Getting Back to the Basics: Managing Litter Techniques for Today’s Poultry in a NAE/ABF program

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The Unspoken Influencer

• Litter and its quality sets the stage for everything that will take place during the grow out process: promoters and challengers

• Litter today is not given enough emphasis

• Litter quality has implications all the way through the grow out cycle from bird health, performance, welfare to the economics

• Litter today is not the litter of yesterday!

• More critical today because of the shifting away from traditional production models and moving more to ABF, NAE, and Organic

• Flock liability and profitability: it all starts at the floor
Opportunistic Environment

- Litter’s impact starts the moment the bird steps on the floor
What is Litter?

- Bedding material
- Excreta
- Feed and water
- Microbial good and bad
- Molds and yeast
- Viral
- Spores and oocysts
- Gas generator
- Feathers
# Effects of pH on Selected Poultry Bacterial Pathogens

Incubation 24 hours, Soy Agar Medium  
Source: Effects of pH on Selected Poultry Bacterial Pathogens, Boyd E. Hardin and C. S Roney, Alabama Dept. of Agriculture and Industries State Diagnostic Lab

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E. coli In Litter - What We Can’t See

Active E. Coli ($1.0 \times 10^8$ CFU/g) (100,000,000 bacteria in a gram of litter - the size of your thumb nail). 1 E. coli can replicate into 1 billion in 24 hrs.

pH manipulation and heat is the only thing that impacts E. coli in the litter.
Function of Litter

- Comfortable surface for birds
- Satisfies dusting instincts
- Dilutes fecal matter
- Absorbs spilled, wasted water
- Insulates from cold pad (dirt or concrete)

Litter is one of the four most critical components to a successful flock

(litter, temperature, water, feed)
Importance of Litter Management

Broilers will not perform to their genetic potential in a poor environment.

Manage litter/moisture to control:

- Ammonia
- Paw burns
- Condemnations/downgrades
- Proliferation of pathogenic bacteria
3 Ways to Impact Litter Quality

- Ventilation
Is this a problem?
3 Ways to Impact Litter Quality

- Ventilation
- Waterline management
Manually Adjust Waterlines
3 Ways to Impact Litter Quality

• Ventilation
• Waterline management
• Bird density
Now More Than Ever

92% of industry professionals think litter management is more important in ABF production

Changes in:
• Ammonia
• Paws
• Diets
• Bacterial/viral conditions
 Costs of Poor Litter Management

• Bird health and performance
  – Pathogens / pH
  – Ammonia
  – Other noxious gases

• Energy efficiency / fuel costs

• External environmental concerns / regulations
Generator Within: BTW=A

**AMMONIA GENERATION FROM BROILER LITTER**

- **Baseline**
- 2x
- 25%
- 3x
- 30%
- 4x
- 42-46%
- 6.5x

**LITTER MOISTURE CONTENT**

- 20%
- 25%
- 30%
- 42-46%
- 75°F
- 95°F
Managing Litter After Move Out
Advantages of Decaking

- Removes high moisture areas
- Removes ammonium
- Reduces microbial stress and load
- Only de-cake the depth of the cake
- Do not disturb the anaerobic microbe bed
- Minimal amount of time and labor
- Improves litter amendment activity
Increased Surface Area, Increased Ammonia
Smart Decaking

- Focus just on caked areas
- Remove all cake, including sidewalls
  - 3,000 sq. ft. NOT decaked
Decakers
Set Decaker Depth Carefully
Set Decaker Depth Carefully

• Remove only cake
Windrow Composting

- Goal: Heat litter to kill pathogenic microorganisms
- Potential benefits:
  - Destroy pathogens
  - Dry pad
  - Redistribute moisture in litter
- Challenges
  - Reaching mandatory target temperature
  - Time for proper implementation
  - Controlling moisture
  - Ammonia control
Importance of Windrow Temperature

• Achieving adequate pile temperature is KEY
• Temperatures not equal throughout piles
  – Target = 135°F // Reduction = 130°F
  – Little microorganism survival at 170°F
• If temps are not achieved, microbial activity will not be optimized!
Two windrows (Day 4)
Windrow Composting

• Like bread, without the right ingredients, the bread will not rise
• Piled litter does not equal pasteurization- learn the signs!
• 3 main ingredients to meet ideal temperatures reduce pathogens:
  – C:N (25:1)
  – Water 20-35% (moisture and Aw)
  – Temperature 130°F
Moisture content (MC)

• Negatively correlated to temperature
• Low MC
  — High T achieved quickly
  — Unable to maintain
• High MC
  — T achieved slowly
  — Difficult to achieve optimal T
• Optimal MC = 20-35%
• Example:
  — 8 ounces vs 1 gallon
Important to make sure all the wet and decayed litter is in the pile and off the pad and side walls
Not complete piles and heating will not occur properly or effectively
Windrow process

1. Form windrows
2. Monitor windrow temperatures
3. Turn windrows
4. Level litter

Ideally, the windrow process will be done during a **21 day** lay out
Windrow process – Step 1

Form windrows
Windrow equipment

Use the right equipment the right way
Windrow process – Step 2

Monitor temperatures
• Use maximum 18” thermometer to reach core
• Note that most have temperature compensator

Insulate part of thermometer not in windrow pile (PVC pipe with foam)
Windrow process – Step 2

Monitor temperatures
Windrow process – Step 2

Monitor temperatures

[Diagram showing temperature variations over days after windrow formation for 10 and 20 feet depths.]
Windrow process – Step 3

Turn windrows
Windrowing – Step 4
Leveling and packing litter
Decaking vs. Windrowing
Conclusion

• Can’t use a cookie-cutter approach
• Impacts of poor litter management are far reaching
• Develop BMPs for litter to be sustainable
• Decake, don’t till
• Make sure all components are in place for an effective windrowing process
• Grower education
• Third party evaluations
Want to learn more:

• We will never improve what we constantly tolerate!

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References