

Manure vs Sewage

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Basic Considerations

Manure:

- Including but not restricted to CAFOs (Concentrated Animal Feeding Operation)
- Organic material including feces, bedding material, by-products of reproduction
- Mostly single **species** (bovine or porcine or poultry, animals stay in place) determines → pathogens
- Single origin/limited number of origins (geographically, one or a small number of CAFOs)
- Controlled feed & H₂O
- High in Nitrogen, phosphate and potassium
 - Results in high BOD (Biological Oxygen Demand)



Sewage:

- sanitary, commercial, industrial, surface runoff
- multiple species (human, companion animals, wildlife)
 - Large variety of pathogens
- Multiple origins due to general mobility, tourism etc.
- 'uncontrolled' food & water sources
- Anthropogenic waste indicators (AWIs)
 - Drug residues
 - Petro-chemicals
 - Disinfectants, fragrances, detergents
 - Radio-isotopes



Microbiological Composition Manure vs Sewage

- Zoonotic pathogens of concern in cow manure:
- Viruses:
 - none
- Bacteria:
 - E. coli O157:H7
 - Salmonella typhimurium
 - Mycobacterium avium paratuberculosis
 - Listeria monocytogenes
- Parasites (Protozoa):
 - Cryptosporidium parvum
 - Giardia lamblia



Zoonotic pathogens of concern in Sewage*:

- Viruses: unknown number – viral 'swarms' ('Norwalk-like' – Noroviruses, hepatitis A)
- Bacteria: 17
- Fungi: 2 (Aspergillus, Candida)
- Parasites:
 - Protozoa: 5
 - Helminths: 10



Why the difference matters

- Affordability of food of animal origin would be seriously compromised
- Properly treated manure has clear benefits, biosolids are highly variable and final assessment is pending
- Farm: On site manure and waste water management law and guidelines address nutrient and pathogen management efficiently (>90% reduction in pathogens in most systems)
- Manure contains significantly less hazardous substances (AWIs, etc.) and organisms than sewage
- Biosolids from sewage are often burned or land filled
- Population dense regions (EU) make clear distinction between manure and sewage
- No precedence for equal treatment of manure and


