TECH OFFER

Transforming Food Waste into Cost-Effective Animal Feed Solutions

KEY INFORMATION

TECHNOLOGY CATEGORY:
Sustainability - Food Security

TECHNOLOGY READINESS LEVEL (TRL): TRL6
COUNTRY: SINGAPORE
ID NUMBER: TO175427

OVERVIEW

The agriculture sector faces a double challenge: rising animal feed costs and unsustainable food waste management. For many livestock farmers, feed accounts for up to 70% of operating costs, with heavy reliance on volatile imports like soybean meal, corn, and fish meal. At the same time, the food and beverage industry generates millions of tons of nutrient-rich by-products such as okara, spent grain, and fish offal, much of which is discarded—causing methane emissions and environmental harm.

This technology provides a circular solution by converting high-moisture food waste into stable, high-value livestock nutrition. Through an innovative bio-conversion process, nutrient-rich by-products are rapidly transformed into a low-moisture, shelf-stable feed enriched with beneficial microorganisms. The resulting feed not only reduces dependence on imported raw materials but also supports animal health and productivity. Compared with insect protein or traditional heat-drying, this approach is faster, more energy-efficient, and scalable across both rural and industrial contexts. The technology directly lowers feed costs for farmers by 5–20%, creates new revenue streams from food waste, and cuts greenhouse gas emissions by up to 2 tons of CO_2e per ton diverted, while requiring only low CAPEX and minimal investment for setup.

The technology owner seeks collaboration with IHLs, research centres, F&B/waste management players, and deep tech IoT companies for R&D, licensing, and test-bedding opportunities.

TECHNOLOGY FEATURES & SPECIFICATIONS

- **Biological Processing System** – Combines proprietary enzymatic treatment with lactic acid fermentation to upcycle high-moisture food waste (e.g., spent grain, okara, fish offal) into protein-rich livestock feed.
- **Moisture Reduction** – Rapidly reduces water content from >90% to <20% without relying on energy-intensive dryers.
- **Nutrient Stabilization** – Fermentation inhibits pathogens, preserves nutrients, and generates probiotic compounds that enhance gut health and feed efficiency in animals.
- **Simple, Modular Infrastructure** – Operates with accessible equipment such as hydraulic presses, fermentation tanks, and drying racks.
- **Scalable Deployment** – Suitable for decentralized rural applications as well as larger industrial facilities.

POTENTIAL APPLICATIONS

- **Animal Feed Industry** – Provides cost-effective, sustainable alternatives to soybean meal, corn, and fish meal for poultry, swine, and aquaculture.
- **Food & Beverage Industry** – Valorization of by-products from breweries, tofu factories, slaughterhouses, and seafood processors.
- **Waste Management Sector** – Supports municipalities and private waste handlers in reducing landfill loads and methane emissions.
- **Climate & Carbon Credit Market** – Enables monetization of waste diversion and reduced GHG emissions through carbon credits.

UNIQUE VALUE PROPOSITION

Current alternatives for sustainable feed—such as insect farming, algae cultivation, or heat-based drying—face significant limitations in cost, scalability, and energy intensity. Traditional feed milling remains dependent on volatile global commodities like soybean meal, corn, and fish meal, while insect-based systems require weeks-long growth cycles and yield high-moisture biomass that is difficult to scale. Heat-drying of by-products, meanwhile, demands high capital and energy input, restricting use in rural or resource-limited settings.

This technology overcomes these challenges by combining a rapid, low-energy bio-conversion process with lactic acid fermentation to produce stable, probiotic-enriched feed directly from food industry by-products. The result is a circular, climate-smart solution that:

- Cuts feed costs by 5–20% through local waste valorization.
- Removes reliance on energy-intensive dryers, enabling deployment in rural and developing regions.
- Boosts animal health and productivity with probiotic-enriched feed.
- Reduces carbon emissions, with each ton of waste diverted avoiding 1.5–2 tons of CO_2e.
- Supports modular, decentralized production, creating resilience and local economic value.