




# **Waste Management in the Fish Processing Industry**



**Waste produced during  
fish processing operations  
can be solid or liquid or gas.**



## **Solid Wastes**

**Include skin, viscera, fish heads,  
fish bones, scraps of flesh.**

## **Liquid Wastes include:**

- ❖ **bloodwater and brine from drained storage tanks,**
- ❖ **water discharges from washing and cleaning,**
- ❖ **scraps of flesh, blood and soluble substances from entrails,**
- ❖ **detergents and other cleaning agents.**

**Effluent from the processing of oily fish can also contain very high levels of oil.**

## **Typical figures for fresh water consumption per tonne of fish intake are:**

- ❖ 5–11 m<sup>3</sup> for fish filleting,**
- ❖ 15 m<sup>3</sup> for canning.**
- ❖ 0.5 m<sup>3</sup> for fish meal and oil production.**

**Typical ranges for the COD loading in fish processing effluent per tonne of fish intake are:**

- ❖ **50 kg for the filleting of white fish,**
- ❖ **85 kg for the filleting of oily fish,**
- ❖ **116 kg for canning**
- ❖ **42 kg for fish meal and oil production.**

**Odor is often the most significant form of air pollution in fish processing. Major sources include:**

- ❖ **storage sites for processing waste,**
- ❖ **cooking by-products during fish meal production,**
- ❖ **fish drying processes, and**
- ❖ **during filling and emptying of bulk tanks and silos.**

**Fish quality may deteriorate under the anaerobic conditions found in onboard storage on fishing vessels and in the raw material silos of fish processing facilities. This deterioration causes the formation of odorous compounds such as ammonia, mercaptans, and hydrogen sulfide gas.**

## **Strategies for reducing the pollutant load of fish processing effluent focus on avoiding the loss of raw materials and products to the effluent stream.**

- ❖ sweeping up solid material for use as a by-product, instead of washing it down the drain;**
- ❖ cleaning dressed fish with vacuum hoses and collecting the blood and offal in an offal hopper rather than the effluent system;**
- ❖ fitting drains with screens and/or traps to prevent solid materials from entering the effluent system;**
- ❖ using dry cleaning techniques where possible, by scraping equipment before cleaning, pre-cleaning with air guns and cleaning floor spills with squeegees.**



## **Odor Prevention**

- ❖ **Avoid processing batches of raw material that are of considerably lower than average quality; this will reduce the odor components;**
- ❖ **Reduce the stock of raw materials, waste, and by-products and store this stock for short periods of time only in a cold, closed, well-ventilated place;**
- ❖ **Seal by-products in covered, leak-proof containers;**
- ❖ **Keep all working and storage areas clean and remove waste products immediately from the production line;**
- ❖ **Empty and clean fat traps on a regular basis;**
- ❖ **Cover all transfer systems, wastewater canals, and wastewater treatment facilities to reduce the escape of foul odors.**

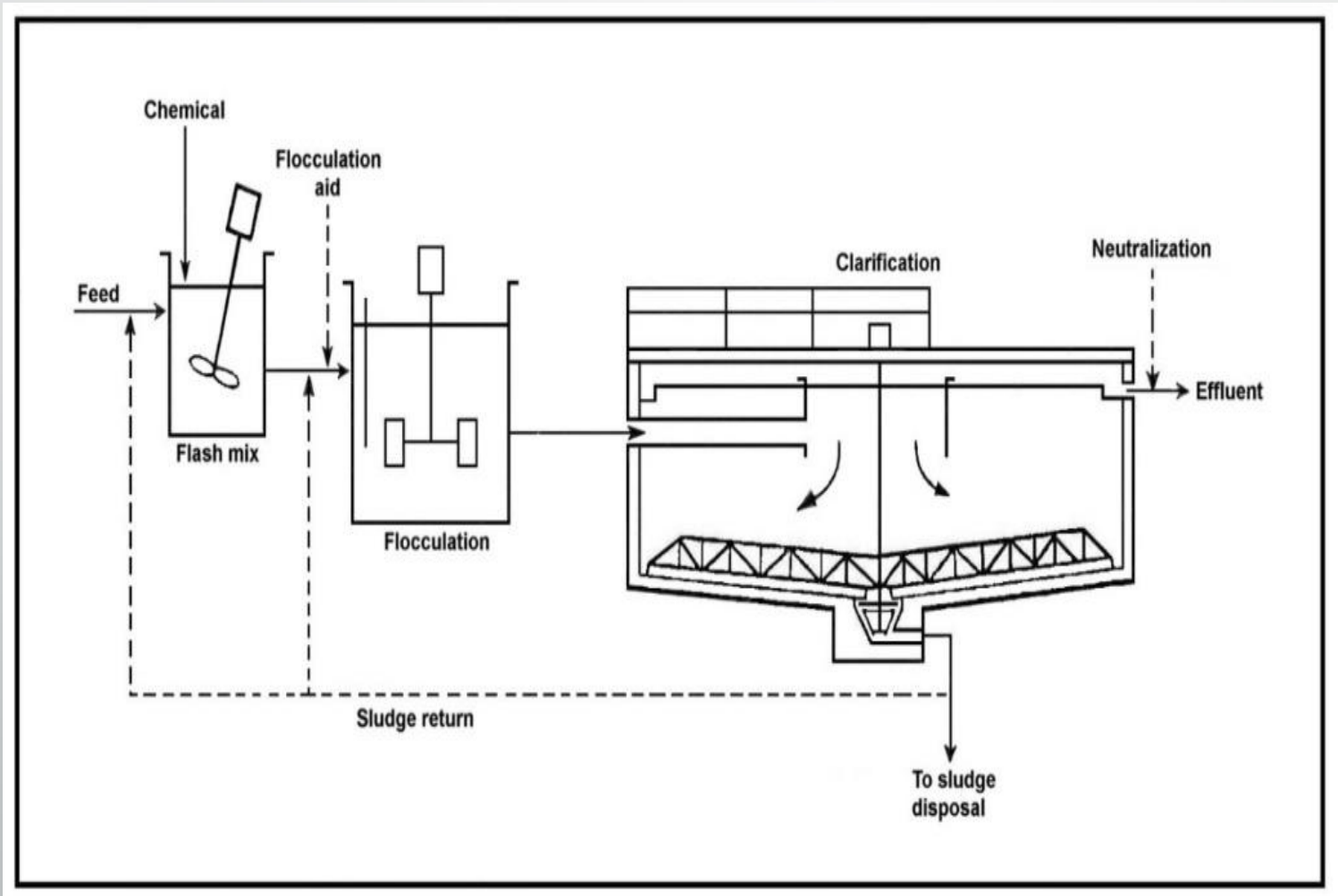
**Solid waste can be recycled in fish meal plants.**  
For trawler fish and fish waste with less than 3% oil content, the plant may include Drier and accessories including Feeding Unit, Meal Cooler, Hammer Mill, Bagging Unit and Scrubber Deodorizer.



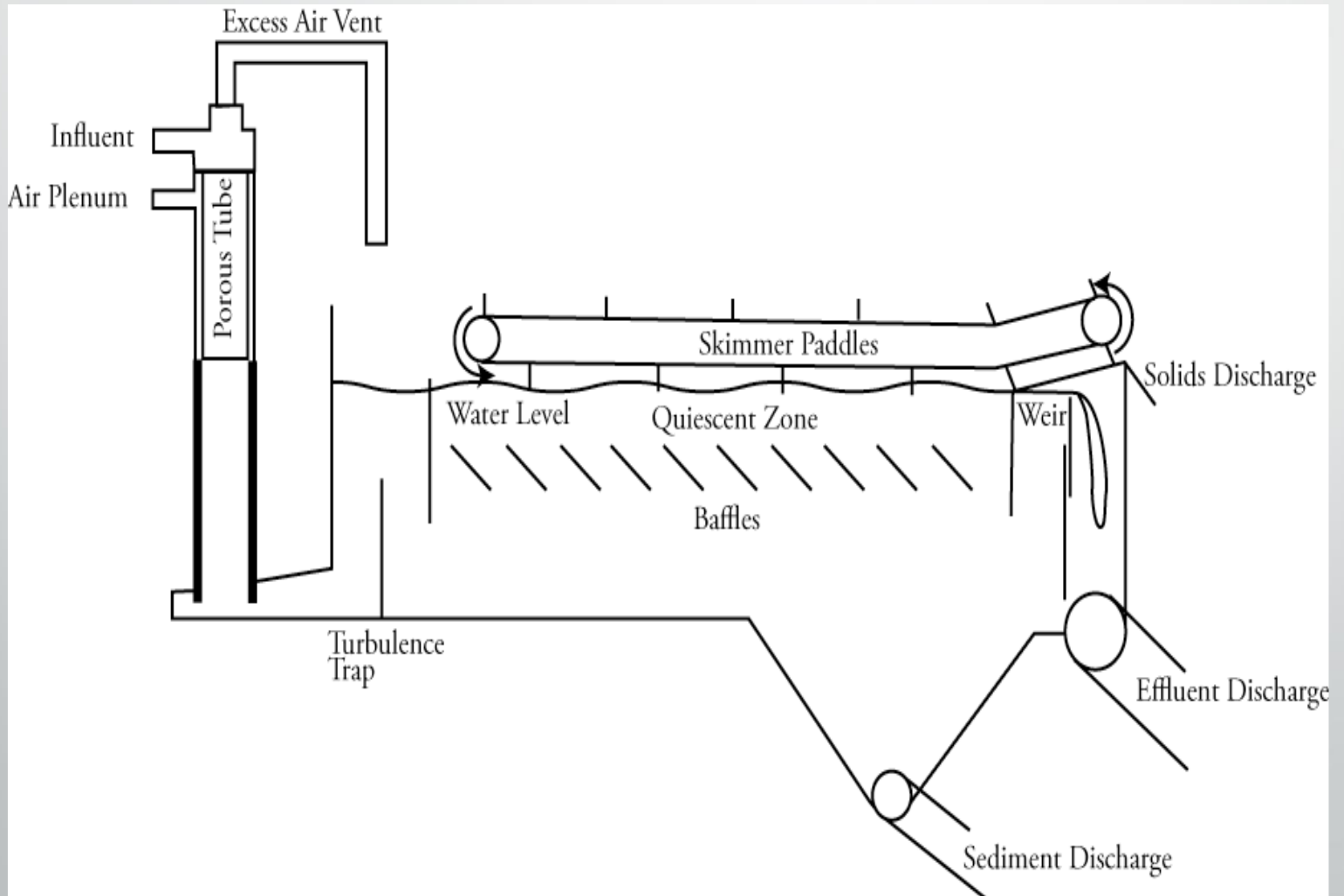
**For fish, fish waste and tuna waste with more than 3% oil content,**  
the plant uses the same components as the other plant but with addition of a cooker, press, solid/liquid decanter separator, oil separator, plus pumps and tanks.



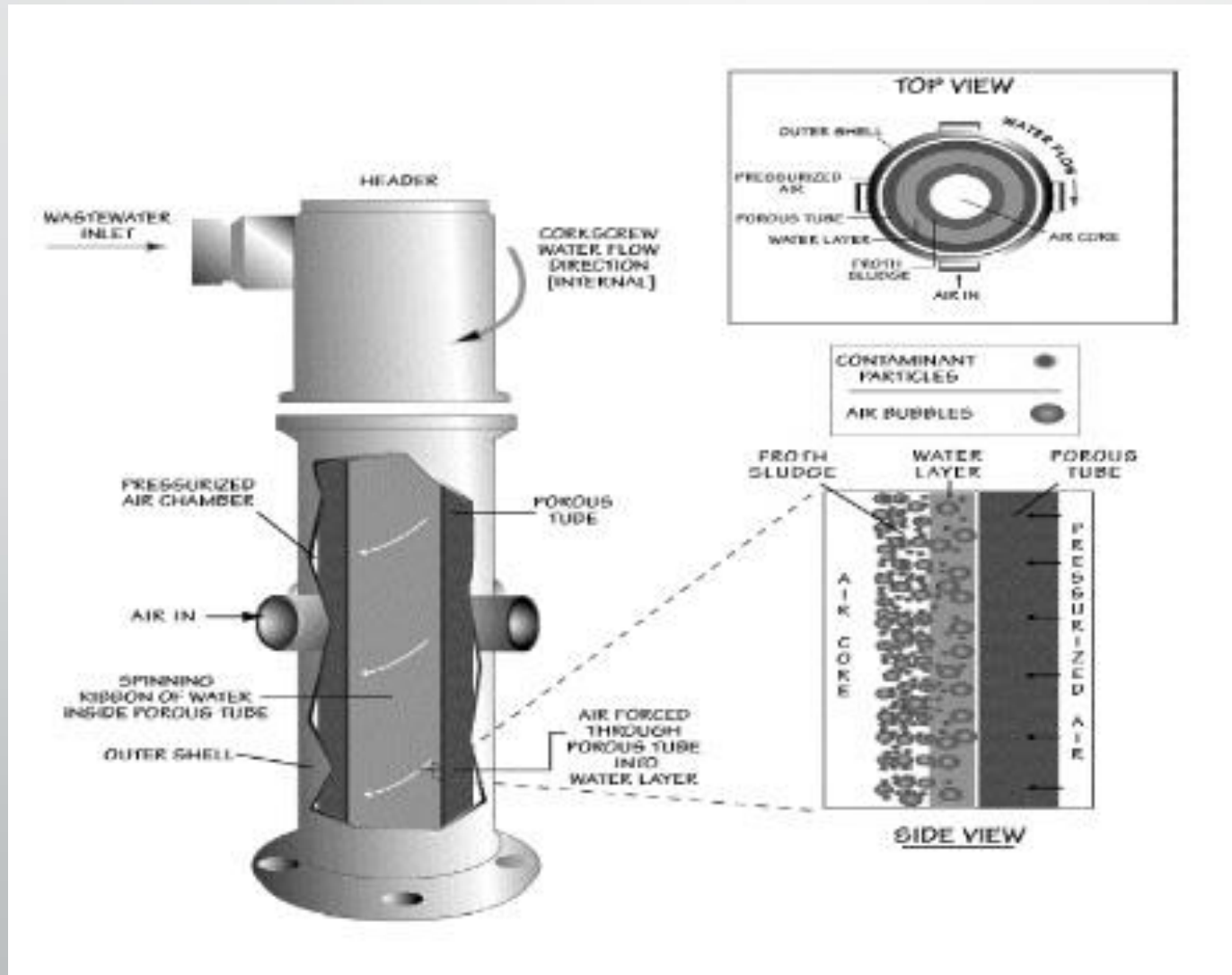
# Simplified Process Flow Diagram for Coagulation and Flocculation



# Schematic Presentation of the BAF System



# Schematic Presentation of the Bubble Chamber



# Actual photo of the wastewater treatment system



**The Eurofish in Ecuador processes 170 tons of tuna a day for brands such as Chicken of the Sea and Bumble Bee. The plant generates 1,300 cubic meters a day of wastewater with COD of 6,500 mg/l.**

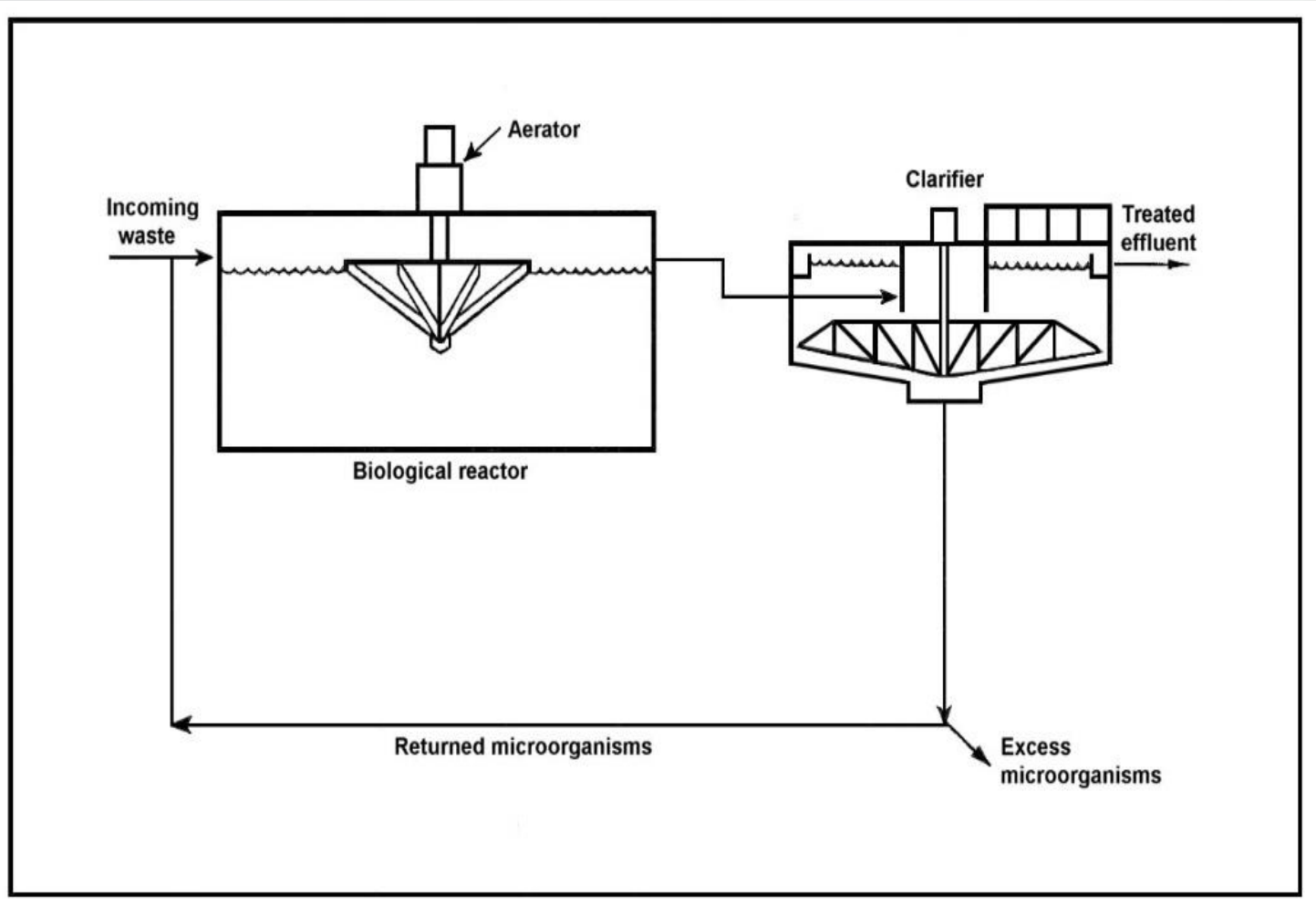




## **The treatment process consists of:**

- ❖ **Separation of effluent in the DAF system;**
- ❖ **Treatment of clarified water in a double nitrification-denitrification stage;**
- ❖ **Anaerobic digestion of solids separated during the DAF process, which produces 1,000 cubic meters a day of methane and significantly reduces sludge volume;**
- ❖ **Final clarification to ensure the treated wastewater meets permit requirements before it is discharged.**

# Simplified Process Flow Diagram of an Activated Sludge System



# KOMPOGAS *Kompakt*

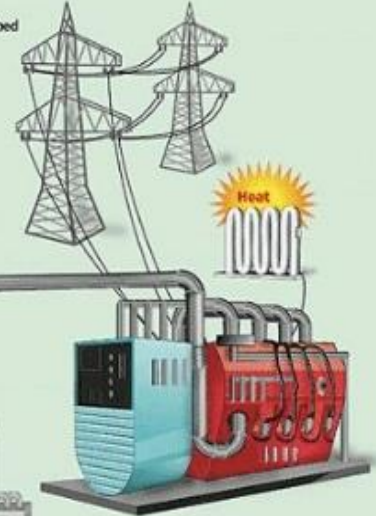
## Option



**Processing plant**  
 · Vehicle lock  
 · Bunker  
 · Shredder  
 · Iron cutter

The standard **Kompost Kompakt** module consists of a fermenter, BHGP and drainage system. A fermenter processes 5,000 tons of ecological waste a year and other fermenters can be added if need be.

Electricity can be piped into the network



**BHGP Block heating and generating plant**  
 · Runs on biogas, generates electricity and heat

**Direct feed**  
 · Sieve 40mm in diameter



**Kompakt Fermenter**  
 · Basic module for fermentation and gas production

**Drainage system**  
 · Separates the remaining fermented matter

## Option

**Initial composting and fine processing**  
 · Mature compost  
 · Rotary drum screen

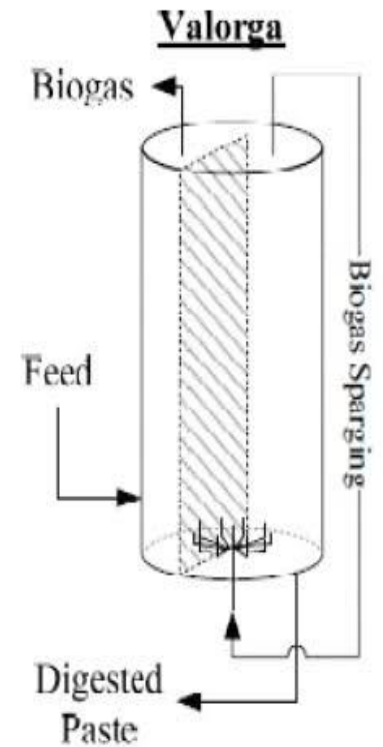


**Fresh compost**



**Liquid fertilizer**

# A typical Valorga anaerobic digestion plant



## **Odor control techniques include:**

- ❖ Install condensers on all appropriate process equipment (e.g., cookers and evaporators) to treat air emissions for odor, including sulfides and mercaptans;**
- ❖ Install biofilters as the final method of air treatment and acid scrubbers for ammonia removal ahead of the biofilter;**
- ❖ Install cyclones and filtration (fabric filters normally are adequate) to remove particulates;**
- ❖ Reduce fugitive odor sources from open doors, open windows, and general room ventilation through the use of negative pressure-controlled ventilation systems.**

**Air cooled condensers are clean, efficient and do not need water, for condensing of vapors from: driers and cookers (atmospheric type), waste heat evaporators (vacuum type), and cooling of hot gases going to bio filter.**

