

SILYMARIN IN LAYING HENS DIET ("PLUSIL" commercial product)

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Key words: laying hens, silymarin, health status, performance.

SUMMARY – The aim of the study was to evaluate the effects of Silymarin, a natural polyphenolic compound with antioxidant and hepatoprotective properties, on laying hens performances and health status. Silymarin was fed to laying hens, producing eggs for industry egg products, at the doses of 200 and 400 mg/Kg of feed during the whole productive cycle. At the dose of 200 mg/Kg, Silymarin improved egg laying rate (+3,08%), feed conversion rate (-6,87%) and produced a significant ($P < 0,05$) increase of dry matter content (+ 0,47%), total lipids (+ 0,67%) and total sterols (0,051%) of the eggs. Any significant difference ($P > 0,05$) was shown for Silymarin at the highest dose (400 mg/kg of feed).

INTRODUCTION – *SILYMARIN* is a preparation of vegetable origin obtained from *Marian thistle* and *Cynara cardunculus* and is constituted by three flavonolignans: silybin, silydianin and silychristin. It is well known for its hepatoprotective properties (¹⁻³) and it has shown to play many activities among which there are the antioxidant activity, the inhibition of lipid peroxidation (⁴), the stimulation of the hepatic detoxification (^{5, 6}), the glutathione conservation in hepatocytes (⁷), the anti-inflammatory action (^{2, 8-11}) and the promotion of the regeneration of liver tissue through the increase of hepatocytic protein synthesis (¹²). Experiments and clinical investigations conducted on intensive-farming animals have highlighted that the integration of the ration with Silymarin is able to improve production performances and their health status with particular reference to liver function (^{13, 14}). Within the laying hen farming, which produces eggs for the industrial production of the so-called egg products, white plumage light genetic strains obtained from Livorno breed has been used for a number of years. These animals, characterized by a reduced weight and a high productivity, have to support a considerable metabolic effort that inevitably causes changes in their physical condition often associated with degenerative phenomena of hepatic parenchyma and steatosis. With this research we aim to evaluate the role of Silymarin on maintaining the health and productivity of laying hens employed in this particular production system.

MATERIALS AND METHODS – For this test 54 Hy-line® W 36 hens of 18 weeks of age, divided into three uniform groups, a control group (C) and two experiment groups (S200 and S400) were used. The animals were housed in cages for laying hens made of wire netting according to current legislation. The test had a duration of 12 months, during which the hens were fed with a complementary feed during the first phase of egg-laying (from 20th to the 40th week) and during the second phase of egg-laying (from the 41st to the 72nd week). While subjects in the "control" group were fed with the basis feed as such, those of the "experiment" groups were fed the same basis feed with the addition of Silymarin at the respective doses of 200 and 400 mg/kg of feed for the entire production cycle.

During the test, the health status and the eggs production were daily assessed, while the consumption of food, the live weight of the animals and the composition of the eggs were with a 4-weeks interval assessed. The dry matter, the content of proteins, of total lipids, of total sterols and the pigmentation of the yolk were determined on a sample of 10 eggs per group. At the end of each production phase blood sample of 5 animals per group were collected for the determination of the metabolic profile.

RESULTS – examination of tab. 1 shows that Silymarin at the doses of 200 and 400 mg/kg of feed (S200 and S400 groups) did not constitute a source of variation for the state of health of the animals and for the weight gain. Compared to the control group, at the dose of 200 p.p.m. Silymarin has positively influenced the percentage of egg-laying (+ 3.08%), the conversion index (-6.87%), the head/day average of feed consumption (-5.76%) and the feed/egg produced ratio (-9.41%). At the dose of 400 p.p.m. Silymarin did not record more appreciable advantages compared to other groups.

Table 1 - Production parameters (between 20 and 72 weeks of age -average values).

Parameters/groups	C	C	S200	S400
Laying hens	n°	18	18	18
Egg-laying	%	85,23	88,31	80,29
Average weight of eggs	grams	61,40±4,86	59,62±5,23	60,23±4,30
Conversion index	Kg feed/Kg eggs	2,024	1,885	1,945
Average of feed consumption	grams/head/day	112,79	106,29	104,23
Feed/egg	grams	124,06	112,38	117,15
Body weight	grams	1620±58,30	1605±65,72	1583±71,67
Mortality	%	0,0	0,0	0,0

As regards the chemical composition of eggs (tab. 2), Silymarin at the dose of 200 p.p.m. of feed appears to be able to significantly improve ($P < 0.05$) the content of dry residue (+ 0.47%), the content of total lipids (+0.67%) and total sterols (+ 0.051%). Similarly to what has been observed about the productive parameters, also for the chemistry composition of eggs, Silymarin at the dose of 400 p.p.m. do not determine significant differences compared to the control group eggs.

The obtained results seem to be supported by blood parameters related to the lipid metabolism and to the liver function of laying hens treated with the lowest dose of Silymarin (200 p.p.m.). Compared to the control group and to the S400 group, the animals have revealed lower levels of GOT (47,93 vs 54,95 and 53,51 U/l), of Total Cholesterol (64.35 vs 89.93 and 78.79 mg/100 ml) and of Triglycerides (1138.80 vs 1674.00 and 1540.40 mg/100 ml).

Table 2 Chemical composition of eggs (between 20 and 72 weeks of age -average values).

Parameters/groups	Feed as it is	C	S200	S400
Dry residue	%	24,28a±0,49	24,75b±0,30	24,30a±0,41
Proteins	%	12,33±0,22	12,24±0,15	12,19±0,29
Total lipids	%	9,62a±0,38	10,29b±0,27	9,88a±0,34
Total sterols	%	0,416a±0,026	0,467b±0,021	0,422a±0,015
Pigmentation of the yolk	p.p.m.	11,91±1,93	11,93±2,76	11,06±2,25

Different a, b for $P < 0,05$.

CONCLUSIONS - According to the results obtained it can be said that the use of Silymarin in the diet of laying hens producing eggs for industrial production of egg products represents an intervention worthy of the greatest interest thanks to the possibility that it offers to improve production efficiency and the edible product quality with particular reference to the lipid and total sterols contents. Following the acquired results, the use of Silymarin at the dose of 200 mg/kg of feed during the entire production cycle seems to offer the best benefits.

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