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Not All Soybean Meals Are the Same

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Not All Soybean Meals Are the Same

There is a tendency for self mix farmers to switch from one soybean meal type to another in their effort to reduce cost of feed. Their purchasing decision is largely determined by offer price and availability in the market. They will use any soybean meal in their store to compound feeds that are required for the day using the same feed formulae they have in hand at that moment. To them, all soybean meals are the same. The question is, are they all the same?

To determine whether or not all soybean meals are the same, Creswell and Swick conducted a trial in BARC, Thailand (Creswell & Swick, 2008) using male Ross 308 broiler birds. US soybean meal nutrient matrix (Table 3) was used as standard. Soybean meals from US (dehulled), Argentina (dehulled), Malaysia (Soon Soon, dehulled) and India (non-dehulled) were compared.

On the assumption that all soybean meals were the same, they formulated diets with identical feed formula with only soybean meal from different source of origin as variable. Composition of starter (1 – 18days) and grower (19 – 40days) diets are summarized in Tables 1 and 2, respectively.

Table 1 Composition of starter diets (1-18 days)

	Indian SBM	Argentine SBM	US SBM	Soon Soon SBM
Corn	40.60	40.60	40.60	40.60
Cassava	15.00	15.00	15.00	15.00
India soybean meal	34.50	0.00	0.00	0.00
Argentina soybean meal	0.00	34.50	0.00	0.00
US soybean meal	0.00	0.00	34.50	0.00
SS soybean meal	0.00	0.00	0.00	34.50
Full fat soy	3.00	3.00	3.00	3.00
Soybean oil	2.20	2.20	2.20	2.20
Limestone	1.22	1.22	1.22	1.22
MDCP 21	1.56	1.56	1.56	1.56
Salt	0.36	0.36	0.36	0.36
Sodium bicarbonate	0.20	0.20	0.20	0.20
Choline chloride 60	0.12	0.12	0.12	0.12
L Lysine HCL	0.20	0.20	0.20	0.20
DL Methionine	0.30	0.30	0.30	0.30
L Threonine	0.04	0.04	0.04	0.04
Maduramycin 1%	0.05	0.05	0.05	0.05
Mycotoxin binder	0.05	0.05	0.05	0.05
Pelleting agent	0.50	0.50	0.50	0.50
Vitamins/mins	0.10	0.10	0.10	0.10
Total, kg	**100.00**	**100.00**	**100.00**	**1000**
Nutrient minimums				
ME, Kcal/kg	2950	2950	2950	2950
Protein, %	21.60	21.60	21.60	21.60
Lysine, %	1.33	1.34	1.38	1.28
Calcium, %	0.86	0.86	0.86	0.86
Available P, %	0.43	0.43	0.43	0.43
Sodium, %	0.22	0.22	0.22	0.22
Choline, ppm	1850	1850	1850	1850
Digest. Lysine, %	1.150	1.150	1.150	1.150
Digest. Methionine, %	0.426	0.426	0.426	0.426
Digest. M+C, %	0.828	0.828	0.828	0.828
Digest. Tryptophan, %	0.184	0.184	0.184	0.184
Digest. Threonine, %	0.713	0.713	0.713	0.713
Digest. Arginine, %	1.208	1.208	1.208	1.208
Digest. Isoleucine, %	0.748	0.748	0.748	0.748
Digest. Valine, %	0.886	0.886	0.886	0.886

Table 2 Composition of grower diets (19-40 days)

	Indian SBM	Argentine SBM	US SBM	Soon Soon SBM
Corn	47.36	47.36	47.36	47.36
Cassava	15.00	15.00	15.00	15.00
India soybean meal	29.60	0.00	0.00	0.00
Argentina soybean meal	0.00	29.60	0.00	0.00
US soybean meal	0.00	0.00	29.60	0.00
SS soybean meal	0.00	0.00	0.00	29.60
Full fat soy	2.00	2.00	2.00	2.00
Soybean oil	2.00	2.00	2.00	2.00
Limestone	1.08	1.08	1.08	1.08
MDCP 21	1.35	1.35	1.35	1.35
Salt	0.20	0.20	0.20	0.20
Sodium bicarbonate	0.20	0.20	0.20	0.20
Choline chloride 60	0.03	0.03	0.03	0.03
L Lysine HCL	0.17	0.17	0.17	0.17
DL Methionine	0.26	0.26	0.26	0.26
L Threonine	0.05	0.05	0.05	0.05
Maduramycin 1%	0.05	0.05	0.05	0.05
Mycotoxin binder	0.05	0.05	0.05	0.05
Pelleting agent	0.50	0.50	0.50	0.50
Vitamins/mins	0.10	0.10	0.10	0.10
Total, kg	**100.00**	**100.00**	**100.00**	**100.00**
Nutrient minimums				
ME, Kcal/kg	3000	3000	3000	3000
Protein, %	18.80	18.80	18.80	18.80
Lysine, %	1.16	1.16	1.16	1.16
Calcium, %	0.76	0.76	0.76	0.76
Available P, %	0.38	0.38	0.38	0.38
Sodium, %	0.16	0.16	0.16	0.16
Choline, ppm	1350	1350	1350	1350
Digest. Lysine, %	1.00	1.00	1.00	1.00
Digest. Methionine, %	0.38	0.38	0.38	0.38
Digest. M+C, %	0.75	0.75	0.75	0.75
Digest. Tryptophan, %	0.17	0.17	0.17	0.17
Digest. Threonine, %	0.64	0.64	0.64	0.64
Digest. Arginine, %	1.08	1.08	1.08	1.08
Digest. Isoleucine, %	0.67	0.67	0.67	0.67
Digest. Valine, %	0.79	0.79	0.79	0.79

Table 3 Nutrient levels used for the soybean meals when formulating the diets in tables 1 and 2.

	US SBM
ME, Kcal/kg	2376
Protein, %	47.50
Calcium, %	0.30
Available P, %	0.20
Sodium, %	0.02
Choline, ppm	2860
Digest. Lysine, %	2.46
Digest. Methionine, %	0.56
Digest. M+C, %	1.13
Digest. Tryptophan, %	0.60
Digest. Threonine, %	1.61
Digest. Arginine, %	3.10
Digest. Isoleucine, %	1.92
Digest. Valine, %	2.02
Moisture, %	10.66
Protein, %	45.99
Fat, %	2.62
Crude fibre, %	3.94
Ash, %	6.22

Table 4 summarizes the cumulative growth performance results of the birds given diets containing different types of soybean meal. The growth performance of broiler birds varied when given diets containing soybean meal from different origin even though the inclusion levels were identical.

Table 4 Effects of soybean meal type on performance of male broilers (0-40 days)

Treatment			Initial weight, (g)	Final weight, (g)	Weight gain, (g)	Feed intake, (g)	FCR[1]	FCR[2]	Livability (%)
	SBM type	Soybean meal specification							
1	India	Standard (US)	41	2812^{b}	2771^{b}	4762	1.718^{d}	1.765^{c}	92.71
2	Argentine	Standard (US)	41	2837^{b}	2797^{b}	4675	1.671^{b}	1.672^{b}	98.96
3	USA	Standard (US)	41	2869^{ab}	2830^{ab}	4765	1.684^{bc}	1.693^{b}	96.88
4	SoonSoon	Standard (US)	41	2908^{a}	2869^{a}	4656	1.624^{a}	1.625^{a}	98.96

^{abcd} Means within a column with different superscript differ significantly (P<0.05)
[1] Feed conversion ratio corrected for mortality and culls
[2] Feed conversion ratio uncorrected for mortality and culls

To Creswell and Swick, if all soybean meals are the same, growth performance of the broilers should be the same because the diets were identical, using nutrient matrix of US soybean meal as standard. However, at the end of 40 days, they found that diets using Soon Soon soybean meal significantly (P<0.05) outperformed diets using soybean meals from

US, Argentina and India in feed conversion ratios (FCR), both corrected and uncorrected for mortality and culls. In terms of final weight and weight gain, Soon Soon soybean meal also performed better than Argentina and India although did not differ significantly from US soybean meal. Soybean meal from Argentina ranked second in FCR, followed by US soybean meal and Indian soybean meal.

Based on the performance results, they concluded that not all soybean meals are the same. This result was expected because different varieties of bean were used for crushing. The nutrient contents of the end product would definitely be different. Furthermore, the efficacy of soybean meal, in terms availability of the critical nutrients like ME and amino acids, is affected by the crushing process. The resultant product will determine how much nutrients are available for growth and production and how much need to be catabolized and converted into waste.

This trial further demonstrated that even though total nutrient contents were the same, it is the availability of these nutrients that will ultimately determine the value of the soybean meal.

This shows that not all soybean meals are the same, as such, when there is a need to decide on type of soybean meal to buy, one should examine the quality profile of the meal before making the final commitment.

References:

1. Creswell, D. and Swick, R.A., 2008. Soybean Meals are not all the same! 1. Effect of soybean meal type and specification on the performance of male broilers. Presented at Soybean Meal Quality Conference, 4 – 5 August, 2008, Bangkok.