LIFE SUBSED - LANDFARMING TO VALORIZE PHYTOREMEDIATED MARINE SEDIMENTS FOR THEIR REUSE IN NURSERY

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INTRODUCTION

Landfarming

periodically (once a week)

through a little excavator

mixing and aeration

• 3 months

The management of dredging sediments represents a great problem. In Europe every year up to 100-200 million m³ of contaminated sediments are dredged and need to be treated in order to be reused. Phytoremediation and landfarming represent two biological methods for the remediation of polluted sediments. The aim of **SUBSED project** is to demonstrate the suitability of landfarming process on marine phytoremediated dredged sediments to create a new substrate able to replace the conventional one

MATERIAL AND METHODS

Marine sediments (port of Livorno) were partially decontaminated in **Agriport** project

> Plant used: Paspalum vaginatum, Tamarix gallica, Spartium junceum
> Compost 4kg m²

Phytoremediation

Decrease in heavy metals (20%)
and total petroleum hydrocarbons
(50-60%) concentration

 ✓ Improvement in chemicalnutritional properties (25% increase in N and P)
✓ Stimulation of the biological activity (50% increase in number and activity of microorganisms) The treated sediment will be tested as agronomic substrates

- fruit trees (olive and citrus)
- ornamental plants (protea, calla, laurel),
- food plants (basil, blueberry, wild strawberry and citrus).

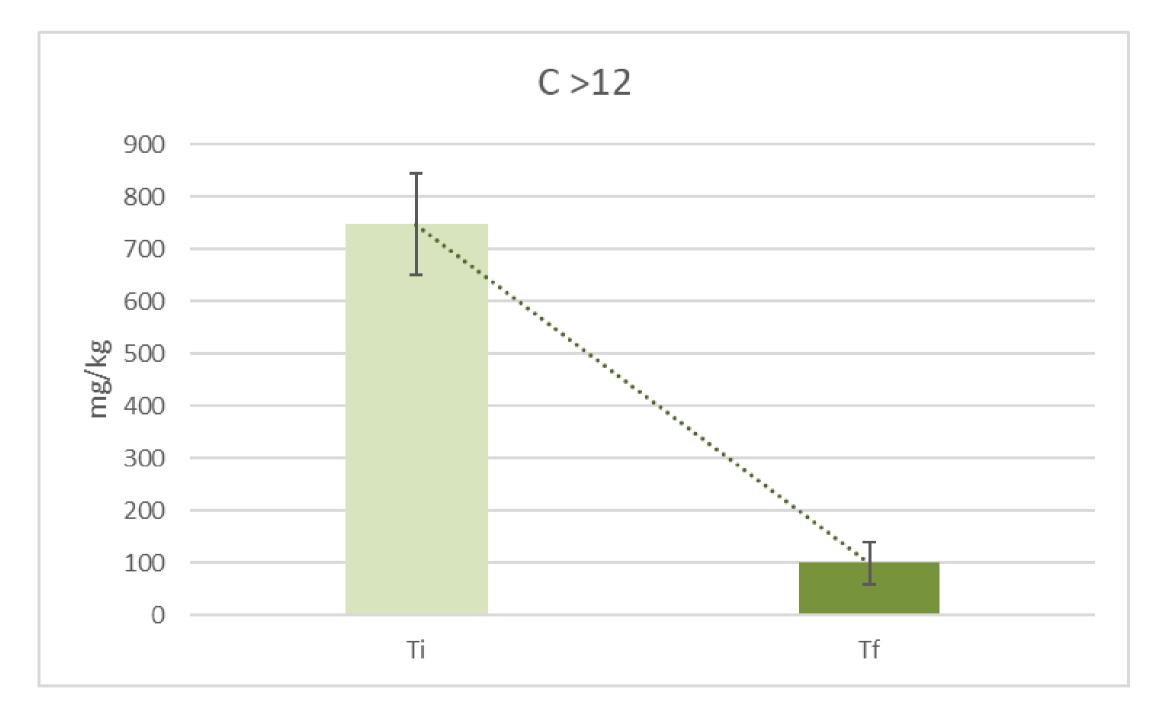
In **Subsed** project the landfarming was applied to phytoremediated sediments

Landfarming is a technique for the remediation of contaminated matrices that exploits the biological action of microorganisms through their biodegradative processes towards pollutants

LANDFARMING RESULTS

		Ti	Tf	D.Lgs 75/2010
Bulk density	g/cm3	1.49 ± 0.004	1.19 ± 0.05	0.95
рН		7.5 ± 0.1	7.4 ± 0.02	4.5-8.5
EC	dS/m	0.26 ± 0.03	0.14 ± 0.02	<1
Cation Exchange Capacity	meq/100g	12.6 ± 1.1	12.6 ± 0.1	-
Total Organic Carbon	%	<i>1.35 ± 0.08</i>	1.38 ± 0.08	4
Total Phosphorus	%	0.042 ± 0.002	0.037 ± 0.002	-
Total Nitrogen	%	0.11 ± 0.01	0.11 ± 0.01	<2.5
Си	mg/kg	45 ± 6	49 ± 2	230
Zn	mg/kg	151 ± 2	146 ± 4	500
Ni	mg/kg	38 ± 2	38 ± 1	100
Pb	mg/kg	<i>39 ± 2</i>	37 ± 6	140
Cr	ma/ka	60 ± 5	50 ± 4	150
Butyrate esterase	mmol/kg h	455 ± 53	<i>317 ± 16</i>	

✓ Hydrocarbon C>12 decrease noticeably (<100 mg/kg)



In compliance with Italian

to reach the limits required,

✓ The bulk density and the conductivity significantly decreased at the end of landfarming process
✓ As expected, no variations for heavy metals were detected

regulation for agronomic substrate (D.lgs. 75/2010) with the exception of **TOC** (lower) and **bulk density** (higher) mixing of sediments with a source of organic matter rich in carbon and light, such as **peat, coconut fiber, wood fiber,** is necessary

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Conclusion The landfarming process was effective in homogenizing the treated sediments and reducing organic contamination, reaching suitable physical and chemical characteristics for its use for agricultural sector in association with other substrates.







