



Optimizing Wheat Mill Co-Product Value in Broiler and Layer Production

1st Middle East Regional Forum, Cairo, Egypt
International Association of Operative Millers
May 2016

Greetings From Kansas USA



engra  n.®

Engrain LLC

- Formed in Manhattan, Kansas USA in 2008
- Mission to unlock new value for the grain processing industries through development and application of novel ingredient technologies
- Co-founder Vaughn Studer serves as Chief Executive Officer and leads technology development strategy
- Vaughn holds Bachelor of Science degree in Animal Science, Master of Science degree in Dairy Science – Nutritional Physiology and Masters of Business Administration degree



The Bran Problem

- 25% of wheat purchase value typically sold at less than wheat value
- Produce bran everyday irrespective of market demand and seasonal valuation
- Poultry and swine inability to utilize bran at significant level
- Warehousing



The Bran Opportunity

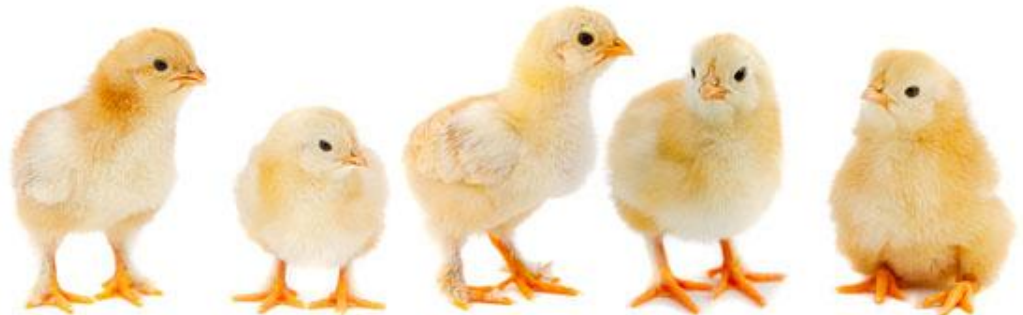
- Freight advantage over imported corn – bran freight has already been paid by the flour
- Bran is loaded with carbohydrate with opportunity for energy conversion, just not currently in a form available by chickens and swine

Tools exist to unlock
this value!





- Enzymes are commonly included in poultry rations in an effort to improve feed efficiency, but effect ends once they are consumed against overwhelming substrate
- Direct fed microbials (DFM) have ability to continue multiplying within the bird, but can start slow or completely stall if proper starter substrate is not available
- eMAX supplies “fiber to sugar” conversion enzymes in addition to approved cellulytic digestive microorganisms for dual action



University of Nairobi (Kenya) Trial

Small pilot trial – 160 birds (4 x 40) in broiler and 40 birds (4 x 10) in layer trial (the lack of statistical power is understood)

5, 10 and 15% energy reduction in both broiler starter (0-21 d), finisher (22-42 d) and layer through higher course bran inclusion

Large cost spread exists in Kenya today between corn (\$337/MT) against course wheat bran (\$154/MT)

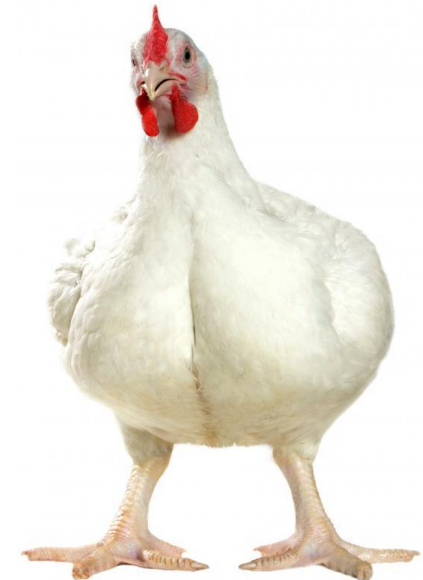


Broiler Finisher Diet (22-42 d)

Parameter/raw material	Diet			
	Control	Treatment 1	Treatment 2	Treatment 3
Energy Reduction %		5%	10%	15%
Ground corn	53	53.5	49.5	38
Wheat (fine) pollard	23	17	10	22
Wheat (course) bran	0	8.3	19.1	21.5
Protein/Vit/Min	23.6	23.1	22.2	18.3
Engrain eMAX	0	0.01	0.01	0.01
Total	100	100	100	100
Calculated composition and cost				
ME, kcal/kg	2999	2846	2700	2546
Crude protein, %	18.1	17.6	17.7	17
Crude fibre, %	2.59	3.17	4.02	4.2
Lysine, %	1.04	0.96	0.96	0.92
Methionine, %	0.38	0.37	0.37	0.37
Cost, \$USD/MT	\$ 464	\$ 445	\$ 429	\$ 395
% Cost Savings		4%	8%	15%

Broiler Performance

Parameter	Energy density (% specification) and eMAX inclusion			
		5% Energy Reduction	10% Energy Reduction	15% Energy Reduction
eMAX	None	With	With	With
Weight gain, g/bird (to 6 wks)	2345	2394	2353	2283
Feed consumption, g/bird (to 6wks)	6077	5663	5685	5648
Feed over gain (kg feed/kg gain)	2.59	2.37	2.42	2.47
Feed cost per kg of gain, \$USD	1.18	1.03	1.02	0.97
% Reduction		13%	14%	18%



Broiler Summary

- Dietary energy intake, even with eMAX administration DID NOT result in positive results in starter phase, but birds recovered in finisher phase and posted excellent results over the complete period
- Finisher broilers consumed less feed in higher fiber (bran) treatments, with weight gains slightly improved in the eMAX 5 and 10% energy reduction diets, resulting in improved feed conversion

Feed cost per kg of gain was
reduced significantly in
5 and 10%
eMAX treatments



Layer Diet

Parameter/raw material	Diet			
	Control	Treatment 1	Treatment 2	Treatment 3
Energy Reduction %		5%	10%	15%
Ground corn	55	48	45	44
Wheat (fine) pollard	20	23	23	17
Wheat (course) bran	0	5	8	15
Cotton seed cake	2	5	5	5
Protein/Vit/Min	23.4	19.6	18.9	18.7
Engrain eMAX	0	0.01	0.01	0.01
Total	100	100	100	100
Calculated composition and cost				
ME, kcal/kg	2750	2600	2540	2470
Crude protein, %	16	16	16	16
Crude fibre,%	3.1	3.7	3.9	4.5
Lysine,	0.8	0.8	0.8	0.8
Methionine, %	0.32	0.32	0.32	0.32
Cost, \$USD/MT	\$ 410	\$ 379	\$ 370	\$ 363
% Cost Savings		8%	10%	11%

Layer Summary

- Feed consumption, egg production, egg weight and feed efficiency did not vary with reduction in dietary energy intake with eMAX supplementation
- There was continuous decrease in feed cost concurrent with energy reduction
- eMAX promoted release of energy from the higher fiber feedstuffs

Feed cost per dozen eggs was
reduced significantly in
energy reduced
eMAX treatments



SE Asia Broiler Trial

- Kenya trial was modeled to repeat in commercial situation now using top genetics (Cobb), with already industry standard conversion rates (1.5-1.6 FCR) and pelleted diets already containing advanced advanced multi-enzyme, antimicrobial compounds and yeast culture.
- In treatment diets, eMAX replaced multi-enzyme and antimicrobial compounds
- eMAX was added to starter phase (0-10 days), then continued through grower (10-20 days) with 5% energy reduction and finalized through finisher (20-30 days) with 10% energy reduction.
- Replacement of ground corn was achieved with adding lower cost feed wheat plus coarse wheat bran.

SE Asia Broiler Diet Cost

	Grower (10-20 d)		Finisher (20-30 d)	
	Control	eMAX	Control	eMAX
ME, kcal/kg	3150	2995	3180	2860
Cost, USD/MT	\$476.63	\$456.39	\$459.85	\$413.30
Savings, USD/MT	\$20.24 (4%)		\$46.55 (10%)	

SE Asia Broiler Performance

	Control	eMAX
Feed Intake, kg	2.11	2.17
Weight Gain, kg	1.38	1.40
Feed Conversion Ratio	1.53	1.55
Harvest Weight, kg	1.42	1.43
Cost to produce per kg of bird \$USD	\$ 0.70	\$ 0.66

eMAX dosing and associated energy reductions lowered overall production (feed) cost by 6% across the entire feeding period

eMAX Value Proposition

eMAX has given evidence that it is effective to release energetic potential of high fiber wheat bran – increasing its feeding potential at higher levels for broilers and layers

Value of eMAX dependent
on current price spread
between corn and wheat bran
in each local market



Commercial Recommendation

- eMAX is ready for large-scale commercial application
- Begin feeding eMAX in broiler starter phase and continue throughout; reduce energy with higher bran inclusion in finisher phase
- Begin feeding eMAX in final development and early layer phase and then increase bran at full intake to reduce energy levels

Evaluate cost savings with
added bran to lower
energy concentration in
range of 5-10%



Questions & Inquiries



Magnus Baumann
mbaumann@engrain.us



Vaughn Studer
vstuder@engrain.us