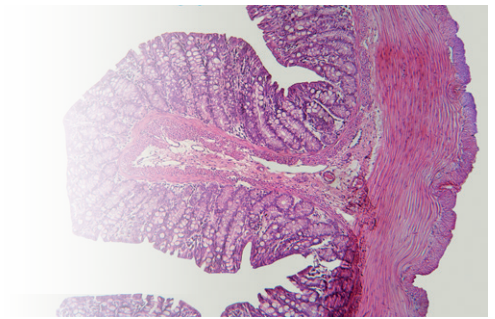


# Lumin<sup>®</sup>

## Intestinal Bio-Modulator



Intestinal health is the overriding determinant for overall health, performance, and, ultimately, profit. The epithelium lining the digestive tract and the associated defense systems are responsible for absorption of needed nutrients, and exclusion of toxins and pathogens.

These crucial roles are threatened by colonization of pathogenic bacteria, stress-induced leaky gut and chronic sub-clinical inflammation, and the need to adapt to changing diets and low-quality feedstuffs.

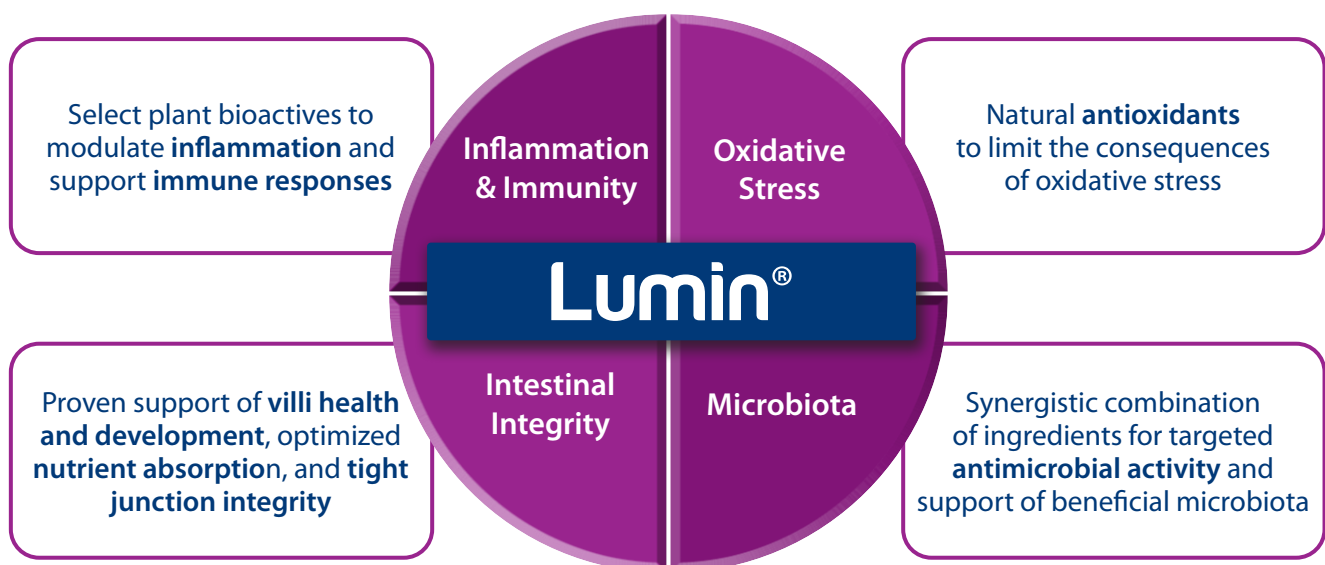
Failure to address these diverse challenges brings both direct and indirect costs in terms of productivity, efficiency, and medical treatment expense.

### Opportunities exist to pro-actively maintain intestinal health and function.

- Manipulating the gut microbiota to support beneficial species while inhibiting undesirable bacteria;
- Physically and metabolically enhancing absorptive capability;
- Strengthening tight junctions and gut integrity; and,
- Modulating inflammatory responses and minimizing oxidative stress and damage.

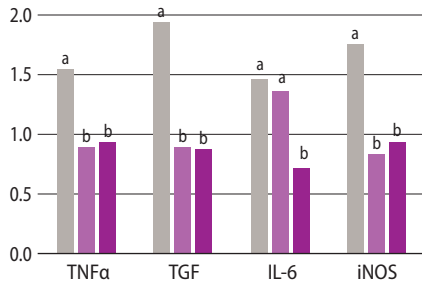
## Lumin: The Power of Synergy

**Lumin** is a complex formulation of complimentary ingredients, developed by Innovad<sup>®</sup> to provide multi-faceted intestinal support. Utilizing proven slow-release and protection technologies, new generation butyrate acts synergistically with naturally-sourced essential oils, plant extracts, and specific fatty acids to help maintain optimal epithelial metabolism.

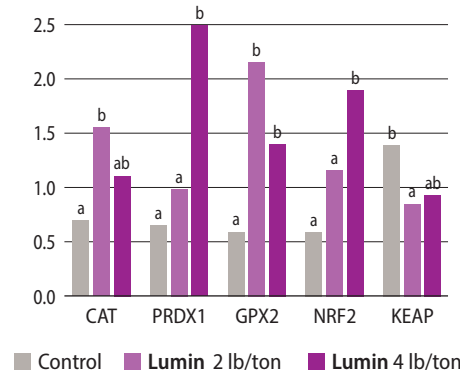


# Lumin<sup>®</sup>—Significant Impacts Reflected in Key Biomarkers

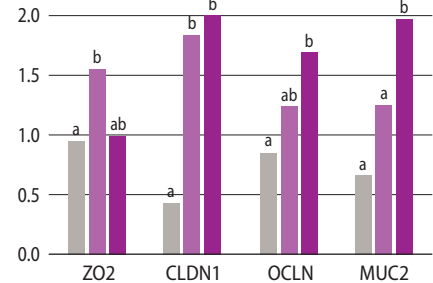
## Anti-inflammatory *in vivo* mRNA gene expression of pro-inflammatory cytokines



## Anti-oxidative & cytoprotective *in vivo* mRNA gene expression of cytoprotective proteins



## Gut integrity enhancer *in vivo* mRNA gene expression of gut barrier proteins



■ Control ■ Lumin 2 lb/ton ■ Lumin 4 lb/ton

## Lumin – Synergistic effects are greater than the sum of individual components

*In vitro* inhibition of LPS-induced inflammation using nitric oxide as a biomarker:

Essential oils alone, 5% reduction  
Plant extracts alone, 16% reduction  
Fatty acids alone, 28% reduction } 49%

**Lumin, 64% reduction** –  
Activity increased by nearly 1/3 when provided in combination.



## Lumin – Natural, not synthetic, plant extracts for greater efficacy

*Inflammatory biomarker (nitric oxide) levels in RAW 264.7 cells treated with synthetic carvacrol or natural Greek oregano, and incubated with LPS:*

Synthetic, 7% reduction

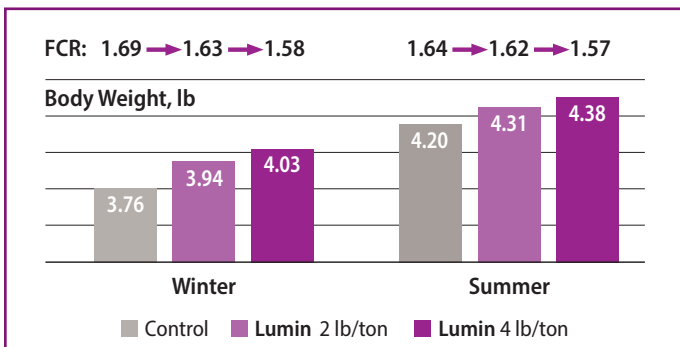
**Lumin, 45% reduction**

## Lumin<sup>®</sup>—Proven in university and on-farm trials

### Broilers, commercial trials, 2 seasons

Lumin at 0, 2, or 4 lb/ton;

Innovad's unique chronic gut inflammation challenge model



### Broilers, 21-day university trial

2 lb/ton Lumin vs Control or tylosin

	ADG, lb	FCR
Control	.069	1.97
Tylosin	.087	1.61
Lumin, 2 lb/ton	.091	1.50

AVAILABLE IN DRY AND LIQUID FORMS,  
FOR DELIVERY THROUGH FEED OR DRINKING WATER

## To learn more

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