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ELECTROSTATIC LAKE FOAM SUPPRESSION MODULE

Urban water bodies like Bengaluru's Bellandur Lake are facing increasing challenges due to toxic foam formation, mainly from untreated industrial and domestic waste. Traditional methods, such as chemical defoamers and mechanical interventions, provide limited and short-term relief. Often, they also introduce new pollutants. This paper describes the creation and use of a low-cost, floating Electrostatic Foam Suppression Module (EFSM) that is designed for air and water cleanup.

The treatment system works by creating a high-voltage electrostatic field between a suspended mesh and a grounded base. This field destabilizes the foam by interrupting the surfactant-stabilized film structures, causing them to collapse quickly. The setup can reduce foam by up to 92% within one minute, and it does this without using chemicals. Additionally, it has an onboard electrostatic precipitator (ESP) that removes airborne particles near the foam.

Made mostly from recycled materials and set on a buoyant thermocol platform, the EFSM includes an ESP32 microcontroller for monitoring air quality and controlling operations in real time. Its modular and energy-efficient design makes it easy to scale for decentralized use in polluted urban water bodies. The dual functionality and sustainable build show strong potential for patents, offering a new, eco-friendly way to address environmental damage in urban areas.

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