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ReSoil

By Soilution

Biodegradable Mycorrhizal Capsules for Urban Soil Regeneration

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Executive Summary

ReSoil is an innovative ecological solution meticulously crafted to address a pressing environmental concern: the declining health of urban and agricultural soils across Europe. It introduces a new delivery format for proven bio-agricultural agents — biodegradable capsules infused with scientifically selected microbial strains. These capsules simplify usage while ensuring targeted effectiveness. Developed by an international team of multidisciplinary students during the 2025 Citeuropass program, this frugal and scalable biotech product addresses environmental restoration, urban agriculture, and sustainable land use, in line with European Green Deal goals. It offers municipalities, farmers, and eco-conscious individuals an efficient, accessible alternative to synthetic soil enhancers.

Problem Definition

Across Europe, urban and peri-urban soils suffer from critical degradation due to industrialization, intensive agriculture, and urban expansion. These soils often exhibit low organic matter, poor microbial biodiversity, compaction, and contamination. Urban reforestation and greening projects frequently fail due to poor root establishment and nutrient deficiencies. Current chemical-based or powder microbial products offer limited effectiveness, high labor needs, or lack user-friendliness. There is a gap in the market for a natural, targeted, and scalable soil regeneration method that is easy to apply and accessible across multiple user types.

ReSoil – Product Overview

ReSoil consists of single-use, compact capsules manufactured from agar-agar, a plant-derived, biodegradable gelling agent known for its moisture sensitivity and safety for live microbial applications. Each capsule is filled with a synergistic formulation including Arbuscular Mycorrhizal Fungi (AMF) for symbiotic root colonization, Plant-Growth Promoting Rhizobacteria (PGPR) such as Bacillus subtilis, and Trichoderma fungi known for suppressing soil-borne pathogens. It also incorporates seaweed extract and humic acids to further stimulate root development and microbial activity. This unique encapsulation ensures that the microbial content is preserved during transport and only activates upon contact with moist soil, enabling precision delivery and maximizing colonization efficiency.

These microbial species are carefully selected based on peer-reviewed studies and local soil compatibility. Our production process prioritizes strain viability through low-temperature drying and sealed storage in compostable packaging. The innovation lies in its

frugal yet scientifically rigorous design — balancing high-tech biotech with the simplicity of a natural, intuitive application method.

How ReSoil Works

The application of ReSoil is straightforward:

1. At planting, place the capsule near the root zone or seed.
2. Cover lightly with soil and irrigate.
3. As the capsule dissolves, its ingredients activate upon contact with soil moisture.

The mycorrhizal fungi quickly form symbiotic associations with the root systems, expanding their nutrient and water absorption capabilities. PGPRs enhance plant health, immunity, and growth. Trichoderma suppresses root pathogens, while organic stimulants stimulate microbial metabolism and root development. This multi-action effect regenerates soil health and plant vitality over time.

Unique Advantages

- **Eco-design**: All ingredients are organic, biodegradable, and selected for compatibility with both urban and rural soils.
- **Scientific efficacy**: Combines fungi, bacteria, and stimulants in optimized ratios tested via pilot experiments.
- **Low application threshold**: Requires no prior training, tools, or complex instructions. Designed for municipalities, farmers, and even hobby gardeners.
- **Minimal labor cost**: Unlike powdered alternatives, ReSoil avoids manual mixing or measuring.
- **Long-lasting effect**: Fungi remain active in the soil across seasons, reducing re-application needs.

Target Market and Segmentation

We identified six segments ranked by potential and relevance:

1. **Sustainable and urban agriculture** – high growth, mission alignment.

2. **Commercial greenhouses and CEA** – high intensity production with soil needs.
3. **Landscaping and gardening industry** – high volume and market accessibility.
4. **Eco-conscious B2C consumers** – small-scale but influential.
5. **Environmental NGOs** – public benefit, large-scale adoption.
6. **Research and education institutions** – long-term partnerships and validation.

The primary focus will be on French municipalities and urban agriculture programs, using ReSoil in parks, rooftops, and degraded lots.

Competitive Edge

Unlike powdered competitors such as **Mykoriza Premium** or **Dynomyco**, ReSoil provides:

- **Pre-dosed simplicity**: No scooping, no measuring, no human error.
- **Fast local colonization**: Capsules dissolve near roots, improving uptake rates.
- **Visual appeal**: More accessible and less intimidating for non-expert users.
- **Eco-packaging**: No plastic jars or foil sachets — shipped in compostable cardboard.
- **Subscription compatibility**: Packaged for repeat use or seasonal delivery.

Business Model

Channels:

- Demo-driven direct B2B (municipalities, NGOs, co-ops), including visual plots and technical workshops.
- Garden centers and retail networks, integrating with sustainability-focused product lines.
- Online D2C via eco-focused marketplaces and social platforms with influencer support.

Revenue Streams:

- Retail kits (10- and 30-pack formats) and starter kits for urban users.

- B2B contracts with municipalities, including long-term supply agreements.
- Customized subscription plans (bi-annual) for farms and co-ops.
- Pilot and educational bundles for institutional partners and training centers.

Customer Relationship Tactics:

- Co-branded education with retailers and agricultural advisors.
- Follow-up support including access to soil health monitoring tools.
- Loyalty programs for repeat B2B and bulk buyers, especially NGOs and regional governments.

Detailed Financial Projections

Per Capsule Cost Breakdown:

- Agar base and bioactives: €0.05
- Labor & drying: €0.10
- Quality control & eco-packaging: €0.13
- Microbial strains & stabilizers: €0.08 **Total: €0.36**

Gross Margin: 44%–64% depending on channel **Break-even:** 8–10 months from launch

Revenue Forecast:

- 6 months: ~€18,500/month
- 1 year: ~€24,000/month
- 5 years: €1 million+/year with EU-wide scale and licensing

Launch Strategy – France as First Market

We chose **France** for its:

- Strong sustainability policy backing.
- Dense network of NGOs, co-ops, and urban farming projects.
- Access to ESATs for ethical packaging partnerships.

- Favorable startup landscape with low barriers to early B2B testing.
- Connections with universities for validation and development.

Initial roll-out will include 3–5 pilot collaborations with municipalities and green-focused NGOs, then expand via co-branded displays at garden centers and regional expos (e.g., Salon de l'Agriculture).

Expert Validation

Industry expert Dmitrii Poralo — a seasoned entrepreneur in the agritech machinery sector with international distribution experience — provided feedback emphasizing real-world proof as a critical factor for market entry. He identified that the average farmer remains risk-averse and loyal to traditional inputs, and highlighted the limitations of online marketing for unfamiliar bio-products.

He strongly advised that ReSoil be introduced through trusted, physical demonstrations hosted by regional distributors or NGOs, where potential users can witness improvements in soil texture, root vigor, and plant health. He also stressed the need to present economic ROI in relatable terms — such as savings on fertilizers, reduced irrigation needs, or improved harvest yields.

These insights were foundational to our implementation plan, prompting us to design localized demo plots in public and private urban green spaces, use visual before-after campaigns, and integrate real customer testimonials into our outreach. Collaboration with French academic labs and green networks will further legitimize the product's efficacy through third-party trials.

Potential Risks and Mitigation Strategies

Risk: User hesitance to try a novel form (capsule vs powder) **Solution:** Free demo kits for early adopters + field result sharing

Risk: Capsule degradation if exposed to humidity during shipping **Solution:** Air-dried capsules + moisture-sealed compostable tubes

Risk: Some customers expect instant results **Solution:** Transparent messaging: Fungal systems take weeks, not days

Risk: Regulation on microbial formulations across countries **Solution:** Work with EU-accredited labs and register country by country

Conclusion

ReSoil blends biotechnology, simplicity, and environmental ethics into a compact, actionable solution to the crisis of soil degradation. Through rigorous formulation, strategic partnerships, and inclusive design, we present not just a product — but a holistic system to support the ecological, social, and economic pillars of sustainable development. Our interdisciplinary approach integrates cutting-edge soil microbiology, frugal engineering, and EU-aligned sustainability principles into a user-friendly form.

With its affordable price point, local sourcing potential, and high adaptability, ReSoil is poised to become a cornerstone in the next generation of regenerative agriculture tools. By empowering communities, municipalities, and individuals to restore their land with a single capsule, ReSoil supports Europe's path to greener cities and resilient food systems.

Together, let's regenerate Europe's soils — one capsule at a time.

References & Further Reading

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