# FACT SHEET

# Alternatives for Poultry Gut Health

# The Development of Antimicrobial Resistance

Antibiotics have been used to promote growth and treat disease in poultry for more than 70 years. Increased use of antibiotics has led to the development of AMR in bacterial pathogens, which can be transferred from animal products to humans, poses a threat to food security and human health.



Antimicrobial resistance develops in bacterial pathogens.

## Antimicrobial Use Strategy in the Canadian Poultry Industry

As of May 2014, the preventative use (at subtherapeutic level) of Category I antibiotics were no longer permitted in the Canadian poultry industry. In 2018, this ban was extended to Category II antibiotics. By the end of 2020, preventative use of Category III antibiotics will also no longer be permitted. Antibiotics are not used in laying hens in Canada. Canadian egg farmers follow feed regulations set by the Canadian Food Inspection Agency.

### Alternatives to Antibiotic Growth Promoter (AGP) in Poultry

Various feed additives are currently available for replacement of AGP, including probiotics, prebiotics, synbiotics (probiotics + prebiotics), in-feed enzymes, organic acids, phytochemicals, or some novel alternatives such as antimicrobial peptides and immune-related products.

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## University of Manitoba Department of Animal Science AGP Alternatives Research

Effective AGP alternatives are able to promote growth, prevent diseases, boost poultry immune system, and improve gut health. Research groups led by Drs Martin Nyachoti, Bogdan A. Slominski, Karmin O, Chengbo Yang, and Woo kyun Kim (former faculty) have been working on the research for many years.

# **1) Probiotics** (live microorganisms which when administered in adequate amounts confer a health benefit on the host)

Dietary supplementation with *Bacillus* spp. strains in broilers improve local and systemic immunity, body weight, and intestinal morphology.

## **2) Prebiotics** (types of dietary fiber which serve as food for probiotics)

Fructooligosaccharide supplementation induces protective effects on immune responses and intestinal morphology in broiler chickens, without impairing growth performance during inflammation and modulate gut microbiota in favour of chicken health. Use of yeast-derived products decreased the incidence of *Salmonella* shedding by broiler chickens and layers.

#### 3) In-feed enzymes

Multi-carbohydrase supplement improves the nutritive value of canola diets and facilitates the post-disease compensatory growth of chickens after *Clostridium perfringens* challenge. Moreover, non-starch polysac-charide-degrading enzymes as feed additives improve nutrient digestibility of canola meal.

### 4) Organic acids and phytochemicals

Blends of sorbic acid, fumaric acid, and thymol improved intestinal morphology and increase digestive enzyme activity in broilers during the grower phase. More recently, cinnamaldehyde alone or in combination with citral in feed improved growth performance and alter cecal microbiota composition in broilers.

#### 5) Novel alternatives

Antimicrobial peptides, hyperimmune egg yolk IgY (major antibody in birds), and bacteriophages have attracted more attention in recent years, but more studies are needed.

## Additional Practices to Optimize Poultry Gut Health

Maintaining good husbandry practices, and applying optimal nutrition strategies and health management are also necessary to control gut diseases and sustain gut health without using antibiotics.

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