NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE
School of Materials Science and Engineering
College of Engineering

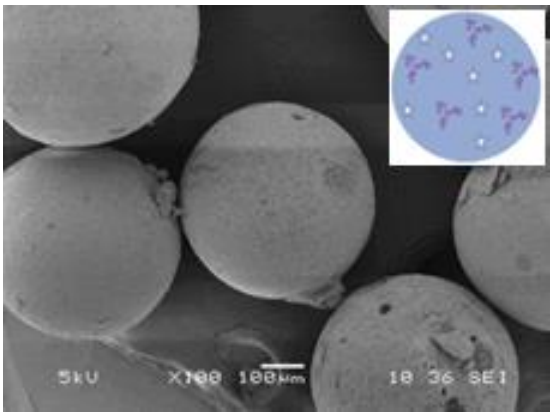
Transforming Fish Reproduction: An Oral Delivery System for Spawning Hormones

TECHNOLOGY OVERVIEW

This platform technology, focused on the development of microparticles designed for the non-invasive oral delivery of fish spawning hormones. This offers as a safer and less labourious alternative to traditional hormone injection methods which can heightened stress levels and injuries causing reduced spawning efficiency and higher mortality rates.

At present, no oral hormone product exists due to formidable hurdle of degradation of hormones by the gastrointestinal (GI) enzymes. The revolutionary fish reproduction through microparticle-encapsulated hormones as fish feed provides protection against the GI enzymes and eases administration.

This robust platform technology can be applied to other peptides and vaccines for oral delivery.



LHRHa-encapsulated microparticles (top) can exhibit comparable performance to injection-based hormone induction in Asian Seabass broodstock

FEATURES & SPECIFICATIONS

- First oral spawning hormone technology in aquaculture industry
- Efficient, risk-free alternative comparable to spawning hormones injection
- Versatile oral delivery platform technology with facile fabrication method
- Multifunctional system for protection & targeted intestinal release
- Improved spawning efficiency from ease in administration and stress-free delivery

MARKET TRENDS & OPPORTUNITIES

- The aquaculture industry is one of the fastest growing food industries in the world which produced 87.5 million tonnes in 2020 (US $265 billion). To meet the increasing consumption of aquatic food products which is expected to double by 2050, innovative technologies to improve aquaculture practices and enhance productivity are actively implemented.

- As an oral hormone, this technology is poised to disrupt the current injection spawning practices in fish hatcheries and farms and value-add to aquaculture healthcare which is expected to reach US$2 billion by 2032. This platform technology can also be extended to proteins, peptides and vaccines delivery for animal and human healthcare.

POTENTIAL APPLICATIONS

- Aquaculture
- Healthcare
- Veterinary Care