

TECO Mobility grant

AURORAs – Applied Urban Orchard Assessment

Beneficiary of the grant- PABLO SOUZA ALONSO

Home Institution/Company (EU)- PERSONAL INITIATIVE

Host Institution/Company (INDIA)- DEPARTMENT OF ENVIRONMENTAL SCIENCE.
BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY (LUCKNOW, INDIA)

Period of the stay in India- SEPTEMBER-DECEMBER (2017)



TECO Project

*Technological ECO-innovations for the quality control
and the decontamination of polluted waters and soils*

Tel: +39 06 9067 2540

E-mail: teco.challenge@gmail.com

Website: www.tecoproject.eu

Objectives of the project

OBJECTIVE 1

Preliminary evaluation of orchards within urban and peri-urban areas of Lucknow. Field prospection

OBJECTIVE 2

Evaluation of bioactive amendments (biochar and microbial inoculum) as fast and non-expensive amendments to ameliorate plant growth, limiting the exposure of crops (radish and spinach) to heavy metals (HMs) in polluted soils.

- Evaluation on plant germination
- Evaluation on plant early growth



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Activities carried out during the period of the grant

OBJECTIVE 1. *Field assay*

Selection and prospection of orchards within the urban area of Lucknow.

Soil collection and characterization

Measurement of soil physic-chemical parameters (pH, humidity, organic matter, total organic C, total N and total P) and HM content (phytoavailable content of Cd, Cr, Pb, Cu, Zn, Mn) through AAS (atomic absorption spectrometry). This part of the study is carrying out in collaboration with NBRI (National Botanical Research Institute)



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Activities carried out during the period of the grant

OBJECTIVE 2. *Greenhouse assay*

Unpolluted soil collection, certified seeds and biochar acquisition. Artificial soil pollution.

Trichoderma culture and inoculation

2.1. Petri dishes experiment. Seed germination (Gt). Radicle and hypocotile length. Fresh and dry biomass. Measurement of different germination and vigour indices

2.2. Pot experiment . Radish and spinach establishment, watering and monitoring. Partial and final measurements: plant height, number of true leaves, root length, fresh and dry biomass, pigment content (Chl_a, Chl_b, and carotenoids).

Total and available content of soil HM content, total HM content in plant tissues.

Colony-forming unit (CFU) measurements



Main outcomes

Biochar seemed to promote germination and initial length of crops (spinach and radish). *Trichoderma* inoculation was not effective to ameliorate seed germination and early growth. The effectiveness of the combination (biochar+trichoderma) was similar to biochar applied alone.

Bioactive amendments seemed to be more effective for plant growth in the germination stage than in the adult plant stage

Results from soil HM content of urban orchards are still under analyses. Similarly, soil and plant heavy metal results derived from the greenhouse assay are still unavailable and, therefore, the reduction of HM mobility is currently under investigation



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Main outcomes

Based on the previous and continuous literature survey, we are currently preparing a review on the state of urban soils in India. This manuscript is currently under elaboration

After soil data collection, analyses and interpretation, we are planning to prepare at least two manuscripts (one based in the experimental design of the proposal + review on urban soils) that will be sent for publication in International peer-reviewed Journals.



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Complementary actions

- Assistance to the International Conference TECO Joint Workshop that was celebrated in Delhi during the 2-3 of November, orally presenting the experimental design and initial results of the project entitled “AURORAS – Applied Urban Orchard Assessment”
- Collaboration on the book chapter “Market opportunities in sustainable phytoremediation”, second chapter of the book entitled PHYTOMANAGEMENT OF POLLUTED SITES



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