Benefits Associated with the Use of Spray-dried Plasma in Broiler Early Nutrition

The digestive enzyme capacity of the newly hatched broiler chick is not fully developed, partially due to the change in composition of nutrient intake from the readily available yolk and albumen to complex carbohydrates, proteins and lipids in conventional cereal-soy starter diets. Therefore, even though chicks grow quite rapidly in the first few days of life, early growth and development can be further enhanced by use of specialized diets with highly digestible ingredients that can help support intestinal development. Any issue of early indigestion today is especially important because of the ever-shorter growth cycle of the broiler, and the current trend to less reliance of antibiotic growth promoters. The young chick digests soybean meal and cereal up to 10% less efficiently than our "book values" for amino acid and metabolizable energy, and often any undigested residues today can fuel microbial overgrowth in the large intestine and ceca (Leeson, 2015a).

Spray dried animal plasma

Spray dried animal plasma (SDAP) is a high quality protein feed ingredient commonly used in pig starter diets. When included in these starter diets, piglets fed SDAP consume more feed, grow faster and are more efficient in utilizing feed compared to piglets consuming a weaner diet that does not contain SDAP (Torrallardona, 2010). The pig typically experiences a "post weaning growth lag" during the initial 4 to 10d immediately after weaning while transitioning from mother's milk to dry feed. Many papers are available in the scientific literature detailing the effects of SDAP on pigs, and this ingredient is now a standard inclusion for piglets. Consistent with the effect in weaned pigs, recent research has demonstrated that the nutrition provided by the addition of SDAP to broiler pre-starter feeds improves daily gain, feed intake, and feed efficiency and helps poultry producers to maximize the early genetic potential of their flocks (Leeson, 2015b).

Feed Processing

It is important to emphasize that the feed processing conditions typically used in the feed industry do not affect the functionality of SDAP proteins. Poultry diets containing SDAP and pelleted at conditioning temperatures of from 85 to 95°C or expanded at 149°C does not impair the positive growth effects of SDAP in diets for broilers (Campbell et al., 2006).

Research studies using SDAP in poultry

A summary of 13 studies conducted world-wide at various research facilities demonstrated that the inclusion of SDAP in poultry diets increased final body weight by an average of 75 g and improved feed conversion (FCR) by 5 points compared with control diets (Table 1). Most studies were conducted using Ross 308 genetics except studies #9 to 12 that used Cobb 500

Table 1: Summary of performance results of studies conducted at research institutes feeding various levels of SDAP in broiler diets.

Exp. #	Plasma Level (%)	Days fed	Days to Market	Final BW Control, g	Final BW SDAP, g	Diff BW,g	FCR Control	FCR SDAP	Diff FCR
1	2.5	4	42	2,446	2,666	220	-	-	-
2	1.5	7	42	2,010	2,048	38	1.890	1.840	-0.050
3	1	7	44	3,267	3,290	23	1.805	1.756	-0.049
4	1	7	44	3,293	3,336	43	1.803	1.773	-0.030
5	1	7	44	3,280	3,313	33	1.804	1.764	-0.040
6	1.5	8	42	2,208	2,262	54	1.785	1.809	+0.024
7	1.5	7	42	3,008	3,034	26	1.709	1.684	-0.025
8	3	7	42	3,008	3,006	-2	1.709	1.681	-0.028
9	1	10	35	2,419	2,514	95	1.580	1.470	-0.110
10	0.5	10	35	2,419	2,542	123	1.580	1.480	-0.100
11	1	10	35	2,419	2,480	61	1.580	1.440	-0.140
12	0.5	10	35	2,419	2,456	37	1.580	1.470	-0.110
13	1	14	42	2,664	2,883	219	1.682	1.724	+0.041
					Average	75			-0.051

Recent Field Experiences

Recent commercial trials have confirmed past research demonstrating beneficial effects of SDAP in starter diets. In Northern Europe, two cycles involving 6 barns (around 50,000 birds/barn) of Ross 308 broilers were used to evaluate SDAP in starter diets. The diet contained 1.5% SDAP for the first 10 days of age, followed by conventional cereal-SBM diets common to all birds through to market weight. The target feed intake per chick for the starter diet was 300 g with 4.5 g of SDAP/chick fed during this 10-day period (Table 2).

Table 2: Performance results at North-European commercial farm feeding SDAP 1-10 d.

	Cycle 1			Cycle 2			Mean
	Control	SDAP	Diff.	Control	SDAP	Diff.	Diff.
Final BW, g	2,168	2,242	74	2,242	2,289	47	60
FCR	1.650	1.591	-0.059	1.595	1.510	-0.085	-0.072
Mortality, %	4.24	2.94	-1.30	4.11	3.39	-0.72	-1.01
Profit per chick placed (€)	0.008	0.085	0.078	0.115	0.175	0.060	0.069

Results of this commercial field trial conducted at farm managed under regular North-European conditions showed improved growth of 60g and improvement in feed efficiency of just over 7 points. There was an improvement of 1.7kg/m^2 with improved profitability of 0.07€/broiler.

Another evaluation on a commercial US farm used a paired barn evaluation (39,000 birds per barn, Table 3). A pre-starter program including 2% SDAP (together with other ingredient differences) vs a regular starter program for the first 10 d, then common diets until market. The target was 227 g pre-starter diet meaning a comparable level of SDAP (4.54 g) as per the study shown in Table 2 during the first 10 days.

Table 3: Performance results observed at USA commercial farm feeding SDAP during first 10 d.

	Trial 1			Trial 2			Overall
	Control	SDAP	Diff.	Control	SDAP	Diff.	Diff.
Final BW, g	3,230	3,325	95	3,270	3,302	32	64
Adjusted FCR	1.717	1.680	-0.037	1.7209	1.706	-0.023	-0.030
White Meat, %	24.88	26.58	1.70	25.56	25.68	0.12	0.91

Final body weight (64 g) and improved feed conversion (3 points) were seen with the pre-starter program containing SDAP. Percent white meat was increased for broilers fed pre-starter with SDAP resulting in approximately a 0.91% improvement in white meat yield, averaged across the two trials. These results of improved performance and white meat yield also confirm previous published research results.

Under commercial conditions in Asia, a field study was conducted with broilers fed a pre-starter diet with 1% SDAP from 1-9d of age. The average initial BW of chicks was 34.7 g and there were 10,000-12,000 chicks per barn. The final average BW at 35 days was 1,933 g for the chicks fed SDAP vs 1,878 g for the barn fed the control diet, therefore an improvement of 55 g final BW using the pre-starter with SDAP.

Conclusions

Collectively, results of recent commercial studies confirm past controlled research studies that demonstrate the nutrition provided by the inclusion of SDAP at 0.5 to 2.5% in diets fed the starter period (approximately 4.5g/chick) improves final body weight and FCR of broilers.

References

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