

Current energy savings from two units in operation are 0.1 trillion Btus per year. Other potential uses of hyperfiltration include the extraction of apple juice in the food industry, recovery of caustic solutions in the textiles industry, and concentration of radioactive sludge. The potential savings estimated for this new technology in 2010 are 111 trillion Btus.

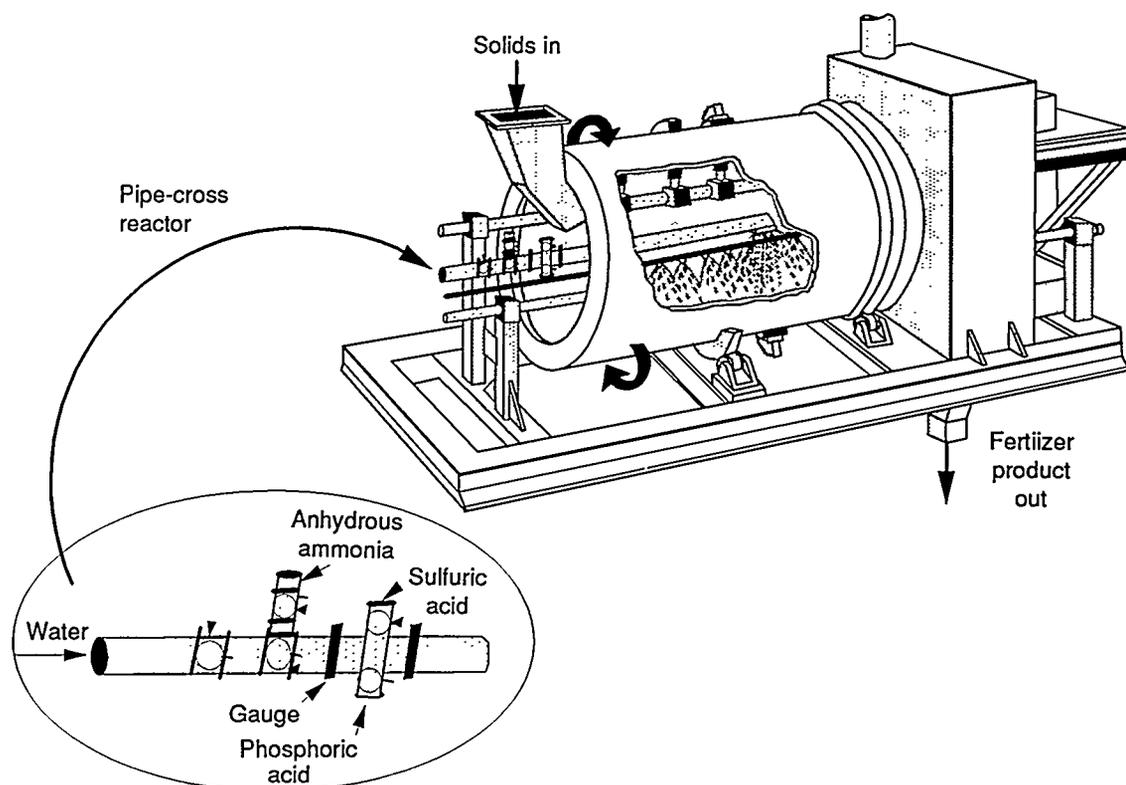
Membrane Separation in the Sweetener Industry

The most energy-intensive process in the corn sweetener industry is the dewatering of waste streams. Industry-wide, evaporators consume 5 trillion Btus per year to concentrate about five billion gallons of steep water. With DOE support, Bend Research Corporation developed an energy-efficient hollow-fiber membrane system to preconcentrate corn steepwater. The process uses reverse osmosis, leaving a concentrated solution of organic compounds (such as sugars) on the feed side of the membrane.

The technology for the process was tested at a Midwestern corn milling plant. The system can extract more than 50% of the water from the corn steep stream before evaporation, significantly reducing energy requirements. Compared with a conventional mechanical vapor recompression system by itself, the membrane distillation process, combined with a mechanical vapor recompression evaporator, provides a capital cost savings of 13.5% and an operating cost savings of 20%. Projected savings in 2010 are 4.5 trillion Btus per year.

Energy-Efficient Fertilizer Production

Conventional production of fertilizer is an energy-intensive process. With financial support from DOE, the Tennessee Valley Authority developed a reactor that can substantially reduce energy use in producing many types of pellet fertilizers. The reactor, which uses a newly devised ammonia-granulation



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A novel configuration allows fertilizer granules to be dried by the heat produced during chemical reactions in the production process.