

What is FO?

Forward Osmosis (FO) is an equilibrium process. Just like plants do, two liquids are separated by a membrane that only allows water to pass. Water passes from one chamber to the next by diffusion until the solids concentration on both sides of the membrane are equal.



Osmotic Digestate Concentrator



Co-generation Food Processing Power Plant digest waste products to create methane for power co-generation for sale to the power grid. Waste water (digester sludge) from the digesters must be treated in order for plants to meet environmental discharge regulations. In food waste digesters, waste is introduced to large tanks where anaerobic bacteria consume the organics, releasing methane and carbon dioxide gas. The gas is collected and burned in a modified diesel generator to produce electricity. Besides the methane, the process produces large volumes of waste stream comprised of water containing dilute nutrients.

HTI is the world leader in forward osmosis technology, and has designed, built and installed forward osmosis water separation systems in extremely challenging environments such as landfills, food processing plants, and the oil and gas exploration and production world.

HTI has developed a unique forward osmosis system to reclaim the high volume waste water streams of food waste digesters and produce high-value Organic fertilizer as a by-product. **HTI's** Digester waste water system is highly energy efficient in operation, and is highly efficient and resistant to fouling.

By implementing HTI's proprietary forward osmosis membrane in the food waste digester system, plants are able to:

- Reclaim fresh water for re-use
- Reduce environmental impact of the waste stream
- Generate a high-value Organic fertilizer as by-product
- Facilitate dairy herd growth by reducing storage requirements
- **HTI** technology retains the fertilizer nutrients of the waste stream
- Reduce transportation costs of hauling digester effluent by up to 80%
- Reduce or eliminate digester growth limitations imposed due to high waste stream volume
- Reduce the need to store waste during winter months when discharge is prohibited by up to 80%
- Reduce the cost of concentrating the waste stream, thus reducing the cost of electricity production

The Waste Stream

Currently the most common waste stream disposal technique is to land-apply the solution where it has minimal value as irrigation water and can cause pollution problems if the nutrients are washed into streams or rivers. The waste stream must be stored until summer months when run-off into streams is minimized. These costs decrease the economic viability of digesters as electricity producers.

Concentrating the stream by evaporation impractical because it loses much of the fertilizer value and causes air pollution problems from the released ammonia. This is also an expensive process.

The Forward Osmosis Solution is capable of treating this waste water and generating two products. The first product is clean water that can be reused in the food processing plant or discharged to the environment. The second is an organic fertilizer that has significant commercial value.

HTI's filtration membranes concentrate the waste stream, and the organic nutrients in the stream produce a high-value Organic fertilizer and a water stream of a purity that can be reused in the food plant or discharged year round. With Current Organic fertilizer prices, the fertilizer byproduct alone could pay for, or dramatically reduce, the operational cost of the digester.

Even modest-sized farms (approx. 4,000 acres) can generate two megawatts of electricity from food waste digesters, which is enough electricity to power up to 2,000 homes. By producing a high-value Organic fertilizer as a byproduct in an energy efficient operation and reducing the overall costs of treating the waste stream, forward osmosis adds a major contribution to making the digester plant economically viable, and thus a real alternative energy source.



HTI's proprietary forward osmosis membrane makes this system possible.



Applying HTI Forward Osmosis Technology to
**Food Waste Digesters and
Co-Generation Power Plants**



HTI Authorized Distributor
Future Technologies L.L.C.
Sheikh Zayed Road
P.O. Box 450581, Dubai, U.A.E.
P : +971-4-3809622
F : +971-4-3809633
E : info@futuretechme.com
W : www.futuretechme.com

