



JH Biotech
Innovation for a Greener Earth

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NUTRAOLIGOSTM

Mannan Oligosaccharide Feed Supplement

OLIGOSACCHARIDES

Oligosaccharides are polysaccharides that yield from two to eight monosaccharide units upon hydrolysis. Oligosaccharides include fructo-, galacto-, mannan-, xylo-, and chito-oligosaccharides. Fructo- and mannan- oligosaccharides have been reported to evoke specific physiological effects when contained in food for monogastric animals. The majority of these effects are related to the resistance of these oligosaccharides to breakdown by the digestive enzymes secreted in the gastrointestinal tract, in combination with their properties as soluble substrate for specific microbial populations in the digestive tract of monogastrics.

OLIGOSACCHARIDES & BACTERIA GROWTH

Fructo-oligosaccharide is largely resistant to acidic and enzymatic hydrolysis by the digestive system of monogastric animals but is degradable by specific microorganisms. Fructo-oligosaccharide can be used by beneficial bacteria such as Bifidobacteria and Lactobacilli and can not be used by pathogenic bacteria such as Clostridia, E. coli and Salmonella. The effects of fructo-oligosaccharide on the growth of certain bacteria is listed below:

Effect of Fructo-Oligosaccharide on the Growth of Certain Bacteria

PATHOGENIC BACTERIA	EFFECT ON GROWTH	BENEFICIAL BACTERIA	EFFECT ON GROWTH
Clostridium botulinum	Suppressed	Bifidobacterium bifidus	Stimulated
Clostridium sporiforme	Suppressed	Bifidobacterium longum	Stimulated
Clostridium sporogenes	Suppressed	Bifidobacterium pullorum	Stimulated
Escherichia coli	Suppressed	Lactobacillus delbrueckii	Stimulated
Salmonella pullorum	Suppressed	Lactobacillus casei	Stimulated
Salmonella typhimurium	Suppressed	Lactobacillus acidophilus	Stimulated
Staphylococcus	Suppressed	Lactobacillus fermentum	Stimulated

NATURAL FUNCTIONAL FEED ADDITIVE

NutraOligosTM is a natural, functional feed additive. It contains fructo- and mannan-oligosaccharides, enzymes and β -glucan. The active ingredients are: Fructo- & Mannan- Oligosaccharides.....60%

NutraOligosTM can modify the intestinal ecosystem of animals by stimulating the growth of Bifidobacterium and Lactobacillus. It can also stimulate the immune system and reduce the toxins and pathogens in the GI tract, hence promoting animal health and growth.

RECOMMENDED USAGE

Swine	Starter	2.2 – 4.4 Lb / Ton
	Growth	1.1 – 2.2 Lb / Ton
	Finish	1.1 – 2.2 Lb / Ton
Sows		2.2 – 4.4 Lb / Ton
Poultry	Layer	1.1 – 2.2 Lb / Ton
	Broiler	2.2 – 4.4 Lb / Ton
	Breeder	2.2 – 4.4 Lb / Ton
Aquaculture		2.2 – 4.4 Lb / Ton

Note: 1 Ton = 2000 pounds



PERFORMANCE OF OLIGOSACCHARIDES

GROWTH PERFORMANCE OF MALE BROILER CHICKS AFFECTED BY MOS SUPPLEMENTATION				
VARIABLE PARAMETER	TREATMENT GROUP			
	Control	0.05% MOSs	0.10% MOSs	0.15% MOSs
Body Weight Gain (g)	2536.8 ± 32.2	2573.9 ± 43.6	2557.8 ± 36.3	2623.1 ± 34.6
Feed Intake (g)	3994.7 ± 117.1	4058.9 ± 130.7	4162.9 ± 40.3	4221.0 ± 60.5
Feed Conversion Ratio	1.58 ± 0.08	1.58 ± 0.04	1.63 ± 0.03	1.61 ± 0.06

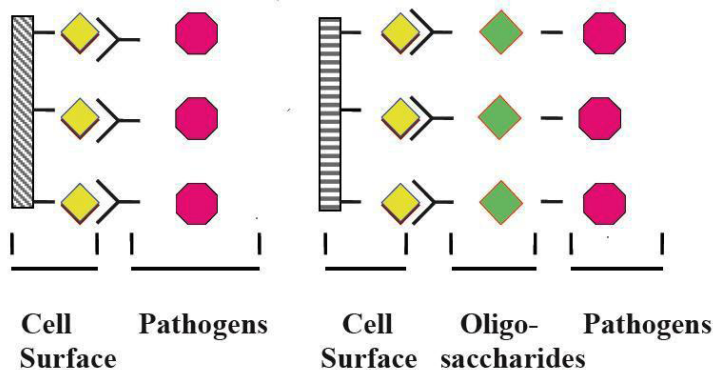
MOS – Mannan- Oligosaccharides

I.Yalincaya et al., 2008

THE USE OF FOS FOR GROWING PIGS		
NUMBER OF LITTERS	FOS	CONTROL
Weaning weight (Kg)	7.81 ± 0.85	7.71 ± 0.83
Weight at 7 days (Kg)	8.70 ± 1.05	8.50 ± 0.91
Weight at 14 days (Kg)	11.04 ± 1.31	10.82 ± 1.12
Weight at 28 days (Kg)	18.70 ± 2.08	18.06 ± 1.64
Total Period (0-28 days):		
Growth / Day (g)	389 ± 61	369 ± 35
Feed intake / Day (g)	583 ± 79	563 ± 67
Feed efficiency	0.667 ± 0.035	0.659 ± 0.042

FOS – Fructo- Oligosaccharides

Gianotten et al, 1993



*Attachment of Pathogens to cell surface

*Attachment of Pathogens to Oligosaccharides

BENEFITS OF OLIGOSACCHARIDES

BARRIER EFFECT

Lactic acid in the small intestine and short chain fatty acids in the large intestine can enhance the barrier effect which prevents the growth of pathogens. Oligosaccharides can stimulate the production of such acids by Lactobacillus and Bifidobacter and hence increase the barrier effect.

OLIGOSACCHARIDES AS RECEPTORS

Many bacterial pathogens possess surface adhesions or lectins which are carbohydrate binding proteins. These pathogens and their toxins attach to the oligosaccharide component of glycoconjugate receptors present on the surface of epithelial cells. This will reduce the ability of a pathogen or toxin to bind to its target epithelial cell surface receptor. Since the attachment of bacterial pathogens to mucosal surfaces is an essential first step in pathogenesis, the oligosaccharide receptor can inhibit the attachment process and prevent diseases. Mannan-oligosaccharide can inhibit the attachment of E. coli and Salmonella with type 1 fimbrial adhesions to ileal epithelial cells and hence reduce Salmonella colonization.

ABSORBING TOXINS AND PATHOGENS

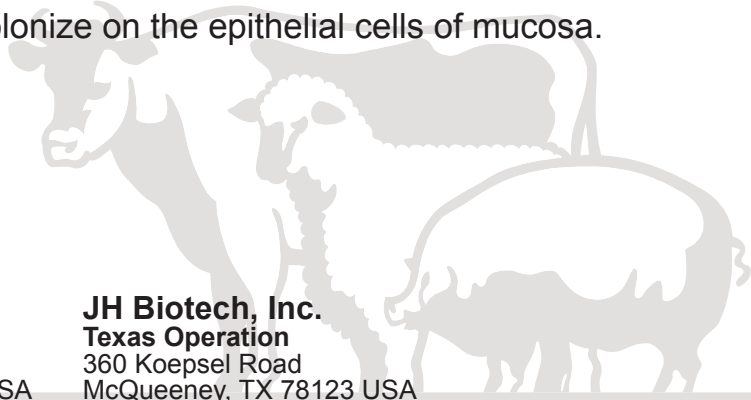
Attachment of E. coli, Vibrio, Cholera and Salmonella to epithelial cells of mucosa is through a mannose-specific lectin-like substance present on the surface of the bacteria. In the presence of mannan-oligosaccharide, the pathogens may be bound to its mannose sites and therefore fail to colonize on the epithelial cells of mucosa.



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