

R&D PROJECT



COMPANIES

COMSA, S.A.U.
Fundación CETIM
Centro Tecnológico LEITAT

BUSSINESS AREAS

Infraestructure area
COMSA, S.A.

DURATION

2015-2019

BUDGET

857.110,60€

KEYWORDS

Anticontaminación balasto,
Metales pesados e
hidrocarburos,
Fitorremediación y bioaumentación

COORDINATOR

Joan Peset

EXTERNAL FUNDING



Title of the project

Sustainable integrated anti-pollution treatment for the creation of green rail corridors

Acronym

RECOVER

Content of the project

Currently, the pollution associated to trains on outdoor and underground railways is very important and its effects are very worrying, as heavy metals and hydrocarbons are released during the circulation of these trains, which represents a toxic risk to health and the environment.

Heavy metal contamination on railways is mainly due to brake wear, wheel-rail contact and pantograph-catenary friction. The presence of hydrocarbons is due to gear grease, oils, fuels, fuels and uncontrolled spills in transport operations.

The objective of the project is the creation of Green Rail Corridors through the elimination or mitigation of pollution associated with the operation of these infrastructures.

General objectives

The project proposes to design various systems for the collection and elimination of pollutants composed of heavy metals and hydrocarbons using different technologies:

- Sol-gel based ballast coating composed of silicon oxide and complexing functional groups capable of absorbing heavy metals and photocatalytic titanium oxide capable of degrading hydrocarbons
- Modified ballast by fixing ionically imprinted polymers based on polyurethanes for heavy metal adsorption
- Phytoremediation processes and bioaugmentation of soil microbial population able to remove heavy metals and hydrocarbons

Results and conclusions

A field test has been carried out at the Alamedilla halt in Salamanca, after agreement with ADIF, due to the presence of contaminants. Samples were taken from ballast and soil adjacent to the railway tracks to analyse the concentration of heavy metals and hydrocarbons before treatment and 8 months after treatment.

In general, good results have been obtained in relation to the uptake of heavy metals and hydrocarbons by sol-gel and PRIs, reaching up to 80% reduction of pollutants in certain areas between before and after treatment. However, the results were not so satisfactory for bioaugmentation and phytoremediation, although it is true that in the latter a better uptake of heavy metals was observed in the aerial part of the plants than in the roots.

It should be noted that the environmental conditions were not ideal for the analysis and that the continuous contribution of external contamination from the diesel locomotives running in the halt during the test period hindered a clearer analysis of the results.

Finally, a Business Plan has been drawn up to exploit the anti-pollution solutions developed in the project.