



REUSING SOLID WASTE AND PRODUCT RECOVERY – R₃

Eco-efficiency resources for the food processing industry

Direct reuse of waste

Reuse solid waste

If a waste cannot be eliminated there may be opportunities for its reuse either onsite or by businesses, customers or community groups.

Reuse of waste or by-products on site

Onsite reuse of waste or by-products (other products produced incidental to the production process) can reduce raw material costs and waste disposal. If foodstuffs are to be reused, rigorous application of the Hazard Analysis and Critical Control Points (HACCP) food safety program is necessary.

REUSE OF FILTER PERMEATE ON SITE¹

Warrnambool Cheese and Butter in Allansford, Victoria standardises milk powder formulation by using milk permeate from its ultra filtration plant. Almost 100 per cent of the milk permeate is used reducing waste disposal. The project had a payback period of eight months.

Organic waste for animal feed

Food processing often has waste that could provide stock with valuable roughage, energy and protein. While the disposal of food through animal feeding is common in the vegetable, bread baking and dairy processing sector, transport and collection costs are often prohibitive.

Note that to ensure Australian meat products have access to domestic and international markets, food waste that contains animal matter (meat, meat products or imported dairy products) or vegetable matter contaminated by animal matter should not be used as animal feed.

WASTE REDUCTION THROUGH REUSE

Golden Circle generates around 4,000 tonnes of fruit and vegetable waste annually. The waste is distributed to dairy farmers saving the company \$840,000 annually in disposal costs. (Golden Circle is an ecoBiz participant.)



Collection of bread crumbs for reuse in the process

¹ Environment Australia, 1988, Cleaner Production – Reuse, Recycle and Treatment Options – Banksia Food Products

Reuse of waste or by-products by other businesses or community groups

As well as investigating the reuse of waste materials beyond the plant, businesses should also consider if they could use the waste from another business.

Unsaleable food waste that is still fit for human consumption can be donated to charity. Recognised food banks require welfare recipients to sign legal contracts not to sell, exchange or barter any food goods donated to not undermine the interests of the donating business. The types of waste that make food products unsaleable but suitable for food donation include incorrect or damaged labelling, incorrect packaging (e.g. wrong weight), over-production runs, discontinued products or end-of-season stocks, off-cuts, damaged or unattractive product.

There are many charities in Queensland to whom food can be donated.

FOOD BANK HELPS REDUCE WASTE

Golden Circle in Queensland donates canned food and beverages to the food bank and saves \$4,000 in waste costs annually, while also providing a valuable service to the community. (Golden Circle is an ecoBiz participant.)

Product recovery from solid waste

Recovering product during processing

Recovering product by process modification can result in considerable savings in product, as well as reduction in the volume of solid waste and associated disposal costs.

RECOVERY OF JUICE¹

The Banksia Food Company, a fruit processor from NSW, previously discharged excess juice extracted in the steam blanching process to drain. The company is now concentrating the excess juice, together with peelings and core, for use as a sugar supplement in sauces and jams. The new product is now bringing in returns of between \$6,000 and \$10,000 annually.

Extracting valuable product

Marketable products can be extracted from food industry by-products or waste streams. Some examples of saleable products extracted from food processing waste are provided in the table below.

Table 1: Saleable products from wastes or by-products

Waste or by-product	Saleable products
Cheese whey	Edible protein and lactose (infant formula) and nutraceuticals.
Meat processing waste	Edible fats (jellies), protein (animal feed), gelatine (coatings on tables and confectionary), collagen (cosmetics), sialic acid (anti-inflammatory drugs)
Fish and seafood processing waste	Protein (pet food), chitin/chitosan (biomedical), oils, lipids, antioxidants, flavours and pigment (red colour from crab waste)
Rice hulls	Silica (insulator during steel manufacturing)
Fruit and vegetable waste	Oils, flavours, lycopene (cancer inhibiting compound), starch, glucose, colouring (Blueberry) and pectin

REUSE OF FISH WASTE

Fortuna processes fresh broad bill and tuna fish into high quality loin and steak pieces. Before exploring waste utilisation opportunities the business was paying a disposal company to remove the waste from the site daily. All waste is now transported daily to a protein extraction business and converted into cattle feed with the remains used by organic farmers as fertiliser.

Energy recovery from solid waste

Solid waste from food processing plants can sometimes be used as a substitute for fossil fuels. The two main biofuel conversions are:

- **Biochemical** – for example, anaerobic digestion which treats organic material in the absence of oxygen to produce biogas
- **Thermochemical** – for example, direct combustion, gasification where organic waste is heated with air to produce syngas (which has 20 per cent the heating value of natural gas) or pyrolysis heating is done in the absence of oxygen to produce gases (with 50 per cent the energy content of natural gases).

For further information and case studies see the *Energy recovery (E5)* fact sheet in this series.

This series of fact sheets provides examples and suggestions to the modern food processor on how to achieve both economic and environmental benefits from eco-efficiency. Visit the project website www.ecoefficiency.com.au for more ideas and case studies.

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The eco-efficiency for the Queensland food processing industry project is an initiative of the Department of Employment, Economic Development and Innovation and the Department of Environment and Resource Management with technical information provided by UniQuest through the UNEP Working Group for Cleaner Production.

This series of eco-efficiency fact sheets will demonstrate the importance of water in a modern food factory and suggest areas where savings can be made. The project website www.eco-efficiency.com.au has more ideas and case studies on water savings across the food industry.