Soil Amendments: Manure and Organic Fertilizers
Segment 2: Manure
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What is Manure?

• The byproduct of the digestive process in ruminant and monogastric animals.
• A common and highly valued soil amendment in a cropping system.
• It can be handled as a solid or a liquid.

Manure total solids characterization and handling requirements.
Source: Virginia Cooperative Extension
Benefits of Manure

• Supplies macro- and micro-nutrients that are essential for crop growth.
• Functions like a slow release fertilizer.
• Builds soil organic matter, stimulating the biological processes in the soil that help to build fertility.
• Nutrient content varies between species, diet, and bedding content.
Manure Handling

• Manure storage and treatment sites should be situated as far as practical from fresh produce production and handling areas.
• Consider barriers or physical containment to secure manure storage or treatment areas where contamination from runoff, leaching, animal, foot, and/or equipment traffic, or wind spread is a concern.
• Consider good agricultural practices to minimize leachate from manure storage or treatment areas contaminating produce.
• Consider practices to minimize the potential of re-contaminating treated manure.
Manure Application

• Land application is an approved method for manure management.

• Generally Accepted Agricultural and Management Practices for Manure Management and Utilization (Manure GAAMPs).
Manure Application

- A farmer complies with the intent of the Michigan Right to Farm Act when a Manure Management Systems Plan is developed, implemented, and sufficient documentation is provided to prove the plan was followed.
- Application rate is determined by soil test, amendment analysis, realistic crop yield, and soil type.
- Manure Management Systems Plans focus more on nutrient placement and movement rather than pathogen control.
- Produce Safety Plans focus on pathogen control.
Food Safety Considerations

- Raw manure can never come in contact with the harvestable portion of the crop or harvested produce (FSMA PSR).
- Applications of raw manure should only occur:
  - Two weeks prior to planting
  - A minimum of 120 days prior to harvest for crops in contact with soil.
  - A minimum of 90 days prior to harvest for crops not in contact with soil.
- Raw manure must be incorporated within 48 hours of application.
- Raw manure should not be applied on commodities typically eaten raw that are harvested within 120 days of planting.
- Maximize the interval between raw manure application and harvest.
Food Safety Considerations

• Treatments that may reduce pathogen levels:
  • Passive treatment – relies on the passage of time in conjunction with environmental factors that help reduce pathogens such as UV, moisture, and temperature fluctuations.
  • Active treatments – require more management and inputs. Includes pasteurization, heat drying, anaerobic digestion, alkali stabilization, aerobic digestion, or some combination.

• Also consider how manure may enter a field from other sources, and plan accordingly.
  • Adjacent field practices can have an affect on your produce.
Recordkeeping

• Document what, where, when, how, and how much was applied.

Tilling surface applied liquid hog manure into the soil.

Photo credit: Charles Gould
Corrective Action Plan

• What happens when:
  • Accidental contact with harvestable portion of the crop

• Some options:
  • Alternative markets
  • Kill step
Corrective Action Plan

• What happens when:
  • Accidental contact with harvestable portion of the crop
• Alternative markets
• Kill step
Key Points

• Manure is an excellent slow release fertilizer and soil builder.
• Locate manure storage and treatment areas away from fruit and vegetable production areas.
• Land application of manure is an acceptable practice for fruits and vegetables if recommended and Produce Safety Rule practices are followed.
• Manure can be treated to reduce pathogen load.
• Document what, where, when, how, and how much manure was applied.
• Manure has little perceived monetary value.
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