

## **Transforming Pathogenic Biomedical Waste into Value-added Soil Additives**

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Biomedical waste, which includes potentially infectious and pathogenic materials, presents a significant challenge for proper management and disposal. India produces 774 tonnes of biomedical waste daily, as reported by Central Pollution Control Board in 2020. Improper segregation of these pathogenic waste, open dumping, open burning, and inadequate incineration leads to several issues including the release of harmful human carcinogens, such as dioxins, furans, and particulate matter, and ash residues. Increased biomedical waste generation demands more transportation facilities, increasing the risk of costly accidents and spills. World Health Organization emphasizes the importance of proper management and disposal of these pathogenic biomedical waste and recommends innovative and alternative protocols, and many countries are already transitioning to these alternatives. According to reports from Global Market Insights, the biomedical waste management market was valued at USD 12.8 B, and is projected to reach USD 23.6 B in 2030, expanding at a CAGR of 6.9%.

Recognizing the significance of an alternative strategy for pathogenic biomedical waste disposal without the use of incinerators, CSIR-NIIST has developed a dual disinfection-solidification system that can spontaneously disinfect and immobilize pathogenic biomedical waste such as blood, urine, sputum, laboratory disposables, etc., apart from imparting a pleasant natural fragrance to otherwise foul-smelling biomedical waste. The developed technology has also been certified by expert third-parties for its antimicrobial action and non-toxic nature of the treated material. To achieve the target of minimal human exposure, an automated equipment has been fabricated for handling and mixing the materials in the right proportion. With its potential to transform treated waste into value-added soil additives, this solution effectively addresses one of the biggest societal challenges of modern times. Our technology provides a safer, efficient, and cost-effective solution for healthcare facilities, avoids the risk of spills and occupational exposure, and assists in preventing uncontrolled spread of infectious and drug resistant microbes. The know-how has been transferred to a start-up in Kerala, Bio Vastum Solutions (BVS) Pvt. Ltd., CML Group of Companies, Angamaly, and the detailed project report was handed over on 13 March, 2023. Through this technology, CSIR-NIIST aims at an innovative solution for the safe and environment-friendly management of pathogenic biomedical waste.