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Continuous Mycelium-Based Drug Production Using Self-Healing Solid-State Fermentation Technology

Technology ID
2025-PORT-70916

Category
Biotechnology & Life Sciences/Bioprocessing & Biomanufacturing
Pharmaceuticals/Drug Discovery & Development

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Purdue researchers have developed an innovative biotechnological approach that focuses on the cultivation of fungal Mycelium Mass for the extraction of pharmaceutical compounds in the solid phase. This mycoponic bioproduction method allows for the direct cultivation of mycelium in solid-state tubes, providing enhanced aeration status over traditional substrate bag systems. Moreover, the system operates as a fluidic-based system for continuous production, with self-healing harvest properties. The approach also has enhanced oxygen availability for the direct cultivation of mycelium, which promotes robust growth due to enhanced nutrient delivery. The mycelium can be left to recover and regrow following the harvesting step, allowing for sustainability in production of the mycelium. This method has an array of applications in the production of receptor-targeting drugs that can be cultivated from mycelium and provides a sustainable biotechnological platform to produce pharmaceutical drugs.

Technology Validation:

Researchers utilized 6 different fungi strains such as Trametes versicolor CM-101, YZ-13, K121 and others for the production polysaccharide-K (PSK) with this method, demonstrating the versatility of this method for cultivation of pharmaceutically relevant ingredients.

Advantages:

-Sustainable biotechnological platform

-Continual harvest and regrowth without autoclaving media and contamination

-Enhances oxygen availability, promoting robust mycelial growth

Applications:

-Pharmaceutical active ingredients

-Pharmaceutical compound production

TRL: 4

Intellectual Property:

Provisional-Patent, 2025-02-13, United States

Keywords: Solid-state mycelium cultivation,Mycoponic bioproduction platform,Continuous fungal compound extraction,Pharmaceutical-grade mycelium,Self-healing harvest system,Sustainable drug production,Fungal metabolite biomanufacturing,Enhanced aeration cultivation,Polysaccharide-K production,Mycelium-derived APIs