Proposed bio-conversion technologies for food waste recycling in Singapore

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ABSTRACT

Singapore is a densely populated island with high standards of living and large food consumption and waste. The total agriculture and farming occupies a total of 1500 hectares (1.6% of Singapore land area). As most of the “beginning” part of the food chain are imports, the focus of this presentation is on the “end” of the chain, e.g. food wastes

Food waste in year 2005 totaled 531,500 tons, which is 20% of Singapore’s waste stream. The total food waste recycled, by converted into animal feed, was only 7%.

New and innovative bio-technologies are required for promoting food recycling. An aerobic composting system was developed at the Nanyang Technological University of Singapore for waste food bioconversion to bio-fertilizers. A two-phase anaerobic digester system was also designed by the Nanyang Technological University, to produce fertilizers from food wastes. Both bio-conversion technologies aim to increase the recycling of food waste in the country.

LCA was carried out for waste food management in Singapore according to the following conditions:

- **System boundary**: from waste generation to final conversion
  (Most food products are imported from other countries, so food production is not included)
- **Objective**: Investigate alternatives for increasing food waste recycling to 30% by alternate bio-conversion methods, and compare with the present incineration/landfilling practices
- **Functional Unit**: Total annual amount of food waste generated in the country

The final environmental impacts showed up to 45% reduction in environmental impacts with 30% food recycling.