Presentation to VT Universal Recycling Stakeholder Group

Food Waste Depackagers
Principles of material separation

- Material characteristics = “code”
  - Size, weight, density, hardness, magnetism, electrical conductivity, light refraction

- Machine action = “switch”
  - Machine identifies code and takes action, active or passive
    - Active – optical sorting of colored glass
    - Passive – drum mesh on trommel screen

- Metrics
  - Recovery % - percent recovered vs. rejected
  - Purity % - percent desired material in recovered stream
Food waste depackagers

- Developed in Europe in 1990s in response to BSE crisis which prevented food wastes going to ruminants
- First machines based on rendering technologies
- Shredding/crushing contaminated recovered food with inorganics/inerts
- Newer machines can separate with less force
- Machines can use multiple codes and switches, but usually:
  - Hardness (resistance to force) = code
  - Pressure = switch
Major companies in depack space

- Scott Equipment Co. (New Prague MN)
  - Makes: Turbo-Separator, THOR
    • Users: AgChoice (NJ), E. L. Harvey (MA)

- Ecoverse (Avon OH)
  - Imports Cesaro Tiger from Italy
    • Users: St. Louis Composting & Midwest Organics (MO)
  - Imports Doppstadt DSP205 from Germany
    • Users: two pending in U.S.

- Doda (St James MN)
  - Imports Bioseparator from Italy
    • Users: A-1 Organics (CO), Quantum Biopower (CT)
Scott Turbo-Separator - https://www.turborecycling.com

- Horizontal shaft with paddles
- Rotating speed = 400 rpm
- Packaging usually separated in first 20% of machine
  - Packaging carried along top of paddles to discharge
  - Recovered food drops down
- Does not use water but AD feedstock prep adds water to make slurry
- Capacities 2 – 40 tons/hour
- Recovery ~98%, purity ~ 99%
- https://www.youtube.com/watch?v=pUX4IsbJne8
Ecoverse Tiger - https://www.ecoverse.net/tiger-depack/

- Unit has 8 cy feed hopper with counterrotating screw augers that start depackaging
- Separation of food with vertical mill rotating at 950 rpm, pushes food through punch-plate screen
- Can be run dry or wet (uses about 300 gal water/ton throughput)
- Recovery ~ 96-99%, purity ~ 99.5%
- Dry recovery - https://www.youtube.com/watch?v=Mxvu21iNBGY
- Wet recovery - https://www.youtube.com/watch?v=vXaXdqP1eaw
Doda Bioseparator - https://www.dodausa.com/equipment/bio-separator/

- Hopper uses serrated edge screw conveyors to open packaging
- Vertical mill pushes waste through punch-plate screen
- Recovery & purity similar to others
- https://www.youtube.com/watch?v=a_Z2E3omhw
Summary

- Technologies available to pre-process food wastes prior to composting or AD
- Costs – in the $400K - $600K range
- While they can handle co-mingled food wastes, they tend to work better on multiples of same kind of packaging
- Higher speed machines can fragment hard plastics and some metal, transferring to recovered product
- No data on microplastics formation or transport