

Technology Offer

CSIC/AI/011

Carbon foam container for the phytoremediation of contaminated soils



An integrated phytoremediation system based on a cylindrical carbon-foam container produced from sucrose and iron. The device functions both as a plant pot and as an active soil amendment, making it particularly suitable for the decontamination of industrial, mining, forestry, and agricultural soils.

Intellectual Property

Priority patent application filed

Stage of development

Laboratory-validated prototype. Technology ready for pilot-scale or industrial testing.

Intended Collaboration

Licensing and/or co-development

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Market need

The remediation of soils contaminated with heavy metals and hydrocarbons commonly relies on granular amendments (such as biochar, compost, and similar materials). However, these approaches often suffer from runoff and erosion in sloped terrains, which significantly diminishes their effectiveness. Furthermore, their application typically requires machinery and soil tillage, increasing costs and restricting their use in areas that are difficult to access. Consequently, there is a clear demand for stable, low-cost, and easily deployable systems capable of combining contaminant adsorption with the support of plant growth under adverse environmental conditions.



Proposed solution

Innovative self-supporting porous cylindrical container manufactured through a straightforward moulding and thermal foaming process based on sucrose and iron nitrate. The resulting material is a carbon foam incorporating embedded iron nanoparticles, which serves both as a physical support for plant growth and as an adsorbent agent for contaminants.

The system is installed directly on the soil surface without the need for excavation, thereby creating a stable and localised treatment zone.

Competitive advantages

- Reduces installation costs and enables deployment in otherwise inaccessible areas.
- Resistant to runoff and erosion on sloped terrain
- Promotes root development and enhances contaminant retention.
- Enhances the uptake of contaminants by plants.
- Functions simultaneously as a plant container and as an active soil amendment with the capacity to adsorb metals and hydrocarbons.