Feed Ingredients, Additives and Quality Control

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Dawe's Laboratories

- Animal nutrition since 1926
- Vitamin-mineral premixes
- Water-dispersible vitamins, minerals and electrolytes
- Feed additives, nutritional supplements
- Probiotics, hatchling supplements
- Formulation
- Nutrition/management consultation

Why Do We Need Additives, Supplements? And when?

Wild gamebirds do just fine without them, but what do they eat?

What do wild gamebirds eat?

EXAMPLES:
Grasshoppers, Crickets, Earthworms, Fresh Plant Growth

Grasshoppers, Crickets, dehydrated

- Dry Matter, fresh,%..28
- Protein,% DM…...57.3
- Fat,% DM……..….8.5
- Calcium,% DM…..0.21
- Phosphorus,% DM..0.78
- Zinc,%……..……0.010
- Iron,%.....0.013
- Methionine,%.....….1.32
- Lysine,%.....2.69
- Vitamin A, IU/lb..214-368
- Vitamin E, IU/lb...31-104

Earthworms, dehydrated

- Moisture, %.....10
- Crude Protein, %.....61.0
- Fat, %.....8.6
- Methionine, %.....2.44
- Lysine, %.....4.51
- Threonine, %.....2.62
- Calcium, %.....0.97
- Phosphorus, %.....0.79
- Sodium, %.....0.44
- Chloride, %.....0.91
- Iron, %.....0.36
- Selenium, %.....0.0004
- Zinc, %.....0.027
- Vitamin A, IU/lb….149 to 1090
- Vitamin E, IU/lb…….32 to 104

- Moisture, when fresh, % ….83

Wheat Forage, Fresh

- Dry Matter,%.....29.5
- Crude Protein,%.....11.0
- Crude Fiber,%.....28
- Fat,%……2.7
- Starch,%.....7.8
- Calcium,% DM……..0.38
- Phosphorus,% DM…0.26
- Vitamins ……
- Minerals…….

Differences between wild and captive reared. How do we compensate?

- Variety of food
- Space, density
- Stress
- Weather
- Disease exposure

How do we replace Natural food - With "Un-natural feed"?

- Energy Sources – corn, milo, wheat, fat
- Protein Source – SBM, CGM, meat meal
- Water – nutrient, surfactant, carrier
- Macro minerals – calcium, phosphorus, Salt
- Vitamins – A, D, E, K, B1-6, etc.
- Micro minerals – Zn, Cu, Fe, Mn, Mg, etc.
- Amino Acids – Methionine, Lysine
- Non-nutritional additives

Energy Sources

- Corn
- Milo
- Wheat
- Fat, oil

Protein Sources

- Soybean meal
- Meat and bone
- Corn gluten

Typical Nutritional Additives

- Macro minerals – calcium, phosphorus, salt
- Vitamins – A, D3, E, K, C, B1-6, etc. (14±)
- Micro minerals – Zn, Cu, Fe, Mn, Mg, (8+)
- Amino Acids – Methionine, Lysine

Non-nutritional Additives

- Mold inhibitors
- Toxin binders
- Pellet binders
- Probiotics, Prebiotics
- Enzymes
- Phytogenics

Non-nutritional Additives

- Anthelmintics, miticides
- Coccidiostats

Why do we need non-nutritional additives?

- Freshness vs storage conditions
- Palatability
- Digestibility
- Gut health
- Disease and parasite control

Fresh vs. stored food - Molds

Mold Inhibitors

- Molds reduce feed value and may produce Mycotoxins
- Attack stressed grain in the field, or
- Can grow during poor storage conditions
- Condensation in spring and fall due to daily temperature changes
- Products to control– propionic acid based products (MycoCurb)

INGREDIENT STORAGE AND HANDLING TO REDUCE MOLD GROWTH

- These measures will prevent or reduce mold growth, but will not affect mycotoxins that are already present.
- 1. Check all incoming corn with a black light (it only detects aflatoxin); reject any corn that appears moldy
- 2. Moisture level, 12% or less will prevent mold growth
- 3. Control insects that damage grain
- 4. Make sure bins are cleaned and leak proof
- 5. Save the best corn for young animals or substitute other grains (wheat, milo)

INGREDIENT STORAGE AND HANDLING TO REDUCE MOLD GROWTH

- 6. Be especially cautious with grain byproducts like screenings and DDG's which are more likely to contain higher levels of mycotoxins
- 5. Reduce handling damage to grain as much as possible to minimize broken kernels and fines
- 6. Only grind grain as needed, keep storage time of ground grain as short as possible
- 7. **Add mold inhibitors to stored ingredients**

Molds may produce Mycotoxins

- Aflatoxins, T-2, DON,
- Usually several present
- Aflatoxins are damaging at ppBillion
- Corn – 1,600 kernels/lb = 83,000,000/26T
- Most mycotoxins cause damage to the digestive tract and/or liver and kidneys
- Symptoms like Vitamin D deficiency (Rickets)
- Weak legs, wing walkers, curly feathers, broken feathers

Mycotoxin binders (flow agents)

- Clay, yeast, charcoal, enzymes
- Adsorb Mycotoxins and carry them away, or
- Enzymatically break Mycotoxins down to less active form
- Nutritional adjustments – protein, vitamins (D3)

FEED ADJUSTMENTS TO HELP CONTROL MOLD AND MYCOTOXINS

- In finished feed, we can take steps to prevent mold growth (as with ingredients) as well as to control mycotoxins and their symptoms.
- 1. Select, add or subtract ingredients based on quality, risk, species to be fed or age (wheat and milo may be safer during a bad corn year)
- 2. Adjust deliveries so that feed storage time is minimized
- 3. Pellet feed

FEED ADJUSTMENTS TO HELP CONTROL MOLD AND MYCOTOXINS

- 4. As with ingredients, make sure bins are clean & dry
- 5. Increase crude protein, and add animal sources, and pure amino acids to provide a better amino acid balance
- 6. Increase digestibility by adding enzymes
- 7. Increase vitamin/trace minerals levels (especially D), in feed and in the water
- 8. Add mold inhibitor
- 9. Add antioxidants (in premix or separately)
- 10. Add toxin binder (T-Bind, Mycofix, etc.)

Digestibility – Enzymes Why??

- Better feed conversion in meat birds
- Especially valuable in starter and breeder diets
- Young gamebirds do not produce enough of necessary enzymes for several weeks > pasty vents, etc.
- Enzymes break down NSP's and other hard to digest fractions
- In breeders enzymes increase ME of feed so that less fat is needed > better pellet quality

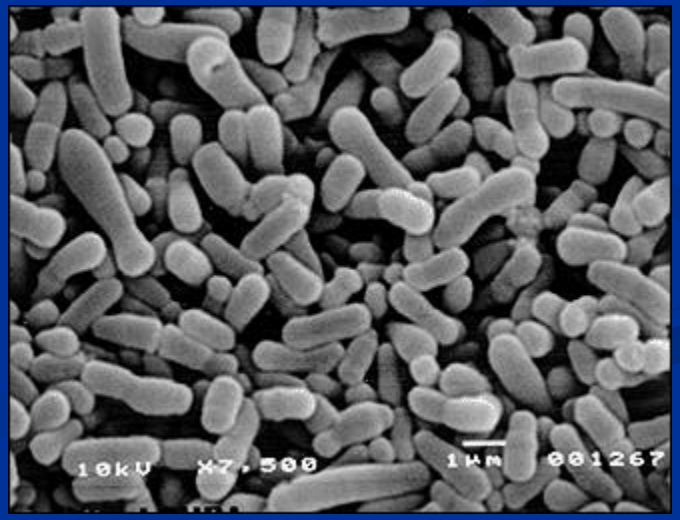
Gut Health - Probiotics (Direct Fed Microbials)

- Why FEED bacteria on purpose?
- No natural brooding: no exposure to beneficials
- Coprophagy

Probiotic (Direct Fed Microbial)

- Beneficial bacteria that: Colonize the gut or act as they pass through to
- Competitively exclude pathogens by: colonizing the gut lining and preventing attachment, and/or
- Produce acid (propionic, lactic, butyric)
- Compete for nutrients
- Produce vitamins, enzymes
- Stimulate immune response

Beneficial bacteria



Features to look for: DPP (Dawe's Poultry Probiotic)

- Multi-species, multi-strain, multi-source – complete System of symbiots
- Poultry specific
- Colonizing ability
- Stable in storage and pelleting
- Antagonistic to pathogens
- Improve performance: enzymes, VFA's

When to Use Probiotics (Minimum)

- Day of age – to establish normals
- Booster or low level continuous
- Times of stress – flushing reduces numbers
- After antibiotics
- During molt

Parent Replacement: Hatchling Supplements

- Rehydration – reduce DOA's, 1st week mortality
- Attractant – train to feed
- Early delivery of probiotics

Hatchling Supplement: attractant

Prompt access to water and feed:

- Reduces early mortality
- Promotes more rapid development of the digestive tract and the immune system
- Improved livability and as much as 5% to 7% heavier bodyweights

- ***THE SOONER THE BETTER!***

GroGel Plus
A Hatchling Supplement

- Super Hydrating Gel, Concentrated Protein, Fat, Carbohydrates, Vitamins, Minerals and Beneficial Bacteria
- When mixed with water, it gels and forms shiny, green, bite sized particles

After mixing, scoop GGP onto a paper tray with some feed

Watch them eat

Anthelmintics, Miticides Coccidiostats

- Wormers (Fenbendazole, etc), Saponins
- Diatomaceous Earth
- Sulfur (Poultry Shield)

Phytogenics (Plant extracts)
Saponins

- Yucca, Quillaja (Micro-Aid, MagnaPhi)
- Surfactant, foam, ammonia reduction
- Membrane Permeability, adjuvant
- Wormer

Phytogenics, (plant extracts) "Essential" oils: Oregano, etc.

- Flavor
- Anti-micro, -fungal
- Membrane effect
- Antioxidant
- Digestive aid

Coccidiostats

- Amprol, Corid (Amprolium) - Pheasants
- Avatec (Lasalocid) - Chukar
- Coban (Monensin) – Quail
- Bio-Cox, Sacox (Salinomycin) - Qiail
- Rofenaid 40 (Sulfadimethoxine & Ormetoprim) –VFD required - Chukar
- Saponins & other phytogenics?

Feed Testing

- Crude Protein
- Crude Fat
- Crude Fiber
- Calcium
- Phosphorus
- Sodium
- Mineral or Vitamin

Why these tests?

- Protein, fat fiber – tells the nutritionist if major ingredients are added in the correct amounts
- Calcium, phosphorus – major macro minerals
- Sodium – salt amount is correct. Ask for sodium - not salt.
- Mineral (zinc) if a vitamin/trace mineral combo is used this indicates premix amount is correct
- Vitamin (A) more costly and not as precise, but necessary if separate vitamin & TM are used

The End

- Questions?
- Comments?