



Gene Circuit for Self-Controlled Biofilm

Technology Summary

Reverse osmosis membrane systems are increasingly used for developing new water sources and recycling water. However bio-fouling, the build-up of microbes and their polymeric matrix, clogs these systems and reduces their efficiency. The inventors have engineered a beneficial biofilm that prevents membrane fouling by sensing the number of its cells that are present via quorum-sensing circuit and limiting its own thickness. The beneficial biofilm also prevents biofilm formulation by deleterious bacteria by secreting nitric oxide, a general biofilm dispersal agent. In addition, the beneficial biofilm was engineered to produce epoxide hydrolase so that it efficiently removes the environmental pollutant epichlorohydrin.

Application & Market Utility

Effectively control biofouling, a major issue in membrane water and wastewater treatment as well as in many other environmental, industrial, and healthcare settings. This invention will help meet the growing demand for fresh being met through utilizing lower-quality water sources including brackish water, sea water, and recycled wastewater.

Next Steps

Seeking research collaboration and licensing opportunities.

TECHNOLOGY READINESS LEVEL

1-3

Seeking

Investment | Licensing | Research

Keywords

- Anti-biofouling and biofilms
- Separation Membranes
- Wastewater recycling
- desalination
- U.S. Patent No. 10,172,362

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