Adding a combination of lysolecithins, synthetic emulsifier, and monoglycerides to diets of laying hens improves nutrient digestibility and performance

David Gonzalez Sanchez[1], Veerle Van Hoeck[1], Sebastian Kaczmarek[2]

[1] Kemin Europa N.V., [2] Department of Animal Nutrition and Feed Management, Poznan University of Life Sciences.

Introduction

The positive effect of supplementing laying hen diets with a combination of lysolecithins, synthetic emulsifier, and monoglycerides (LYSOFORTE® EXTEND, LEX) on performance, egg mass, and feed efficiency has been previously reported. However, there is limited information available on its effect on nutrient digestibility. This study investigates the efficacy of adding LEX to laying hen diets on nutrient digestibility and performance.

Material and methods

- Location: POZNAN University of Life Sciences – Poland.
- A total of 120 twenty-week-old Hy-line Brown hens were randomly assigned to two dietary programs, with 20 replicates each and 3 birds per replicate:

Positive Control (PC)	LEX250
Control basal diet	PC supplemented with 250 mg/kg of LEX (LYSOFORTE® EXTEND)

- The duration of the study was 24 weeks (168 days), with 20 days pre-trial period.
- All feeds were manufactured at Poznan University feed mill. Diets contained phytase (300 FTU/kg) and a multi-enzyme complex consisting of xylanase, cellulase, ß-glucanase, amylase, and protease. Feed formulation is presented in Table 1.
- **Measured parameters:**
  - Bird weights were measured at the start and end of the trial. Performance parameters were recorded every four weeks and for the overall trial. Mortality was recorded daily.
  - Dry matter (DM), nitrogen (N), and gross energy (GE) retention, total tract digestibility of crude fat (CFat), starch and AMEn were determined from day 84 to day 88 (week 12). The values of total tract digestibility of the diets were calculated in relation to the TiO2 ratio of the nutrient content of the feed and feces.
  - Pens were the experimental unit, and $P<0.05$ was considered significant. All data were calculated using the analysis of variance of the general linear model procedure under the SAS.
  - To assess the economic impact of LEX supplementation, the income over feed cost (IOFC) was calculated for each treatment.

Table 1. Ingredient and nutrient composition of the experimental diets

Ingredients (%)	Pre-laying	Laying
Maize	35.00	28.05
SBM 45% CP	20.00	15.19
Wheat	20.00	20.00
Barley	6.98	2.19
Triticale	-	10.00
Sunflower meal 34% CP	5.00	10.5
Rapeseed meal 34% CP	1.62	-
Limestone*	6.49	8.86
Soybean oil	3.03	3.27
MCP	0.85	0.76
Premix (vit/min)	0.50	0.50
Sodium bicarbonate	0.21	0.24
Salt	0.20	0.18
DI-Meth	0.12	0.13
L-Lysine HCl	-	0.11
L-Threonine	-	0.01
Phytase 5000	0.006	0.006
KEMZYME PLUS dry	0.025	0.025
Nutrients (%)		
Moisture	11.27	10.96
Crude Protein	17.00	16.45
Crude Fat	5.04	5.00
Crude Fiber	3.81	4.26
Ca	2.95	3.85
Phos	0.58	0.58
available P	0.46	0.43
Na	0.18	0.18
Cl	0.17	0.18
Dig.LYS	0.70	0.70
Dig.MET	0.36	0.37
Dig.MET+CyS	0.60	0.60
AME (kcal/kg)	2780	2700

* Particle size, 40% fine (less than 1mm) and 60% course (more than 2.5mm).

Results

Fig. 2. Laying rate (%) and feed conversion ratio (FCR)

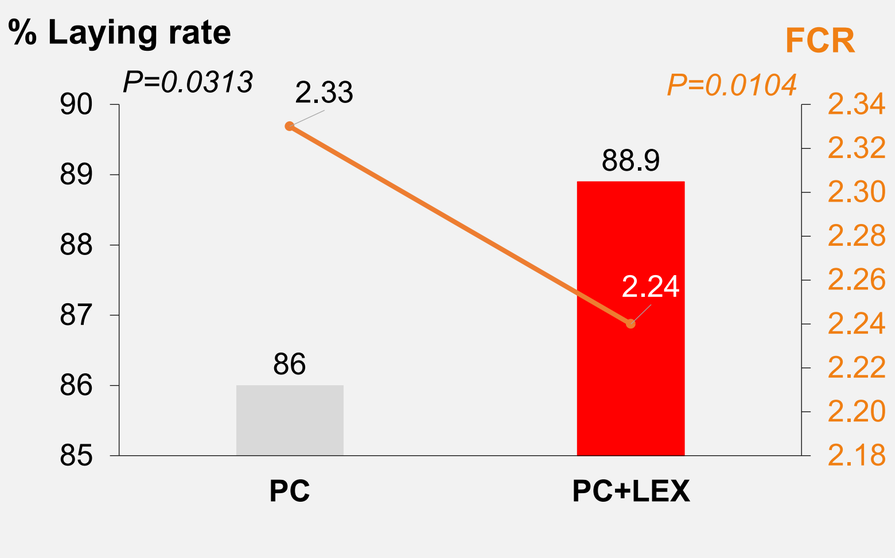


Fig. 3. Dry Matter (DM) and Gross Energy (GE) retention and Total tract apparent digestibility of Crude Fat (Cfat)

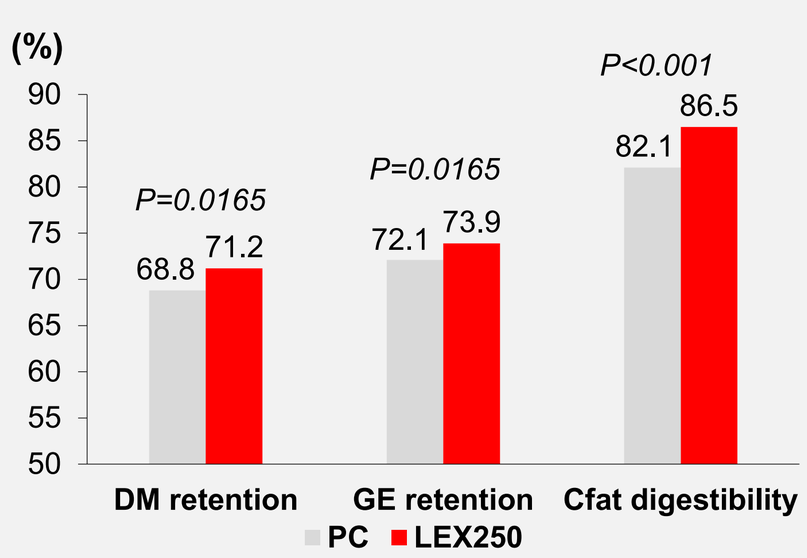
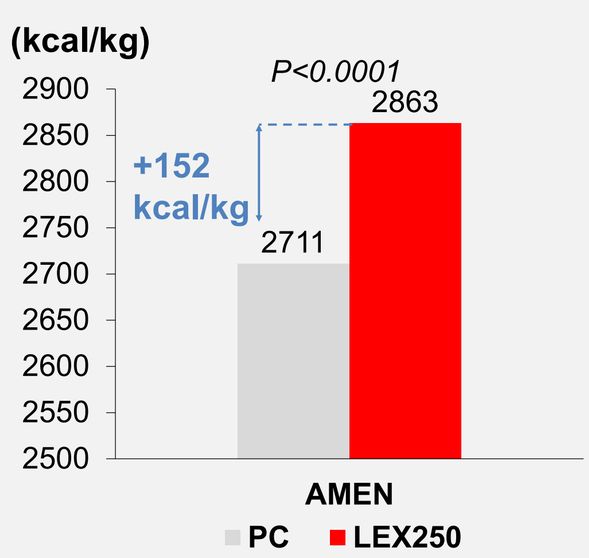


Fig. 4. Apparent Metabolizable Energy, nitrogen corrected (AME_N)



Conclusion

The dietary supplementation of LEX at 250 g/t for 24 weeks compared to PC:

- Increased laying rate (88.9 vs. 86.0 %; p=0.0313).
- Improved feed conversion ratio (2.24 vs. 2.33; p=0.0104).
- Increased DM and GE retention (71.2 vs. 68.8 % DM; p=0.0165 and 73.9 vs. 72.1 % GE; p=0.0165).
- Increased CFat digestibility (86.5 vs. 82.1%; p<0.001) and AMEn (2863 vs. 2711 kcal/kg; p<0.0001).

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