Best Management Practices to Prevent Antibiotic Contamination of Water Bodies

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Types of BMPs

Livestock Management
Manure Management
Land and Water Management







Livestock Management BMPs

 Antibiotic BMPs based on recommendations from the American Veterinary Medicine Association

• Two types:

– 1) BMPs that reduce antibiotic use
– 2) BMPs for antibiotic use

1) BMPs to Reduce Antibiotic Use

- Limit antibiotic therapy to sick animals.
- Emphasize preventative measures such as
 - Good hygiene
 - Routine health monitoring
 - Immunizations
- Consider other types of therapies before choosing antimicrobial therapy.
- Avoid antimicrobials for uncomplicated viral infections.

2) BMPs to Guide Antibiotic Use

- Only treat animals for as long as is necessary.
- Use narrow spectrum antibiotics whenever possible.
- Maintain accurate records regarding all antimicrobial use.



Manure Management BMPs

• Two types:

– 1) BMPs that speed degradation of antibiotics
– 2) BMPs that limit off-site transport





1) BMPs to Speed Degradation of Antibiotics

- Aeration speeds bio-degradation.
 - Lagoon aeration reduces antibiotic concentrations in wastewater.
 - Actively composting (including turning as necessary to mix and aerate) speeds antibiotic removal.





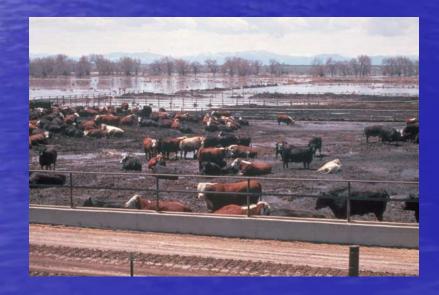
1) BMPs to Speed Degradation of Antibiotics

- Exposure to light speeds photolysis.
 - Spreading manure stockpiles out could degrade pharmaceuticals.
- Phytoremediation can degrade tetracyclines and possibly other antibiotics.



2) BMPs to Limit Off-site Transport

- Maintain ability to collect runoff from 25yr, 24-hr storm at all times.
- Line retention ponds and lagoons to reduce seepage (and maintain liners).



2) BMPs to Limit Off-site Transport

- Site corrals and manure storage areas at least 150 ft from wellheads, creeks, or ponds.
- In humid regions, store manure under roofed areas.



Land and Water Management BMPs

1) Manure application BMPs
2) Soil conservation BMPs
3) Irrigation BMPs





Manure Application BMPs

- Make field-specific application decisions
- For example, avoid
 - Sandy soils over shallow groundwater or tile drains OR
 - Clayey soils on steep slopes near surface water bodies

 Avoid application to saturated or frozen soils if possible

 Incorporate immediately after application



Soil Conservation BMPs

- Many pharmaceuticals are strongly sorbed to soil particles.
- Therefore, preventing soil erosion also prevents antibiotic contamination of surface water (especially for tetracycline, erythromycin, and tylosin).
- For example, use:
 - Conservation tillage
 - Cover crops
 - Filter strips

--Terracing --Strip cropping --Grassed waterways

Irrigation BMPs

- Avoid over-watering to prevent leaching and runoff.
 - Monitor soil moisture and irrigate based on crop needs
- Manage irrigation systems for optimum uniformity and efficiency



Future Outlook for BMPs

 As our scientific knowledge base expands, we will be able to develop more effective BMPs to protect water bodies from antibiotic contamination.

