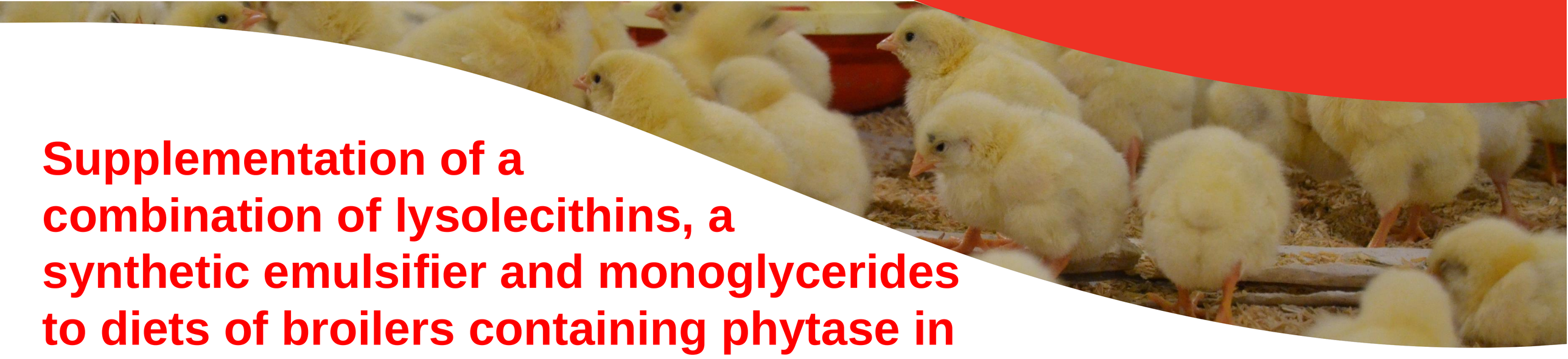

Supplementation of a combination of lysolecithins, a synthetic emulsifier and monoglycerides to diets of broilers containing phytase in super dosing, on performance and profitability

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Introduction

Super dosing of phytase is becoming an increasingly popular strategy to allow a complete phytate destruction in the digestive tract, which can lead to an increase in inositol secretion in the gizzard. As such, super dosing may result in performance enhancement due to both reduced antinutritive factors from the phytate as well as the increased presence of inositol. To date the impact of supplementing a combination of lysolecithins, a synthetic emulsifier and monoglycerides (LEX) to diets with phytase in super dosing had not been yet explored. Therefore, a scientific study was designed to elucidate this impact on growth performance and subsequent production profitability of broiler chickens

Experimental design and diets

- Location: MATE University broiler research farm, Hungary.
- A total of 576 one-day-old males Ross 308 broilers were randomly assigned to two dietary treatments for 35 days, each with 14 pens of 24 birds:

Control	LEX
standard diet with a high level of phytase (1500 FTU/kg)	Control + 500 ppm of a combination of lysolecithins, a synthetic emulsifier and monoglycerides

- Diets were produced in pellets and fed in 3 phases: starter (0-14 d), grower (14-28 d) and finisher (28-35 d)
- **Measured parameters:**
  - Primary zootechnical data: body weight (BW), average daily gain (ADG), average daily feed intake (ADFI), feed conversion ratio (FCR) and mortality were determined as mean pen values.
  - A pen was considered the experimental unit. The data were analyzed with one-way ANOVA (SAS, 2014). In case of any significant treatment effects the differences among the treatments were checked by Tukey test (SAS, 2014). Significant differences were declared at $P<0.05$, while near-significant trends were considered for $0.05 \leq P \leq 0.10$.
  - An economic analysis was carried out to determine the income over feed cost (IOFC), considering the broiler price per kg of live weight, the feed intake and feed cost for every growing period and the body weight at 42 d of both treatments.

Table 1. Ingredient and nutrient composition of the experimental diets

Ingredients (%)	*Starter* (0-14 d)	Grower (14-28 d)	Finisher (28-35 d)
Wheat	20.000	20.000	20.000
Corn	37.485	40.405	45.625
Soybean meal 46% CP	33.500	27.500	20.630
Sunflower meal 36% CP	2.000	5.000	7.000
Sunflower oil	3.000	1.300	1.300
Poultry fat	-	2.000	2.000
Limestone	1.285	1.285	1.155
MCP	0.800	0.650	0.440
Salt	0.260	0.220	0.220
Sodium bicarbonate	0.140	0.180	0.180
Choline Chloride 70%	0.080	0.080	0.080
L-Lysine HCl	0.300	0.300	0.360
DL-Methionine 99%	0.330	0.290	0.290
L-Threonine	0.140	0.130	0.140
L-Valine	0.080	0.060	0.030
Phytase 5000 FTU/g	0.030	0.030	0.030
Xygest HT 20 D	0.020	0.020	0.020
Maxiban 160 G	0.050	0.050	0.050
Premix Min-Vit	0.500	0.500	0.500
Nutrients*			
Moisture, %	12.21 (Control=10.6; LEX=10.6)	12.15 (Control=9.3; LEX=9.2)	12.19 (Control=9.3; LEX=9.1)
AME-poultry (kcal/kg)	2895	2935	2995
Crude Protein, %	22.00 (Control=22.5; LEX=22.1)	20.50 (Control=20.6; LEX=20.6)	18.50 (Control=18.5; LEX=18.4)
Crude Fat, %	5.25 (Control=3.7; LEX=3.7)	5.61 (Control=6.0; LEX=5.7)	5.73 (Control=5.7; LEX=5.9)
Crude Fiber, %	3.41	3.68	3.77
Ca, %	0.75	0.72	0.62
P, %	0.567	0.541	0.489
Digestible P poultry, %	0.307	0.271	0.220
Phytase (FTU/kg)	1500	1500	1500
Xylanase (U/kg)	30,000	30,000	30,000
Na, %	0.141	0.137	0.136
Cl, %	0.259	0.240	0.254
K, %	0.968	0.891	0.788
Lys SID, %	1.231	1.116	1.020
Met SID, %	0.623	0.570	0.550
M+C SID, %	0.906	0.844	0.806
Thr SID, %	0.804	0.742	0.682
Trp SID, %	0.231	0.211	0.184

*Analyzed values for each treatment in brackets ().

Table 2. Performance results

Parameter[1]	Control	LEX	P value[2]
BW at start, g	39.8	39.8	0.7632
BW day 14, g	413	417.5	0.2395
BW day 28, g	1719	1729.6	0.2547
BW day 35, g	2671.6	2705.8	0.2092
ADG 1-14 d, g/d	26.9	26.9	0.3971
ADG 15-28 d, g/d	93.5	94.0	0.4077
ADG 29-35, g/d	137.1	140.6	0.1662
ADG 1-35, g/d	75.2	76.2	0.2049
ADFI 1-14 d, g/d	34.5	34.4	0.8960
ADFI 15-28 d, g/d	114.8	115.1	0.8772
ADFI 29-35 d, g/d	193.7	195.0	0.6312
ADFI 1-35, g/d	91.1	90.5	0.2308
FCR 1-14 d	1.28	1.28	0.5177
FCR 15-28 d	1.26	1.25	**0.0657**
FCR 29-35 d	1.41	1.39	0.3529
FCR 1-35 d	1.31	1.30	**0.0681**
Adjusted FCR 2700 g BW	1.316	1.299	-

[1]BW average body weight/bird; ADG: Average Daily Gain corrected for mortality; ADFI: Average Daily Feed Intake; FCR: Feed Conversion Ratio. [2]14 replicates per treatment (24 birds per replicate). Means separated by Tukey´s (GLM) with significant difference at $p \leq 0.05$ and near significant difference at $0.05 < p \leq 0.1$

Results

Table 3. The impact of LEX on overall income over feed costs (IOFC).

	Control	LEX
Total FI day 0-14 (avg. g/bird)	483	481.6
Total FI day 15- 28(avg. g/bird)	1607.2	1611.4
Total FI day 28-35 (avg. g/bird)	1355.9	1365
Final BW (avg. g/bird)	2671.6	2705.8
Broiler price (€/kg)	1.30	1.30
Income (€/1000 birds)	**3473.08**	**3517.54**
Feed cost* (€/1000 birds)	**1351.29**	**1364.44**
Income over feed cost (€/1000 birds)	**2121.79**	**2153.1**
Additional IOFC for LEX *vs.* Control (€/1000 birds)		**+ 31.3**

*based on Standard broiler Starter feed = 418.7 €/ton; Standard broiler Grower feed = 396.8 €/ton; Standard broiler Finisher feed = 377.1 €/ton (prices of week 44-2023)

Conclusion

These findings indicate, that adding LEX to a broiler diet on top of a super dose of phytase, can additionally improve FCR (-10 g of feed/kg BW gain), resulting in an increased production profitability (+31.3 €/1000 birds IOFC).

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