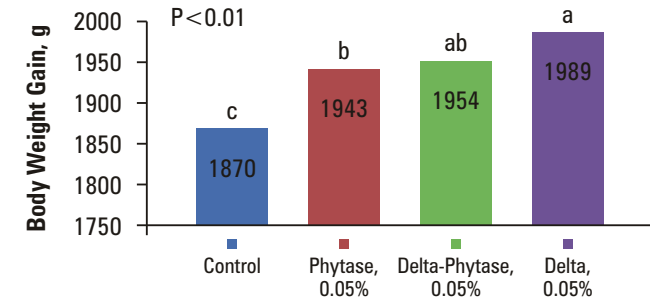


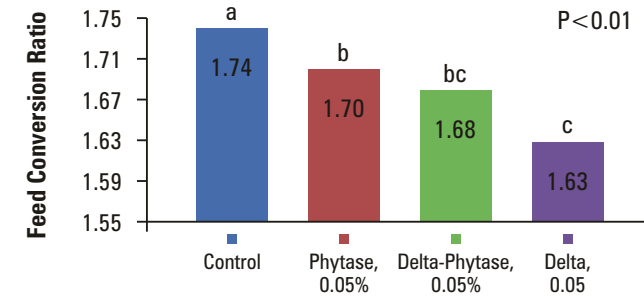
### Trial 3: DigeGrain Delta with and without Phytase

Location of trial	Kangwon National University, South Korea
Year of trial	2015
Strain used	Ross 308

#### Body Weight Gain (d 7-35)



#### Feed Conversion Ratio (d 7-35)

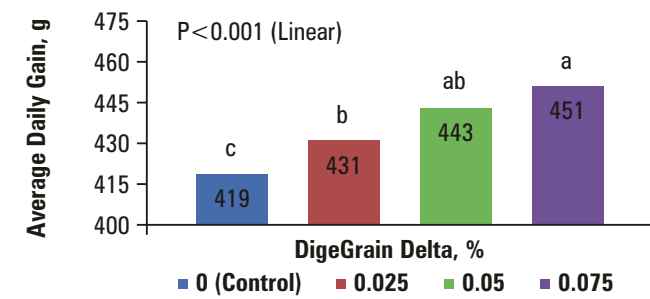


### Performance in Pigs

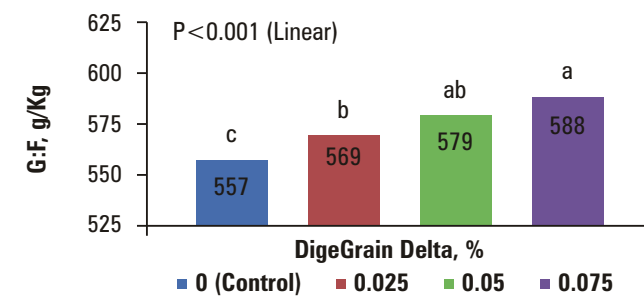
#### Trial 4: Dose study

Location of trial	Kangwon National University, South Korea
Year of trial	2014
Strain used	Landrace x Yorkshire x Duroc cross

#### Average Daily Gain, g (d 0-42)



#### Growth to feed ratio, g/Kg (d 0-42)



#### Matrix Value of DigeGrain Delta - Weaning Pigs

DigeGrain Delta, %	0.025	0.05	0.075
ME Kcal/kg feed	56	75	87
CP Matrix, %	0.21	0.35	0.34
P Matrix, %	0.05	0.07	0.08

P.S. Diet for trial: Corn SBM

#### Recommended Dose:

	Broilers / Weaning Pigs
Through feed, g/ton	250 to 500
Through drinking water, g/1000 litre water	125 to 250
Through water medicators, enzyme (g): water (ml)	1: 4,000 to 1:8,000
Post pelleting applications, g/ton pellets	250 to 500

\* The economical optimum dose of DigeGrain Delta may vary depending upon stage of growth and available feed ingredients

#### Form:

Powder and liquid

#### Packaging:

In 25kg HDPE drums / 30kg Jerry cans

#### Animal Feed - Our Offerings

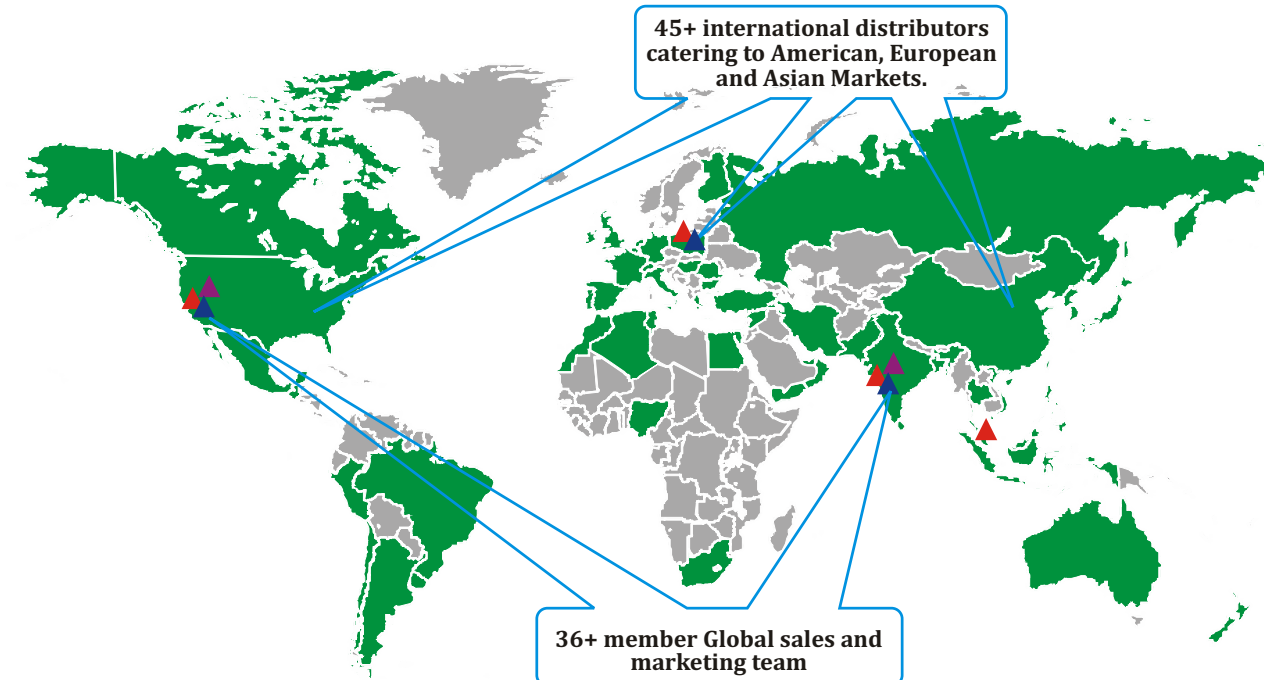
Product Name	Enzyme Type
DiegGrain X	Xylanase
DigeGrain M	Mannanase
DigeGrain G	endo beta-1,4 glucanase
DigeGrain C	Cellulase
DigeGrain Pro	Protease (acidic and alkaline)
DigePhos	Phytase 5,000 and 10,000
DigeGrain Max	Amylase, xylanase, mannanase, glucanase, cellulase, pectinase
DigeGrain Delta	Amylase, xylanase, mannanase, protease & phytase
DigeGrain Delta Plus	Amylase, xylanase, mannanase, glucanase, cellulase, pectinase, protease & phytase
DigeGrain Super	Amylase, xylanase, mannanase, pectinase, cellulase, beta-glucanase, alpha galactosidase, protease, lipase, phytase, Bacillus subtilis & Bacillus coagulans
AciGrain (Feed Acidifier)	Blend of organic acids and their salts
Probiotics Products	Bacillus subtilis, Bacillus coagulans, Saccharomyces boulardii, multi microbe probiotics

P.S. Single enzymes and customized blends are available on request

### About Us

**Advanced Enzymes** is a research driven company with global leadership in the manufacturing of enzymes. We are committed to providing eco-safe solutions for a wide variety of industries like Human Healthcare and Nutrition, Animal Nutrition, Food and Industrial Processing.

- Animal Nutrition
- Baking
- Biocatalysis
- Biofuel
- Brewing & Malting
- Dairy & Cheese Processing
- Detergents & Cleaning Aids
- Fruit & Vegetable Processing
- Human Nutrition & Healthcare
- Leather
- Oils & Fats Processing
- Pulp & Paper
- Protein Modification
- Specialty Applications
- Starch & Grain Processing
- Textile
- Wine Processing
- Yeast Processing



- ▲ Manufacturing Facilities
- ▲ Sales and Marketing Offices
- ▲ R & D Centres
- International Presence



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www.advancedenzymes.com



## DigeGrain Delta

### A Complete Enzyme for Complex Diets

- Unique multi-enzyme preparation containing mannanase, xylanase, amylase, protease and phytase
- Single product against NSP's, phytates and indigestible proteins
- Flexibility to use variety of raw materials
- Improve profitability
- Can reduce antibiotic growth promoters use
- Reduced environmental pollution



### Complex substrate need complex enzyme

Commonly used feed ingredients in broiler diets contains varying level of anti-nutritional factors like NSP's and phytates, which are not digested by monogastric animals due to lack of endogenous enzymes. Also, around 12-15% of dietary proteins remains undigested in poultry and causes environmental pollution. Studies on the use of exogenous enzymes to degrade NSP's and phytates have yielded inconsistent results mainly because of the presence of complex substrates in feedstuffs and the use of enzyme activities often not suitable for effective hydrolysis of such substrate. This indicates that combinations of different enzyme activities are required for complete degradation of complex feed and to improve nutrient utilization and performance of broilers.

#### NSP content of common feed ingredients

Ingredients	NSP, %	Arabinoxylan, %		Glucan, %	Cellulose, %	Mannan, %	Galactose, %
		Soluble	Insoluble				
Corn	10.1	0.1	5.1	-	2	0.2	0.6
SBM	21.7	0.75	2.25	-	6.2	1.8	4.1
Wheat	11.4	1.8	6.3	0.8	2	0.1	0.3
Barley	16.7	0.8	7.1	4.3	3.9	0.5	0.2
Rye	13.2	3.4	5.5	2	1.5	0.7	0.3
Sorghum	6.45	0.12	3.8	0.2	2	0.1	0.15
Sunflower cake	31.5	0.8	5.2	-	12.3	1.5	1.3
Corn DDGS	28.6	0.4	-	-	7.1	0.7	2.1
Wheat DDGS	33.2	4.9	13.4	2.3	5.8	-	0.9
Wheat Bran	35.3	1.1	20.8	0.4	10.7	0.4	0.8
Rice Bran	21.8	0.2	8.3	-	1.2	0.4	1.2
Rapeseed meal	22	0.46	2.4	1.1	4.5	0.66	2.86

#### Phytate-P content of common feed ingredients

Ingredients	Total P (g/100 g DM)	Phytate-P (g/100 g DM)	Phytate-P (as % of total P)
SBM	0.65	0.39	60
Wheat	0.39	0.27	69
Barley	0.42	0.27	64
Oat	0.43	0.29	67
Rye	0.48	0.31	65
Sorghum	0.36	0.24	66
Wheat Bran	1.3	0.92	71
Rice Bran	1.29	1.03	80
Sunflower meal	1.16	0.89	77
Cottonseed meal	1.2	0.84	70
Rapeseed meal	1.19	0.7	59
Peanut meal	0.6	0.48	80
Coconut meal	0.59	0.29	49

#### There is considerable potential to increase protein digestibility in poultry diet

Ingredients	Protein %	% Protein Digestibility	% Amino acid Digestibility							
			Lys	TSAA	Thre	Trp	Arg	Val	Ile	Avg
Corn	8-Sep	80-82	92	91	86	81	92	91	93	89
SBM	48	85-87	91	85	85	90	93	89	90	89
Wheat	11-Dec	80-83	85	90	86	85	86	89	94	88
Corn DDGS	27	73-77	81	82	79	78	81	80	79	80
Sorghum	11	65-70	91	85	84	88	88	85	91	87
Sunflower M	41	81-84	88	86	82	87	93	86	88	87
Canola meal	38	75-80	80	81	75	81	86	78	78	80
Feather meal	85	50-75	56	50	54	45	67	65	72	58
MBM	50	65-80	70	63	60	55	78	72	70	67



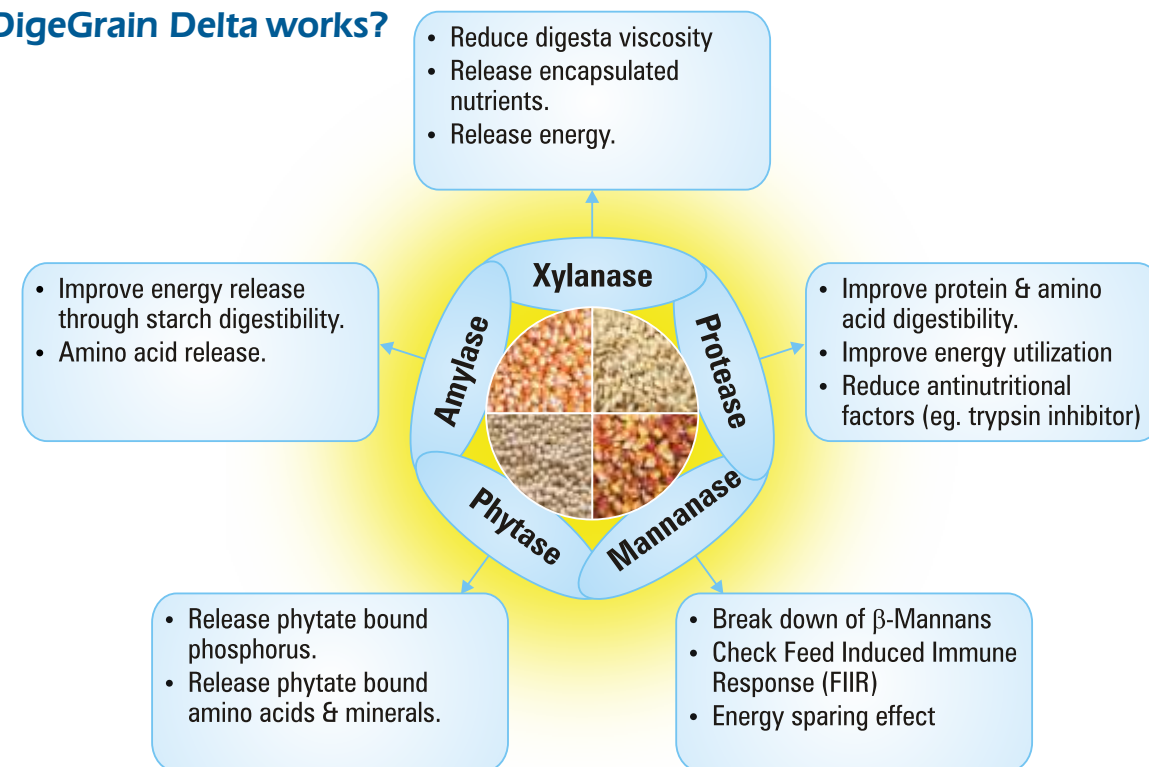
## Our Solution

# DigeGrain Delta

### Specifications:

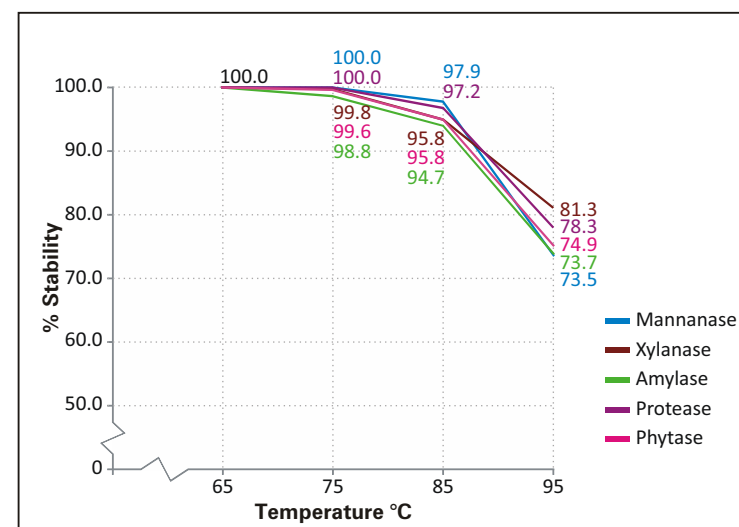
Enzymes	Units
Mannanase	2,500,000 U/kg
Xylanase	600,000 U/kg
Amylase	800,000 U/kg
Protease	1,000,000 U/kg
Phytase	1,000,000 U/kg

### How DigeGrain Delta works?



### Pelleting stability:

All enzymes in DigeGrain Delta are found to be heat stable up to 85°C for 45 to 60 seconds

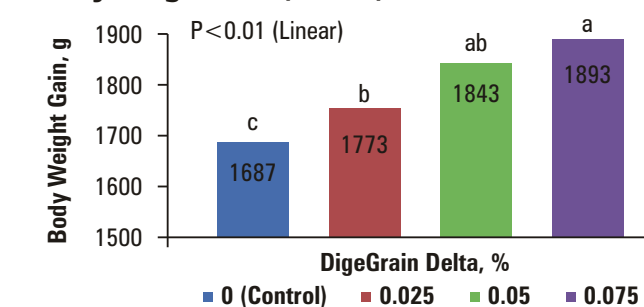


### Performance in Broilers

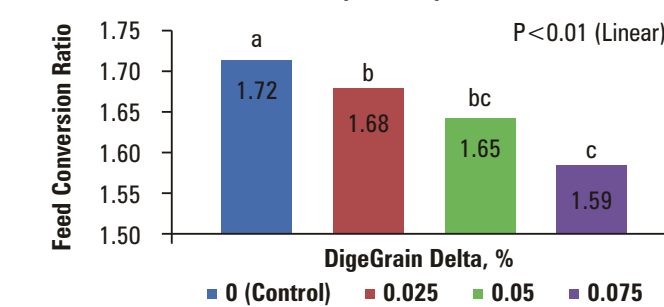
#### Trial 1: Dose study

Location of trial	Kangwon National University, South Korea
Year of trial	2014
Strain used	Ross 308

#### Body Weight Gain (d 7-35)



#### Feed Conversion Ratio (d 7-35)



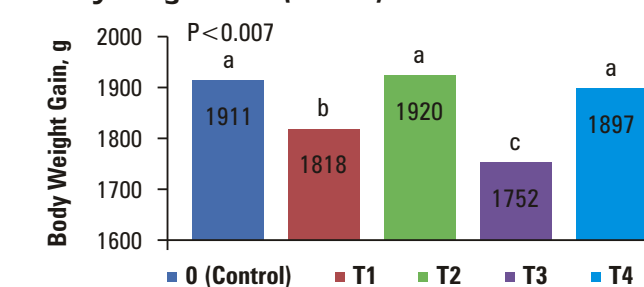
#### Matrix Value of DigeGrain Delta - Broilers

DigeGrain Delta, %	0.025	0.05	0.075
ME Kcal/kg feed	42	93	122
CP Matrix, %	0.29	0.59	0.79
P Matrix, %	0.03	0.13	0.15

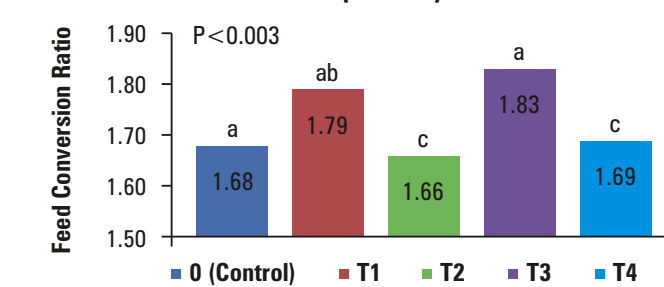
#### Trial 2: Matrix study

Location of trial	Kangwon National University, South Korea
Year of trial	2015
Strain used	Ross 308

#### Body Weight Gain (d 7-35)



#### Feed Conversion Ratio (d 7-35)



Treatment	DigeGrain Delta, %	Energy	CP	Available P
Control	-	Std	Std	Std
T1	-	-60 Kcal/kg	-0.5%	-0.05%
T2	0.05	-60 Kcal/kg	-0.5%	-0.05%
T3	-	-90 Kcal/kg	-0.5%	-0.05%
T4	0.05	-90 Kcal/kg	-0.5%	-0.05%

