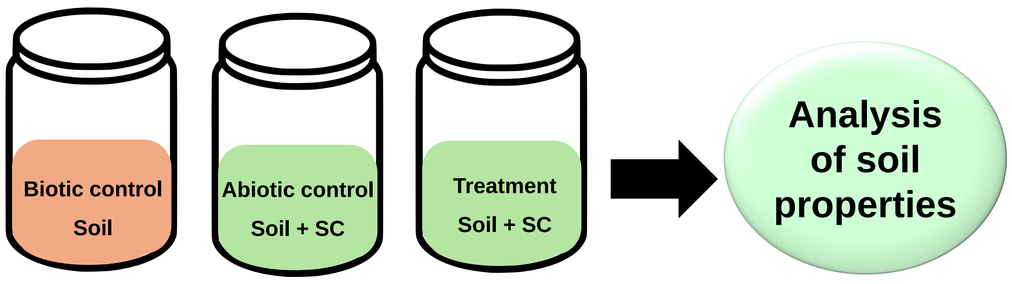
1. Evaluation of biodegradability of **TSC** and **SC** produced by **UNITN**
2. Assessment of impact of the **SC** in controlled condition
3. Probable use of the **TSC** in agriculture
4. Evaluation of impacts of the **TSC** and **SC** in forest
5. Evaluation of beneficial role of **TSC** in soil using qPCR

## Methodology

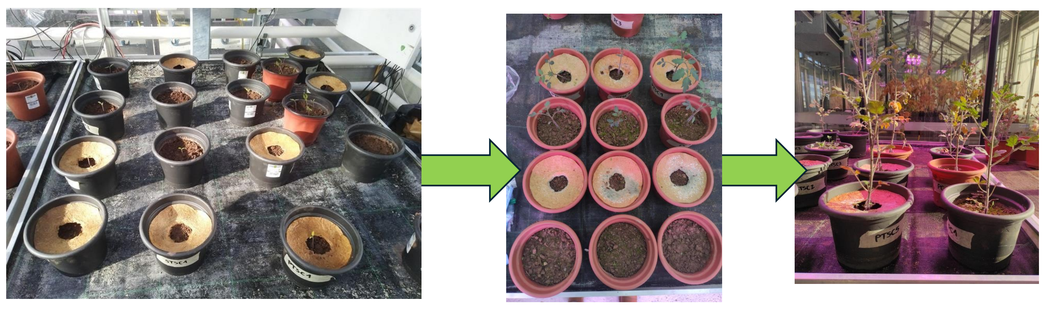
### Biodegradability




### Microcosm study of SC




### Greenhouse study with TSC and tomato plant



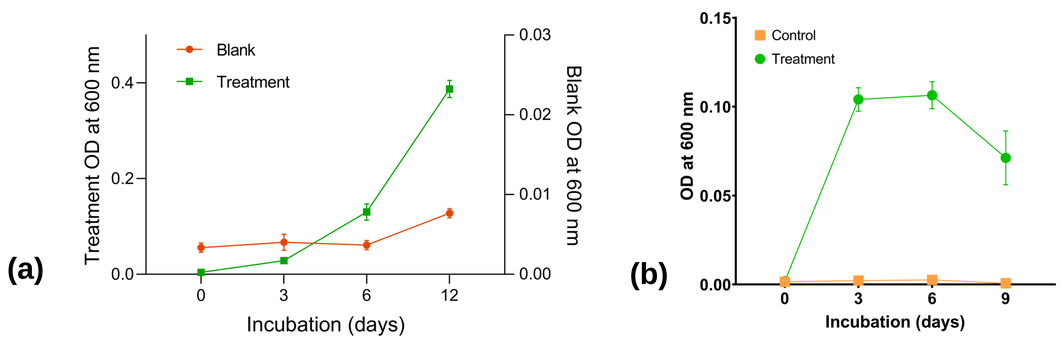

### Field trials with SC and TSC

1. Germany (SC)
2. Spain (SC)
1. Spain (TSC)

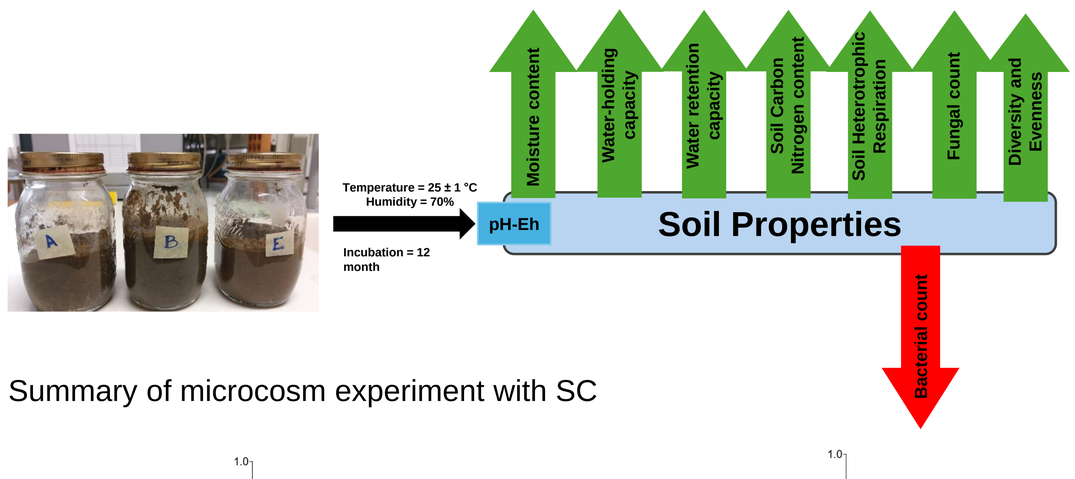
### Key techniques used for analysis

- Microbial metabarcoding (Illumina)
- Gene quantification (qPCR)
- Bacterial functionality (Omnilog)

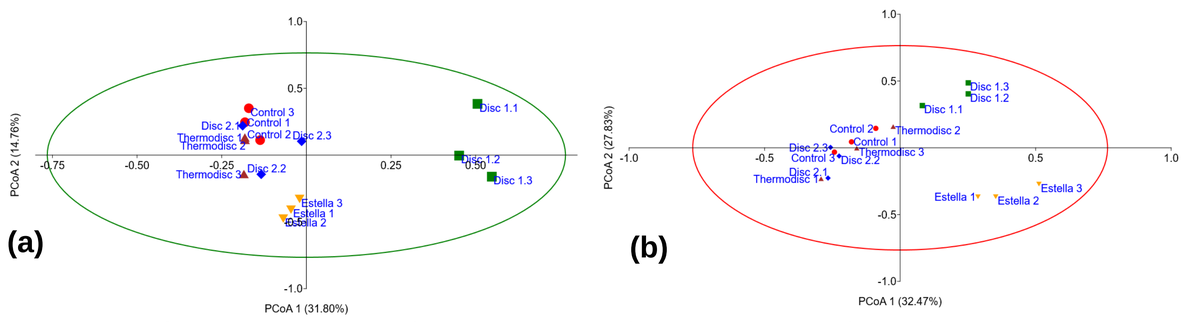
## Result




Biodegradability of (a) Soil conditioner (SC) and (b) Top Soil Cover (TSC)




Summary of microcosm experiment with SC




PCoA plot of (a) bacterial and (b) fungal diversity in field trial with TSC in Central Nursery of Forestal Catalana, Girona, Spain

## Conclusion

✓ Advantageous ✗ Disadvantageous

| Properties | Soil conditioner (SC) | Top Soil Cover (TSC) |
|---|---|---|
| Biodegradability | ✓ | ✓ |
| Indigenous microbial community | ✓ | ✓ |
| Unaltered soil properties | ✗ | ✓ |
| Increased microbial richness in soil | ✓ | ✗ |
| Increased microbial activity in soil | ✓ | ✗ |
| Increased microbial evenness | ✓ | ✗ |
| Decreased microbial dominance | ✓ | ✓ |

- SC cause irreversible change in soil properties, as they are mix with soil
- On the other hand, TSC is not able to increase soil microbial activity and richness, despite a decreasing the overall microbial dominance

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