Eco-Friendly Antimicrobial Coating for Long-Term Biofilm Prevention

Background

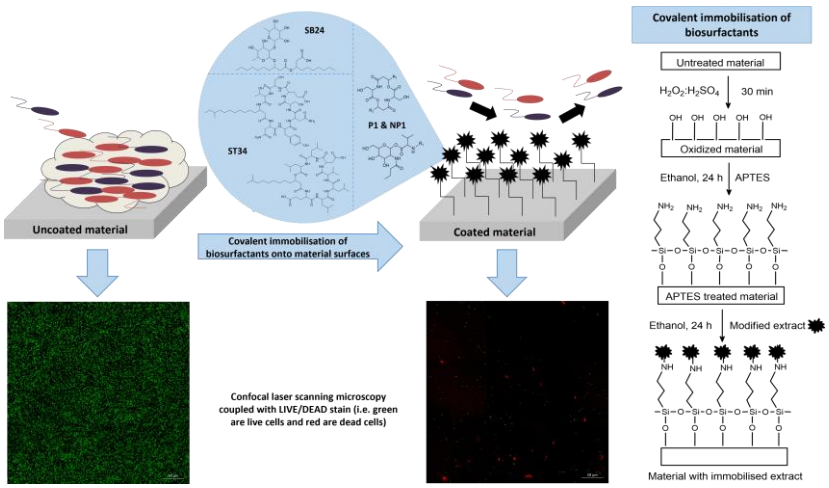
Biofilm formation and microbial adhesion on High-Density Polyethene (HDPE), Polyvinyl Chloride (PVC), and stainless steel surfaces cause persistent hygiene and safety issues in the medical, food, and water sectors. This contamination leads to costly downtime, increased maintenance, and equipment replacement.

Our patented biosurfactant coating prevents bacterial adhesion and biofilm growth—delivering long-term protection for critical infrastructure. Derived from natural sources, biosurfactants are non-toxic, eco-friendly, and as effective as synthetic alternatives, offering a sustainable solution without harmful chemicals.

Technology overview

Our innovation is a patented biosurfactant-based coating that covalently bonds to HDPE, PVC, and stainless-steel surfaces, creating a durable, non-leaching antimicrobial barrier. The coating prevents microbial adhesion and biofilm formation, even under extreme pH and temperature conditions. Unlike conventional antimicrobial coatings, our solution contains no toxic biocides, silver, or quaternary ammonium compounds—making it safe for human health and the environment. The biosurfactants, sourced from beneficial bacteria, remain permanently attached to the surface, ensuring long-term effectiveness without reapplication.

This technology is compatible with existing industrial manufacturing processes and has broad applicability across water infrastructure, medical devices, food processing, and marine environments. Proof of concept has been achieved with validated lab-scale results demonstrating >99% biofilm inhibition.



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Benefits

- Long-lasting protection – no reapplication needed after repeated use.
- Safe & sustainable – free from QACs, silver, and leaching biocides.
- Versatile – adheres to HDPE, PVC, and stainless steel.
- Industry-ready – compatible with existing surface functionalisation methods.
- Resistance-proof – no release of active agents, preventing the development of antimicrobial resistance.
- Durable – works under extreme pH and temperature conditions.
- Wide application – suitable for water infrastructure, medical devices, food processing, and more.
- Cost-saving – reduces downtime, cleaning needs, and equipment replacement.

Applications

- The water sector can use this technology for water distribution systems such as pipes, taps, and valves, as well as water-storage tanks and conveyance systems where microbial biofouling is a persistent issue.
- In the food industry, the coating can be applied to food vending machines, processing equipment, and any surface that comes into contact with food to ensure hygiene and reduce spoilage.
- The medical industry can benefit from biosurfactant coatings on implantable devices such as catheters, as well as surfaces within hospitals and clinical settings to minimise the risk of healthcare-associated infections.
- The biomedical and biotechnology industries can apply these materials in sterile environments, laboratory surfaces, and fluid transfer systems where sterility is critical.
- Industrial cooling systems can leverage these coatings to prevent microbial buildup and biofilm formation that compromises efficiency.
- The shipping and marine industries can use biosurfactant coatings on metal and polymer surfaces to reduce biofouling, thereby enhancing equipment lifespan and operational efficiency.

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Opportunity

This technology provides a unique opportunity to commercialise a non-leaching, eco-friendly antimicrobial surface solution across several high-impact industries. It enables long-term biofilm resistance on widely used materials—HDPE, PVC, and stainless steel—without relying on harmful chemicals or heavy metals. The innovation is well-suited for water infrastructure, food processing, clinical environments, and beyond.

Proof of Concept achieved. Laboratory methods for biosurfactant production, surface treatment, and covalent immobilization have been successfully developed. Key performance indicators—including bonding efficiency, antimicrobial function, and surface analysis—have been validated through advanced instrumentation.

Seeking

Stellenbosch University is seeking strategic partners to commercialise its patented antimicrobial biosurfactant coating technology. We invite:

- Licensees in water treatment, healthcare, and food processing sectors.
- Original Equipment Manufacturers (OEMs) and suppliers manufacturing HDPE, PVC, and stainless-steel products.
- Development partners to conduct validation, pilot trials, and market integration.
- This is a unique opportunity to lead the adoption of safer, more sustainable antimicrobial surface solutions—enhancing public health while meeting environmental and regulatory demands.

IP Status

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Contact Information

Contact us to request more information or initiate partnership discussion:

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