



GUT HEALTH

TRIPLE CHECK



In today's livestock production environment, gut health is increasingly synonymous with animal health. The Kemin Gut Health Solutions program encompasses many health priorities, such as nutrient digestion and absorption, metabolism and energy generation and more. Proper gut health promotes the absence and prevention of disease, leading to optimal performance.

A background image of two white chickens, likely a breed like Game Fow, looking towards the camera. The image is overlaid with a semi-transparent blue filter.

**UP
TO 70%**
**OF THE IMMUNE
SYSTEM IN BIRDS
RESIDES IN THE
GASTROINTESTINAL
TRACT.**



Kemin has been a proactive leader within the gut health industry. By using decades of scientific research, thorough testing and customer feedback, Kemin created its multi-faceted **Gut Health Triple Check** approach to provide a broad platform of solutions.

GUT HEALTH BEGINS AT HATCH

A long-term, comprehensive approach to poultry gut health is crucial — Kemin solutions support and protect birds from hatch to finish. Proper gut health support will strengthen intestinal integrity, ensure a healthy microbial balance and support immune function.

The interaction of these factors determines the optimal nutrient utilization of the animal and helps promote the following:

- Better nutrient digestion and absorption
- Proper weight gain and management
- Healthy metabolism response for energy generation
- Absence, prevention and avoidance of disease
- Bone and joint health

HEALTH CHALLENGES CREATE GUT INFLAMMATION

When gut health is compromised, inflammation often occurs. Triggers such as oxidative stress, mycotoxins, social and environmental stress, growth rates and dysbiosis of the microbiome can spark this process. Many of these triggers also impact one another (e.g., social stress leading to dysbiosis), which can lead to a cycle of inflammation — ultimately, leaving animals more susceptible to illness. This can result in poor quality of life for the bird, and a shrinking profit margin for producers.

Pathogens impacting poultry gut health:

- | | |
|------------------------|---------------------------------|
| ■ Coccidiosis | ■ <i>Escherichia coli</i> |
| ■ <i>Clostridia</i> | ■ <i>Listeria monocytogenes</i> |
| ■ <i>Campylobacter</i> | ■ <i>Salmonella</i> |

GUT HEALTH

TRIPLE CHECK

Recently, intestinal health has been elevated to the same level of importance as other management practices. The Gut Health Triple Check helps you to establish the intestinal integrity and protection your birds need.

This program serves as a support system to **CLEAN UP** contaminants in feed and water prior to animal exposure, **BUILD UP** intestinal strength and immunity to reduce leaky gut and **KNOCK OUT** harmful pathogens for healthier and better performing birds.

Over the years, Kemin has researched alternatives to antibiotic use, creating gut health solutions for poultry — positively impacting beneficial bacteria and optimizing feed efficiency. Improving poultry gut health involves a comprehensive focus of the feed going into the bird, integrity of the intestinal wall and pathogen reduction. Each of these elements are interconnected and all must be checked to optimize efficiency.



A COMPREHENSIVE FOCUS
ON CONTAMINANT MITIGATION,
INTESTINAL INTEGRITY AND
PATHOGEN REDUCTION.

CLEAN UP • BUILD UP • KNOCK OUT

CLEAN UP

With the continued industry-wide reduction in antibiotic usage, producers are discovering an entirely new set of management challenges which impact poultry health and performance. When using medications, quality problems can be disguised in fat, grain, water and finished feed. However, in today's production systems, those previously low-priority concerns can become major problems.

HEALTHY BIRD

When gut integrity is uncompromised, contaminants from feed and water move through the animal with little negative impact to the animal or its performance.

COMPROMISED BIRD

If contaminants from feed and water get into the animal and the gut is NOT healthy (due to strain from stressors like heat, feed changes, disease, etc.), contaminants have the ability to invade the gut lining and potentially move into the bloodstream, going systemic and causing major production and health issues.

HELP PREVENT THE PREVENTABLE

Safeguarding feed and water quality starts with protecting raw materials as they arrive at the feed mill and continues through manufacturing and storage.

Target specific profit-robbing contaminants in fat, grain, water and finished feed using the following Kemin Gut Health Solutions:

ENDOX®

KALLSIL™

CURB® AF

Acid LAC®

Myco CURB®

RENDOX®

CURB® RM Extra

Ammo CURB® 85

SAFEGUARD

YOUR FLOCK



BUILD UP

Intestinal integrity is all about maintaining the strength of the intestinal barrier in order to maximize nutrient absorption within the bird. The intestinal barrier is made up of a layer of epithelial cells, which prevent harmful pathogens and toxins from entering the system (e.g., leaky gut), and are critical for fluid and electrolyte secretion. The intestinal barrier is regularly exposed to up to 10 trillion microorganisms, making it extremely important to keep it functioning properly.¹

To strengthen the barrier, the focus is on the tight junctions and minimizing cell damage. By upregulating the proteins making up the tight junctions, the barrier is built stronger, reducing toxin transfer. The barrier can also be stronger and can maintain proper absorption if lesions are reduced or can heal quicker after a challenge has occurred.

Additionally, since up to 70% of the immune system resides in the intestine, preparing the bird for a challenge is imperative.² By building up immune cells and reducing corticosteroids, the bird can improve its ability to fight off disease and maintain performance during challenges.

Strengthen the intestinal barrier and immune system to maximize nutrient absorption and inhibit harmful pathogens or toxins with the following Kemin Gut Health Solutions:

KemTRACE[®]
CHROMIUM
Essential to you and your operation.

THE INTESTINAL
BARRIER IS REGULARLY
EXPOSED TO UP TO
10 TRILLION
MICROORGANISMS¹

KNOCK OUT

A healthy balance of microbiota provides a protection against pathogen colonization and contributes to the overall well-being of the bird. In order to achieve a healthy balance, knocking out potentially harmful pathogens is necessary. Controlling and inhibiting pathogens can encourage the microbiota to produce metabolic substrates like vitamins and short-chain fatty acids.³

BENEFITS OF PATHOGEN KNOCK OUT IN THE GASTROINTESTINAL TRACT:

- Improved host nutrition
- Reduced intestinal pathogen colonization leading to sickness
- Development of proper intestinal morphology
- Enhanced immune function

Balancing microbiota to promote gut health diversifies the complex community of microorganisms living in the digestive tract of birds. Knocking out harmful bacteria to encourage beneficial bacteria promotes a healthy gastrointestinal (GI) tract by stimulating the immune system and protecting against pathogens.

Support intestinal balance to inhibit or eliminate harmful pathogens from infiltrating the body with the following Kemin Gut Health Solutions:

FORMYL

Acid LAC



INTESTINAL MICROBIOTA COMPOSITION

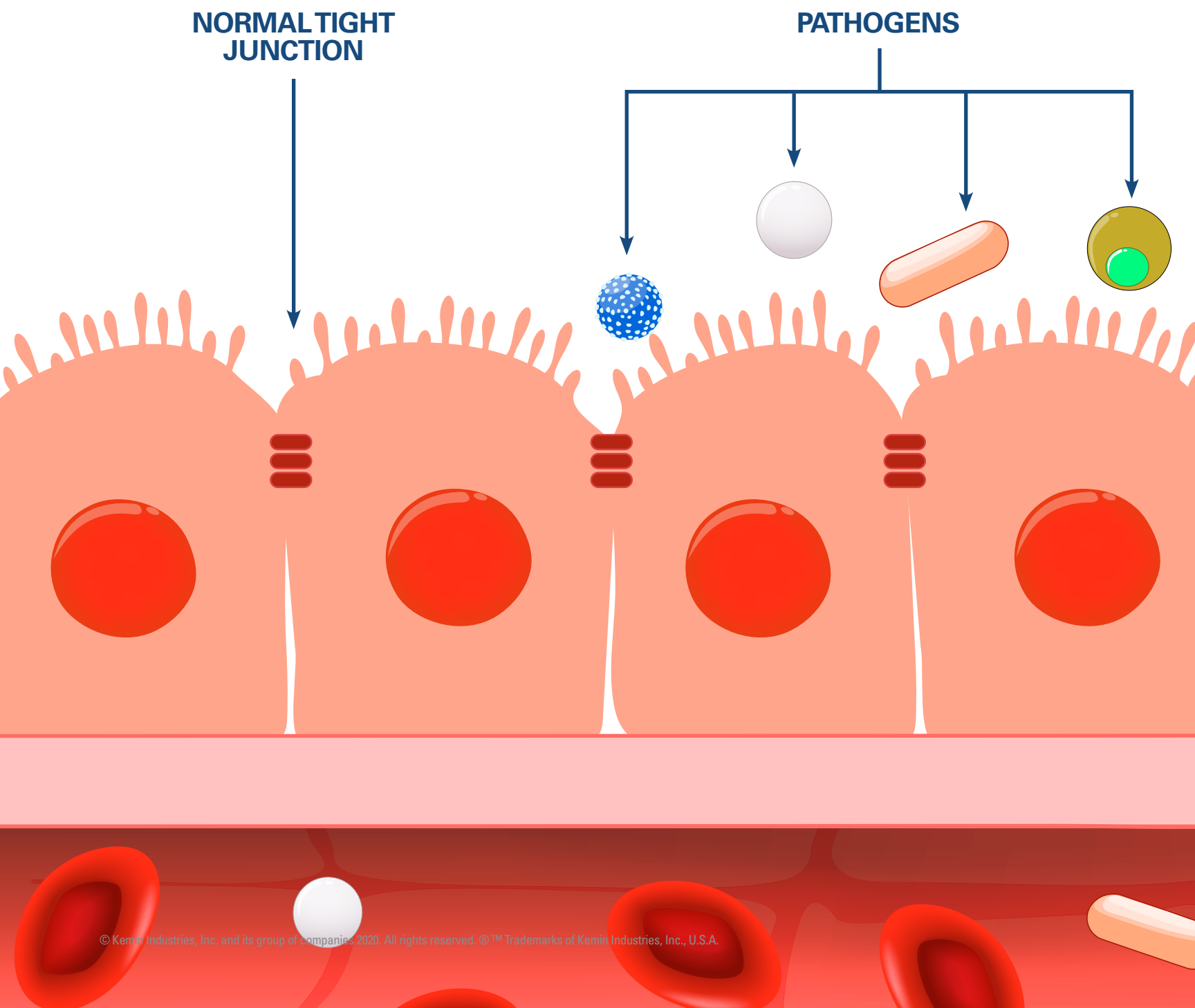
The digestive tract of a healthy chick is considered free from microorganisms at hatch. Afterward, microbial colonization evolves very quickly. The bacterial population within poultry is very diverse, comprised of more than 900 species.⁴

3. Ewing, M. W. 1997. The Living Gut. 2nd Edition. Nottingham University Press. Nottingham, U.K.

4. Apajalahti, J., et al. 2016. Interaction between chicken intestinal microbiota and protein digestion. Anim. Feed Sci. Tech. <http://www.sciencedirect.com/science/journal/03778401?sd=1>.

BUILD A BARRIER AGAINST LEAKY GUT

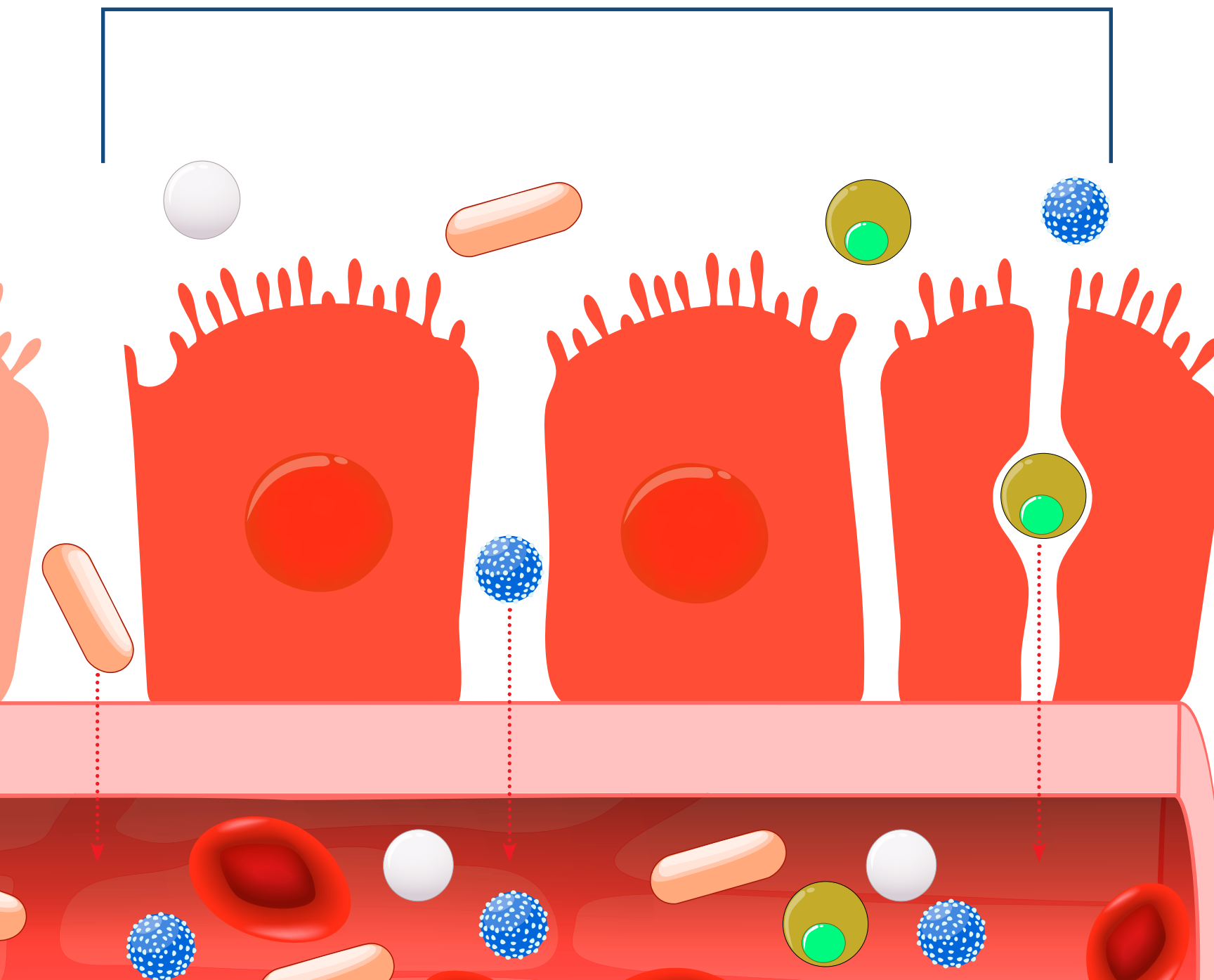
THE INTESTINAL BARRIER IS REGULARLY EXPOSED
TO UP TO 10 TRILLION MICROORGANISMS.



The intestinal barrier is made up of a layer of epithelial cells, which prevent harmful pathogens and toxins from entering the system — also known as leaky gut.

The intestinal barrier is regularly exposed to up to 10 trillion microorganisms, making it extremely important to keep it functioning properly. Additionally, up to 70% of the immune system resides in the gastrointestinal tract, so preparing the animal for a challenge is imperative.

LEAKY GUT



GUT HEALTH TRIPLE CHECK SOLUTIONS

Acid LAC™

Acid LAC is a unique combination of effective organic acids. It has been proven to control a broad spectrum of pathogenic bacteria in drinking water. By reducing the pathogen load in the water, there are fewer challenges presented to the bird, which helps maintain gut health.

Ammo CURB® 85

Ammo CURB 85 is a buffered mold inhibitor for processed feed ingredients and livestock feeds.

CURB® AF

CURB AF is a formaldehyde solution that maintains quality of complete feed and ingredients.

CURB® RM Extra

CURB RM Extra is a blend of formaldehyde and propionic acid designed to protect feed and feed ingredients from mold development.

ENDOX®

ENDOX was formulated specifically to protect finished feeds by safeguarding fat-soluble vitamins against degradation, protecting complete feeds from fat oxidation, vitamin loss and more.

FORMYL™

FORMYL is a free-flowing micro-encapsulated source of formic and citric acid. Formic acid, which helps reduce GI tract pH while reducing bacterial contamination.

KALLSIL™

KALLSIL reduces caking in poultry feed by absorbing moisture. This results in improved flow in feed ingredients to prevent feed from hanging to the sides of the bins or feeders.

KemTRACE® CHROMIUM

KemTRACE Chromium — the first product of its kind on the market — is a safe, proven trace mineral. This highly bioavailable, organic source of chromium propionate helps to reduce the negative effects of stress and improve glucose utilization.

Myco CURB®

Myco CURB is a mold inhibitor for feed, formulated to inhibit mold growth in processed feed ingredients, complete feed and total mixed rations (TMR). Myco CURB contains propionic acid blended with sorbic and benzoic acids and is buffered for improved equipment and employee safety.

RENDOX®

RENDOX stabilizes animal fats and protein meals during the rendering process with antioxidants to maintain product freshness, protect product quality, and increase product shelf life.

Visit [Kemin.com/GutHealthSolutions](https://www.kemin.com/GutHealthSolutions) to find out what gut health solutions can improve your poultry operation.



GUT HEALTH SOLUTIONS

A COMPREHENSIVE APPROACH TO GUT HEALTH

Help each bird reach its full production potential. Establish the intestinal integrity and protection your birds need using our Gut Health Triple Check.

Kemin offers a range of nutritional solutions for raising healthy animals. We understand your need to raise healthy livestock and poultry that give consumers the nutritional and health benefits they are looking for, while also returning a profit. Our products and services help you with nutrition, feed quality and gut health.

Kemin.com/GutHealthSolutions

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