

Bioprocess reducing the solubility of rhizospheric cadmium

This project proposes an innovative and environmentally friendly bioprocess to reduce the bioaccumulation of cadmium (Cd).



The aim of the project is to reduce the cocoa bean Cd concentration to values below 0.8 mg kg⁻¹ dry weight in the cocoa plantations where this biotechnology will be installed.

The implemented initiative

The bioprocess will involve: (a) the isolation of a consortium of soil fungi native to cocoa plantations, that have the ability to decrease aerial and root Cd bioaccumulation (CB_{r,a}) coefficients; (b) the assessment of the effectiveness of the bioprocess in

bioreactors, and the elevation of cocoa family farms (FF) to Technology Readiness Levels (TRL) 6 and 7. Activities will be carried out via technical cooperation with scientists and farmers as well as private and governmental sectors.

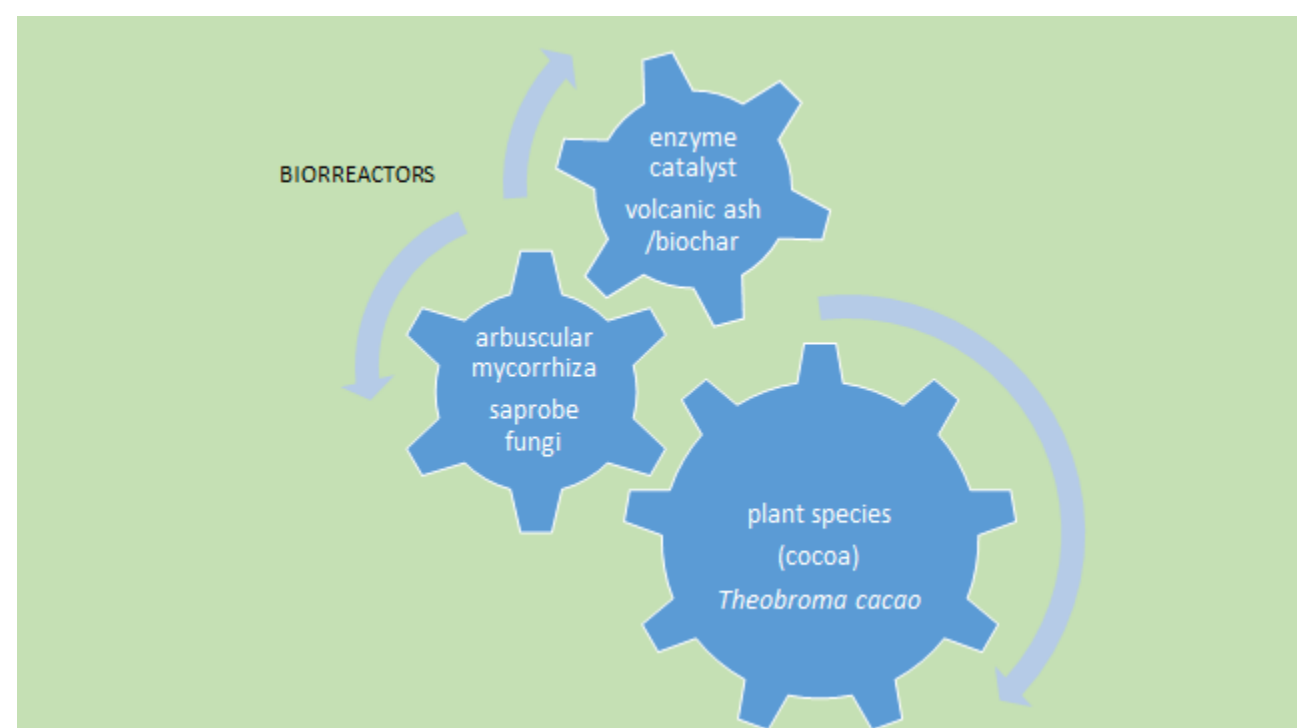
To generate a bioprocess based on a fungal consortium that will reduce the Cd content in cocoa beans.

The technological solution

The goal of the project is to reduce Cd bioaccumulation in cocoa beans to values lower than 0.8 mg kg⁻¹ dry weight via the management of soil microbiota. This biotechnology will be implemented in Ecuador and Venezuela, where assistance is currently being given to more than 30 cocoa farm owners, and 15 entrepreneurs are being trained, all being leading figures in their

localities. This will enable improvements in living conditions and increases in income for beneficiaries. Emphasis will be on the advancement of the women involved (whether rural population, technicians, professionals or entrepreneurs). Media broadcasting are via networks, 13 published scientific papers and 3 theses.

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MÁS INFO



Results

Present results show:

1. The high P-solubilizing efficiency of microbial populations native to soils under lemon plantations in Ecuador permits the growth of CN seedlings and eliminates the need for incorporating Cd-contaminated P fertilizers.
2. The isolation of fungal strains capable of being used in the bioprocess was carried out.
3. The fungal isolates are conserved in the Glomeromycota banks of the UBA and the CSIC

Estación Experimental El Zeidín.

4. TRL 4 bioreactors allow evaluation of the impact of varying Cd concentrations in cocoa seedlings.
5. The physico-chemical data obtained in the TRL 4 bioreactors can be upgraded to TRL 6 in plant purification modules while respecting the physical, chemical, and biological calibrations obtained at TRL 4.
6. Symbiotic effectiveness of the mycorrhizal strain was assessed in Baccharis salicifolia, with very high bioextractive potential of Cd.



+6000



+5

Graduate and postgraduate theses defended and in progress



522

Women benefited from the initiative



15

Publications



2

Technological solution



7

Networks



+7

Published articles-conference presentations



2

Undergraduate thesis executed



+3

PhD thesis in progress



+9

Didactic and reference material



1

Defended doctoral thesis



+4

Courses, conferences, workshop

Main donors



Participating Organizations

