Compostables: Turning Resources into Waste?

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Main Topics

1. Dynamics within Solid Waste Management

2. Terminology

3. Feedstocks

Dynamics Within Solid Waste Management

Principle #1: Garbage begets garbage: If you treat discarded resources like garbage, that's what you get.

Principle #2: Least cost > environmental values: Least cost collection leads to greater emphasis on last-chance processing over education/training, highest/best use, effective policy.

Principle #3: Garbage in, garbage out: Over time, Recycling and Composting are being treated more like garbage, with greater commingling, predictable downcycling, loss of markets.

The PUSH of recycling and composting policies ("we gotta get rid of this stuff, wherever, however") exceeds the PULL ("we want this stuff; we make good products that people want from it") from recycling and compost markets.

Eternal vigilance: price of true sustainability.

Dynamics Within Solid Waste Management

- Trash
  - 1900: Simple--horse manure, food waste, wood ash, wood, glass
  - 2000+: Complex--many materials, laminates, presumably more toxic
- Municipal Recycling
  - 1988: Emphasized source separation
  - 2018: Much commingling, need for greater downstream processing
- Municipal Composting
  - 1985: Few municipal programs, emphasis on leaves
  - 1995: Yard trimmings only (2000+(?) municipalities, started in East)
  - 2000: Commercial food waste (SF Bay Area)
  - 2005: Commercial organics (West Coast)
  - 2019: Commercial and residential organics (usual suspects, plus)

Food Waste Disposal

- Largest single category of disposed MSW
- >30 million TPY disposed in U.S.
- <5% recycling rate
- Foregone end products
- Landfilling organics → climate change

Visualizing "Urban Food Waste"

- Food: We know what it is. But…what about:
- Urban Food Waste: What pictures come to mind?
- Edible Food: Ditto

Program success depends on

how closely

what we imagine

matches with facts.

“Urban”

- Includes what?
- Excludes what?

Much food waste from suburbs, exurbs, even large rural prisons

Many West Coast suburbs have food waste programs

Needs clarification.

Focus More on Responsibility, Less on Geography

- Local governments ("municipalities"), at their core, form to protect public health & safety
  - Discarded food scraps create a localized public risk
- Public health risk has shifted
  - Originally, infectious disease
  - Now, global warming
- Need new policies for new challenges

Food Waste Is An Enduring Public Health Issue

- 1900: Reduce Transmissible Diseases
- 2000: Protect the Environment
  - save landfill space
  - reduce GHGs
- 2100: Support Community Resilience
  - water conservation
  - local food supply
  - local energy supply

Emphasize Municipal Role

- To protect **PUBLIC HEALTH**
- To improve the **ENVIRONMENT**
- To strengthen **COMMUNITY RESILIENCE**

So, perhaps “municipal” > “urban”

“Food Waste”

“Food Waste” vs. “Food Scraps”

Consider:

--use ”waste” mainly as a transitive verb (“to waste something”), not as a noun. Why?

--Waste is a social construct

--not found in nature

--not inherent in the wasted thing

Not sure “scraps” is much better though. For edible food that becomes trash, how about “wasted food” (NSF/Hopkins)?

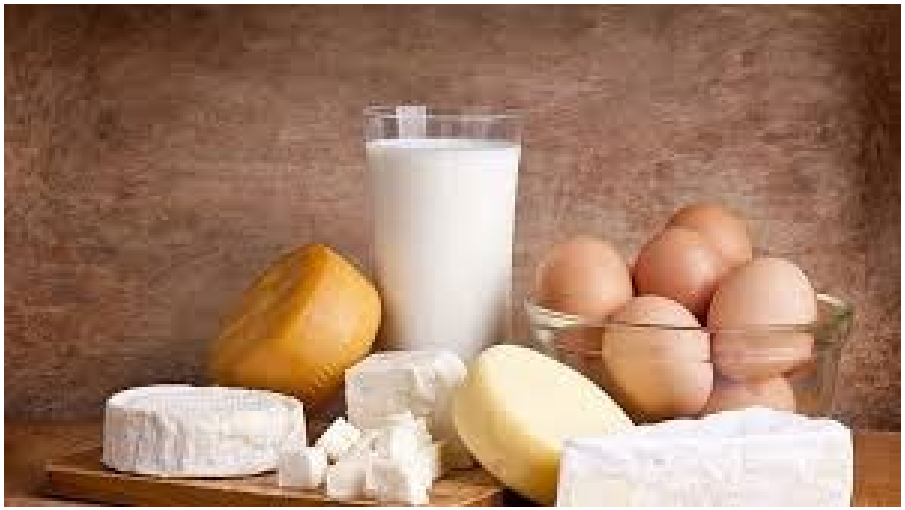
Food Waste

“Edible Food”

https://andrewemberson12.wordpress.com/2011/01/20/fruit-vid/

https://www.unilever.com/sustainable-living/reducing-environmental-impact/sustainable-sourcing/our-approach-to-sustainable-sourcing/sustainable-fruit-and-vegetables/

https://wsimag.com/wellness/18969-allergic-to-dairy-and-eggs



Feedstocks: What's Really Out There?

Edible Food Recovery: Some Issues

- It's a market; demand not infinite or unchoosey
  - Eaters determine what's edible, not suppliers.
  - Bakery's unsold sheetcakes for diabetic elders?
- Edible comes with non-edible often; who should pay for sorting, disposal of non-edibles?
- Not a panacea for hunger or environment:
  - Food's embedded energy matters ➔ eat less meat, drink more water.
  - Hunger amidst plenty: not so much a distribution issue; fundamentally, it's a resource ($) and access issue.
  - Still, SB1383 (CA) will have many benefits.

Much Food Waste in Cities is Liquid

- Restaurant Fats, Oils, Grease
- Breweries
- Beverage Manufacturers (sodas)
- Condiment Manufacturers
- Meat Processors (blood)
- Milk
- Also possible: wineries, distilleries, cheesemakers

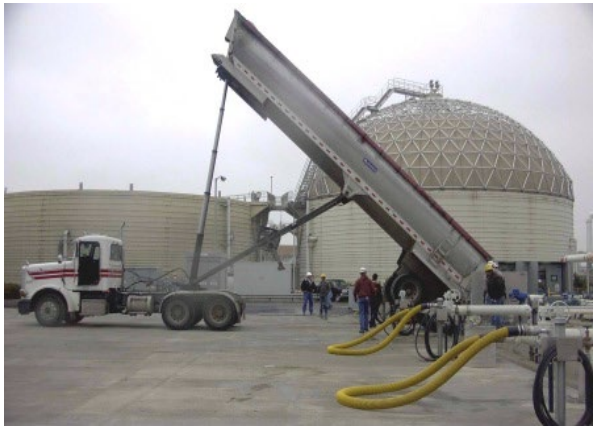
Not landfilled or incinerated, except retail sized milk

Sent to WWTP; on-site lagoons; other

Anaerobic Digestion of Municipal Food Waste: Feedstock Contaminants Cause Processing Challenges

Liquids

- Grit (sand, bone, shells, glass, etc.)
- Salts

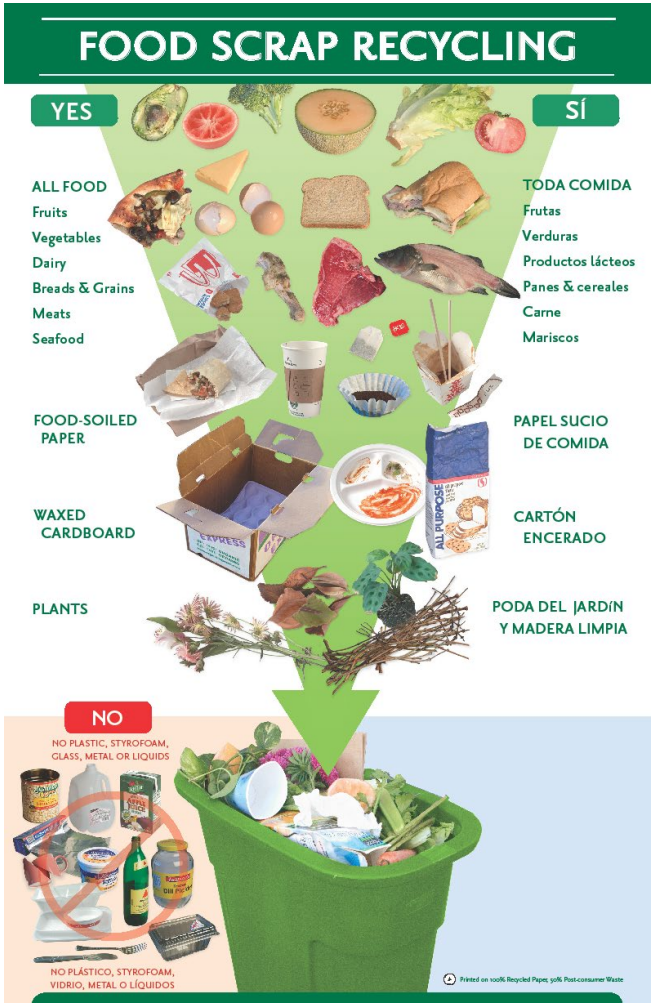


Solids

- Grit
- Plastics, including compostable
- Take-out boxes and related
- Food-soiled cardboard
- Toxics/Hazards (if MSW is feedstock)

WWTP Perspective: Handling Municipal Source-Separated Organics

- The Good
  - Fruits
  - Vegetables
  - Grains
- The Bad
  - Food-soiled paper
  - Waxed cardboard
- The Ugly
  - Bones, shells, glass
  - Wooden crates
  - “Compostable” plastics



Food Waste: "Animal" vs. "Vegetative"

- Vegetative Only
  - Produce wholesalers, coffee shops, juice bars, vegetarian restaurants.
  - Relatively straightforward to compost.
  - Generally does not major facility upgrades.
- Meat/Dairy + Vegetative
  - Must follow health/safety requirements.
  - Much more stringent permits and operating conditions.

"Food Waste-Only" Programs for Animal Feed

- Considered higher, better use than for compost or energy production (EPA)

- One Example: Sunnyvale, Stanford (Mission Trails)
  - Feedstock: residential, institutional food only.
  - Use of slow-speed screw press.
  - Product: dog food. High $ value/ton.

“De-Pack”

- Discarded food in packaging from manufacturers, wholesalers, retailers.

- Opportunity for processing improvements.

- Biocycle

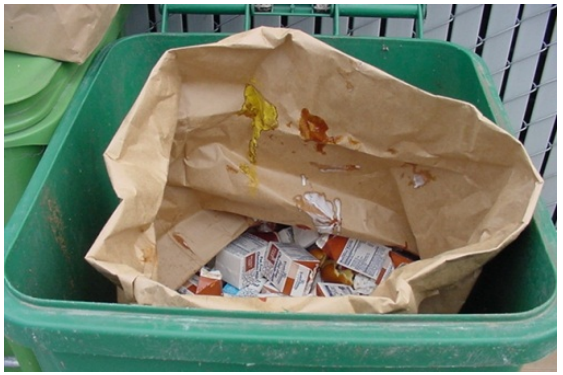
"Source-Separated Organics": Compostable Plastics Mixed with Food Waste

- Useful in limited circumstances
- Problematic when widely used:
  - Sometimes GMO corn-based
  - Doesn't degrade quickly in compost operations
  - Doesn't digest
  - Not necessarily best product quality
  - Expensive
  - Fundamentally, fails to challenge single-use, disposable paradigm

"Source-Separated Organics": Paper Products Mixed with Food Waste

Paper can be compostable (not very digestible), but two main processing challenges:

- Large quantity of food-soiled paper, esp. in comm. sector. Is it Tr, R, or C?



- Increasingly plasticized paper stream—milk cartons, food soiled cardboard boxes, etc.

"Organics-Derived MSW" Contains Food Waste

- Opportunity: Large quantity of digestible food waste, compostable food waste/paper in MSW

- Constraints:
  - Glass fragments (glittering compost is not golden)
  - Illegally placed toxics (batteries, broken fluorescent bulbs, thermometers, medical waste, etc.) have typical concentration in MSW; need for mass balance testing to evaluate screens
  - Other product quality, market acceptance issues

What Do Communities Need?

- Case studies of similar communities and situations
- Program planning
- Program implementation
- Data collection and analysis
- Program evaluation and expansion
- Policy impetus

Food waste: an opportunity for generators, haulers, facility operators, and equipment dealers

Four Steps to Effective Policy

1. **CONCENTRATE** on discards that
   a. harm public health and
   b. do not have market value.
2. **PROTECT** public health and safety:
   a. use GHG endangerment finding as rationale
   b. use bans and incentives.
3. **REQUIRE** source separation:
   a. commercial food scraps, at least.
4. **BROADEN** paths to success:
   a. include anaerobic digestion in policy, hierarchy
   b. use hauling contracts to recover edible food.

Main Areas for Research

- Behavior Change Approaches
- Collection Improvements
- Processing Improvements
- Higher-Value Products
- Packaging Changes
- Policy Levers

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