Treatment and Recycling of Waste Water

Business Opportunity

Water management has become a major issue in the last decade for all Governments and business users as centralised population pressure increases and as droughts become more prevalent. Water recycling has become a key response to increased population density and drought. Current market demand is for a technology that can be easily integrated into the current centralised water treatment infrastructure, or on a decentralised basis for domestic and industrial applications.

ANSTO has developed the nanoparticulate membrane bioreactor (NMB) technology, an efficient oxidation and biomass retention system ideal for waste water treatment. It is more cost effective than existing technologies and is simple to scale-up, highly effective in recovering solids and bacteria and ideal for domestic use, small-scale industrial use and large municipal treatment plants.

The NMB evolved from the invention of a cheap, strong porous membrane. Unlike submerged cultures, oxygen in the NMB is freely available, and unlike solid-state cultures, the culture conditions can be easily adapted and controlled to allow the desired products to be easily retrieved. The ANSTO NMB has applications in the treatment of grey water (e.g. shower and hand basin), and black water (toilet waste). It can also be used to recycle water from the bathroom to the laundry and further recycle it to the toilet system with effective treatment in the NMB at all stages, achieving savings in water use of over 60%.

The Sewage and Waste Water Treatment Market

Market Size
Australian waste-water treatment market is $4.4 billion pa with strong on-going growth being experienced by the industry

Applications
- Municipal sewage treatment (secondary and tertiary treatment)
- On-site wastewater treatment
  - household scale waste water treatment
  - sewer mining of grey water in housing estates and industrial applications
  - sewage treatment in regional areas

Key Advantages of NMB Technology
- Cheap, easy to operate and scalable technology
- No air pumping required (highest cost in sewage treatment)
- No odour, bio-oxidation of waste water

Benefits of NMB Technology
- Up to 60% less water used per household by treatment and recycling of wastewater in homes, especially in decentralised areas
- Considerable cost savings - power and chemicals
- Reduced maintenance labour and cost

Speed to market for NMB Technology
- Expect scale-up and product launch within 18-24 months

Competition - Current MBR Technology
- Costly compared to NMB technology
- Requires complex pumping system
- Has low oxygen transfer efficiency
- Membrane fouling issues
- Requires high energy use and chemical usage

The Technology

ANSTO has developed a new bioreactor technology based on nanoparticulate membranes (NMB), which clearly demonstrates superior performance in wastewater treatment compared to existing modern municipal treatment plants.

The NMB Technology is used in secondary and tertiary sewage and wastewater treatment offering total biomass retention, facilitating downstream processing, biomass harvesting, continuous culture, sequential processing and efficient, rapid removal of organic and inorganic compounds (C, N, P, and heavy metals) from solution in a single step.

- Demonstrated scale-up from a membrane area of 0.0126 m² to 40 m².
- Current system operating dimensions:
  - Height: 1.5m (size of a refrigerator)
  - Volume flow of sewage: 600L/day (average family’s daily production).
  - Ongoing scale-up to 50 kL/day is currently underway.
- Technology tested with a sewage treatment company.

Management and Scientific Team

Warren Brady – General Manager, Access ANSTO
- MBA, BEc, CA, FAICD
- Over 20 years’ experience in commercialising early stage research and technology and venture capital investment
- Director of six start-up companies

Dr Anthony Taylor - Research Scientist
- PhD in Microbiology
- Principal inventor of the NMB Technology
- 20 years experience in microbiology engineering and biotechnology

Intellectual Property

The technology is proprietary – ANSTO has two patents in this technology area, one is a provisional and the other is at PCT stage.

Investment Opportunity

ANSTO is seeking early stage investment up to $500k to demonstrate the use of a pilot plant water treatment system using the proprietary NMB technology.

For Further Information

Warren Brady
General Manager, Access ANSTO
E warren.bradey@ansto.gov.au
T +61 2 9717 9565

Dr Anthony Taylor
Research Scientist
E anthony.taylor@ansto.gov.au
T +61 2 9717 3055