Consumers Concerns About Antibiotic Usage

Industry Response

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Key Time Line of AGP Usage

• **1946**: The growth promoter effect discovered (Moor et al. 1946)
• **1951**: FDA Approved AGP usage 1951 (Jones & Rick, 2003)

• **2000**: WHO suggested rapidly phase out medically important antibiotics in food animals. (World Health Organization 2000)

• **2006**: EU bans of all AGPs
• **2009**: FDS Guidance for Industry GFI #209
• **2013**: FDA guidance for Judicious use of Antimicrobials GFI #213
• **2017**: FDA Final rule Veterinary Feed Directive (VFD)
Antibiotics Usage in Food Animals

- Disease treatment
- Disease control
- Disease prevention
- Production purposes (AGP)
Medically Important Antimicrobials

• Aminoglycosides
• Lincosamides
• Macrolides
• Penicillins
• Streptogramins
• Sulfonamides
• Tetracycline

*Non-Medically Important Drugs:
Bacitracin, Ionophores, Avilamycin, Flavomycin
Poultry Production Based on Antibiotic Use

- Conventional
- Certified Responsible Antibiotic Use (CRAU)
- No Medically Important Use Antibiotics (NAIHM)
- Raised Without Antibiotics (RWA, NAE)
- Organic poultry production (Certified Organic)
ANTIBIOTICS USE IN POULTRY PRODUCTION STEP

- Hatchery
- Health Management
- Growth Promotants

**PRIMARY ANTIBIOTIC**

- To prevent Injection site bacterial contamination
- Poultry diseases treatment & control
- Improve performance, feed conversion by managing GUT microflora

ABF
RWA
RWA POULTRY PRODUCTION SYSTEM

- GGP, GP Farms (No RWA)
- GGP Hatcheries (No RWA)
- GP Hatcheries (Considering RWA)
- Broiler Hatcheries (RWA)
- Broiler Grow-Out Farms (RWA)
- Broiler Slaughter (RWA)
- Broiler Processing (Traceability)
- Further Processing (Traceability)
Commercial Broiler USA

- *Coccidiostats in Feed ✓
- GP Antibiotics in Feed ✓
- Antibiotics in Feed or Water ✓
- Antibiotic in Egg or Chicks ✓
Commercial Broiler EU

• *Coccidiostats in Feed
  ✔

• AGP Antibiotics in Feed
  ❌

• Antibiotics in Water
  ✔

• Antibiotic in Egg
  ✔
Certified Responsible Antibiotics Use

- Ionophores in Feed
- AGP Antibiotics in Feed
- Antibiotics in Water
- Antibiotic in Egg
- Therapeutic Treatment under veterinary supervision
Raised Without Antibiotics (RWA, NAE)

- Ionophores in Feed
- Antibiotics in Feed
- Antibiotics in Water
- Antibiotics in Egg

*Flocks treated with therapeutic antibiotic will be diverted to conventional market.*
TRANSITIONING US BROILER INDUSTRY

- COMMERCIAL BROILER
- ALL NATURAL BROILER
- FREE RANGE BROILER
- ALL VEGETARIAN BROILERS
- ABF VEGITARIAN BROILER
- ABF BROILER
- NO ADDED ANTIBIOTICS
- NO HUMAN ANTIBIOTICS
- GROWN WITHOUT ANTIBIOTICS
- ANTIBIOTIC FREE
- NO ANTIBIOTIC RESIDUE

- ORGANIC (O)
- RAISED WITHOUT ANTIBIOTICS (RWA)
- NO ANTIBIOTICS EVER (NAE)
RWA Production System

• Integration of Antibiotic Free Program

• Protocols, label claims

• Verification of RWA system

• Tracing and segregation mechanism
CHALLENGES OF RWA PROGRAM

- Confusing Labeling Language
- Defining ABF program and Labeling requirements
- Health & welfare Challenges
- Nutritional Challenges
- Management Challenges
- Performance, Economics, and Cost of production
- Growth & Future of ABF Farming
Disease Challenges of RWA Broilers

- Early chick mortality
- Coccidiosis Control
- Necrotic enteritis
- Cholangio hepatitis
- Bacterial Osteomyelitis
- Animal Welfare Issues
Disease Challenges of RWA Broilers

<table>
<thead>
<tr>
<th></th>
<th>Conventional Production</th>
<th>RWA Production</th>
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<tbody>
<tr>
<td><strong>Necrotic Enteritis</strong></td>
<td>11</td>
<td>36</td>
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<td><strong>Airsacculitis</strong></td>
<td>4</td>
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<tr>
<td><strong>Gangrenous Dermatitis</strong></td>
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<tr>
<td><strong>Cellulitis / IP</strong></td>
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<td><strong>Viral Enteric Disease</strong></td>
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<tr>
<td><strong>Bacterial Osteomyelitis</strong></td>
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<td>12</td>
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<tr>
<td><strong>Kinky Back</strong></td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
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Source: Singer et al, Impact of no antibiotics ever production broiler health survey May 2018
Performance, and Economic Challenges

RWA Broiler Production

- Loss of 3 – 5 points in Feed Conversion
- 7-Day mortality increase from 0.8% - 4%
- Cost of RWA production estimated to be an additional $0.02 – 0.03 /lb.
- WSJ estimates increased cost of production to be 10 –15%.
- 300 fewer people fed from RWA chicken house
Poultry Industry Response to Antibiotic Free Production

• Rocky Start.....early 1990’s

• Consumer Concerns & Expectations

• Integrator response

• Regulatory control

• Media /Social media involvement
Control at Breeder level

• Nutritional Management
  - Egg shell quality
  - Cloacal water activity
  - Vertical and Lateral pathogens

• Gut Microbiota management
  - Probiotics
  - Prebiotic
  - Essential Oils

• Antibiotics Resistance Management
  - Therapeutic antibiotic usage
  - Resistant bacterial population
  - Dysbacteriossis / Dysbiosis
Antibiotic Resistance at Breeder Farms

![Graph showing bacterial population percentages sensitive and resistant to therapeutic antibiotics.](image-url)
Nutritional Management

- Functional gizzard
- Feed Particle size
- Calcium Phosphate ratio
- Potassium Level
- Cloacal Contamination

Adopted from Laverty and Skadhauge 2008
Alternatives to Antibiotics

- Probiotics
- Prebiotics
- Essential oils
- Enzymes
- Organic acids
- Toxin binders
- Bacteriophages
Alternatives to Antibiotics

Probiotics:
- Protect colonization of enteropathogen
- Enhance intestinal microbiota
- Reduce pathogens load
- Produce short chain fatty acids & Bacteriocin's
Alternatives to Antibiotics

Prebiotics:

• Newer scientific discovery (1995)

• Food for gastrointestinal microflora

• Mainly various Oligosaccharides

• Inhibit pathogens from colonizing in the gut
Alternatives to Antibiotics

Essential Oils:

• “Natural alternative” to antibiotics

• Oregano, thyme, cinnamon

• Antibacterial, antifungal, coccidiostat,

• Gut health improvement nutritional
Feed Additives - Probiotics

- An in-field study measured pathogen levels over time from more than 2,000 broiler gastrointestinal tract samples.
- Feeding a probiotic effectively changed the microbial landscape to reduce the prevalence of avian pathogenic *E. coli* and *C. perfringens*.

Feed Additives - Probiotics

- *Bacillus* product resulted in lower instances of avian pathogenic *E. coli*.

Feed Additives - Probiotics

- Broilers fed *Bacillus subtilis* tended to have lower ileal *E. coli*.

Feed Additives - Probiotics

- Broilers fed *Bacillus subtilis* tended to have lower ileal *Clostridium*.

Prevalence of Salmonella in breeder hens fed enzymatically hydrolyzed yeast cell wall

Feed Additives - Prebiotics

Effect of yeast cell wall products on the ability of *Salmonella* to adhere to gut epithelium *in vitro*

Baines, et. al., 2013, Presented at the Gut Health Symposium in St. Louis, MO, USA
Feed Additives - Prebiotics

Enzymatically hydrolyzed yeast cell wall source of MOS reduced number of hens with high concentration of cecal Salmonella

Prevalence of cecal Salmonella above one million cfu/g

Control: 47.9% Hens, Treatment d1: 25.5%, Treatment week 10: 43.8%

P=0.06

Feed Additives – Essential oils

Salmonella Prevalence in ceca from broilers fed an Essential Oil blend with or without Butyrate

Conclusion: Industry Response

• After 1st FDA approval for AGP in 1950 pharmaceutical

• Integrators extensively use AGP in feed under FDA guidance

• Antibiotic resistance concerns late 50’s remains inconclusive

• Industry started experimenting on removing AGP antibiotics

• Limited scientific support was available from pharmaceutical
Conclusion: Industry Response

- ABF broiler production begins in mid 90’s was

- ABF industry was small 1995 < 5%.

- Organic broiler production standard established by NOP

- 2000 WHO report and rising consumer concerns was a reality check
Conclusion: Industry Response

• The consumer and retailer pressure continues to build up

• Europe pulled all AGP from food animals in 2006

• FDA issued voluntary withdrawal of AGP from food animal in 2009 #209

• Extensive research and development on alternatives to antibiotics

• USDA established RWA standards in 2005
Conclusion: Industry Response

- Science and technology started catching up.

- Extensive R&D on ”Gut Microbiome, prebiotic and probiotic

- By the end of 2015 more than 46% industry adapted a version of ABF program

- There are several antibiotic alternative products and programs now available

- Poultry industry is defining various programs (RWA, NAE, CRAU)
Antibiotics Usage in Broiler Industry

Figure 1. US broiler-feed tonnage by program type, 2013-2017

- Full Spectrum (ionophores, bacitracin, bambermycin, avilamycin plus medically important)
- Reduced Use (ionophores, bacitracin, bambermycin, avilamycin only)
- Ionophores Only
- No Antibiotics Ever

Source: Rennier Associates, Inc.
THANK YOU

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TECHNICAL SERVICES
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