ArrowBio Process for Mixed MSW: Single System Recovers both Material and Energy Resources

Unique Watery Process Yields

- Traditional Recyclables
- Liquid Water
- Organic Soil Amendment
- Energy-Rich Biogas

Patents: Israeli, American, European

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Small Commercial/Developmental Plant
Town of Hadera 1999-2002

Full Scale Plant at
Tel Aviv Transfer Station 2003 - Present

Why Watery Processing?
(1 ton MSW contains ~ 600 lb H_2O)

FRONT-END

- Separate non-bio-degradable and biodegradable fractions (gravity in water)
- Water superior separation fluid (compare buoyancies water and air)
- Separation and preparation inextricable

BACK-END

- Preparation of (isolated) biodegradables for Upflow Anaerobic Sludge Blanket (UASB) digestion
- UASB performance superior (compare to high solids anaerobic digestion)
- Preparation and separation inextricable

Front-End
Physical Separation/Preparation Element

Physical Separation/Preparation

Overlooking the Water Vat

Plastics Baler

Products of Physical Separation/Preparation Element

- Non biodegradable "recyclables" (metal, glass, plastic)
- Non-usable junk to landfill (essentially biologically inert)
- *Isolated* biodegradables in solution/fine suspension, as necessary for UASB digestion

Biological Element

UASB Diagram
(From Grady, et al, 2nd Edition)

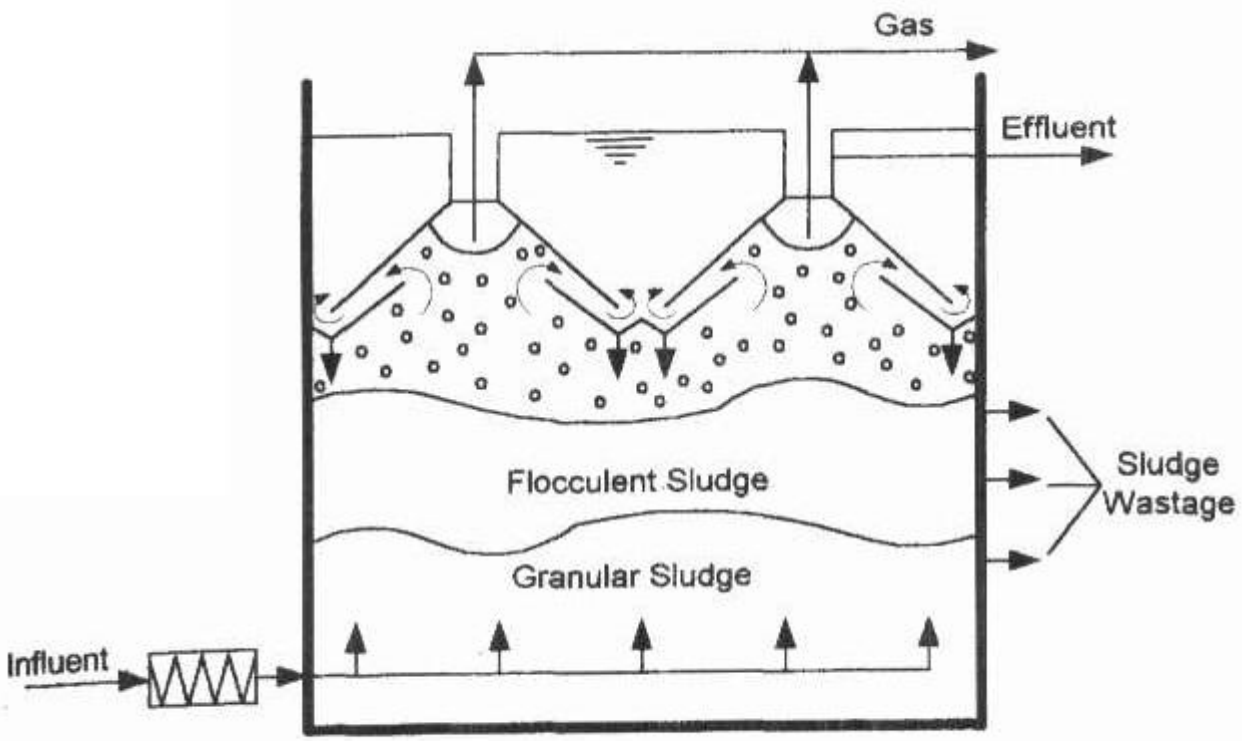

Figure 13.9 Upflow anaerobic sludge blanket bioreactor.

UASB and "High Solids" digestion

Hydraulic and Solids (culture)

Residence Times

	UASB	High Solids
HRT	1 day	15 days
SRT	80 days	15 days

Note: UASB possible in ArrowBio

because of front-end separation/preparation

Consequences of UASB vs. High Solids Amounts and Quality Comparisons

Water

Solids

Biogas

ArrowBio's - Basic Driving Forces

- Gravity
- Biological action (advanced anaerobic digestion)

Absent from ArrowBio

- High pressure/high temperature containment vessels, with associated costs and potential for catastrophic failure
- Generation of hazardous/toxic chemicals (CO, carcinogenic/teratogenic hydrocarbons, dioxin/furans, etc.)

ArrowBio - Benign Conditions

- Temperatures:
  - physical sep/prep: “room temp”
  - UASB bioreactor: 35°C to 40°C
- Pressure: ambient (1 atmosphere)

Construction

- Material and labor - local
- Fabrication - local
- Equipment – 95% off the shelf (proprietary ~ 5%)
- Time - 16 months

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