

THE PRODUCTIVITY AND DIGESTIBILITY OF HEN'S BREEDS SPECIALIZED IN THEIR EGGS AND ITS EFFECT ON SOME PHYSIOLOGICAL PARAMETERS WHEN THEY CONSUME SAND

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ANNOTATION

Many domestic hens that are raised outdoors or in a free-ranging home environment unknowingly consume sand, especially when this is often the case when they bathe in soil or consume with sand. This means that an average of 10-20% of the daily diet of hens raised outdoors or at home consists of sand. This study examined the effect of egg-laying hens on productivity (egg production, eggs weight, body weight), feed digestion, and some physiological parameters of the blood when fed with a feed containing up to 30% sand.

Keywords: Enriched nutrient medium, sand, physiological parameters of blood, heterophyll, lymphocytes, eggs weight, body weight, nutritional value, productivity.

INTRODUCTION

Nowadays, the development of the poultry industry in our country and the increase in the volume and expansion of production of ready products for export, as well as providing the population with quality food produced locally, development of science-based standards for poultry feeding, ensuring the biological and ecological safety of poultry products, feeding and enrichment of poultry in various ways, special attention is paid to increasing the number of hens and the quantity and quality of products.

As a result of these opportunities, the number of hens in our country has recently increased and the quality of their products is improving, one of the most pressing issues today is to find and put into practice the scientific basis for the enrichment of animal feed with additives to improve the production of hens products, based on our local capabilities to further increase the effectiveness of these.

In our study, the addition of fortification of hens feed with sand was aimed at expressing the feed that the caged hens consumed as if they were in the external environment or alone in a free environment. Including a strategy of enrichment in the form of sand, the hens in the cage can be encouraged to feed on sand as appropriate in the wild. This condition is important for hens in the cage because they express this condition when they are naturally housed in a free-range system or when fed in the wild.

The aim of our study was to study the effect of enriching hens feed on poultry farms in our country on sand productivity and some blood parameters. In this study, hens raised on poultry farms in our region were enriched with sand and reared in compliance with other regulatory requirements.

MATERIAL AND METHODS

Each of the 40 breeds of hens at 24 weeks was placed in separate cages of 2,000 cm². The hens were under environmental control, ventilated for ventilation, and provided with food and water in a room at 22 C (hens were in the light period for 15 hours and in the dark period for 9 hours). After a two-week adaptation period, the hens were fed a standard feed tailored to our local conditions (corn, oats, and wheat) as a control feed.

Table 1: Structure and calculated composition of 1.5 kg feed ration (in gr)

Maize	230.0
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Maize gluten feed	10.0
Crushed peas	100.0
Crushed corn	500
Crushed barley	100
Wheat	200.2
Crushed wheat	150
Vitamin-mineral premix *	5.0
Soybean oil	10.0
Animal fat	20.0
Salt	2.5
Limestone	100.0
Monocalcium phosphate	7.5
NaHCO ₃	2.0
DL-methionine	1.8
Prequisite	15
P	5.6
Ca	38.9

(Table 1, Research Diet Services BV, adapted to local conditions based on Wijk bij Duurstede).

* One kilogram of vitamin-mineral premix contains: vitamin A 8000 IU, vitamin D₃ 2500 IU, vitamin E 10 IU, vitamin K₃ 1 IU, vitamin B₁ 0.5 mg, vitamin B₂ 4 mg, d-pantothenate 6 mg, niacin 6 mg, Vitamin B₁₂ 20 mg, folic acid 0.3 mg, vitamin B₆ 2 mg, choline chloride 200 mg, Fe 70 mg, Cu 15 mg, Zn 55 mg, Mn 80 mg, Co 0.25 mg, Se 0.2 mg and antioxidant 50 mg.

The heterophyll-lymphocyte ratio was calculated by spectrophotometry (EMC-30PC-UV) and the results are given in the table. Hemoglobin concentration - spectrophotometry (EMC-30PC-UV), the amount of erythrocytes and leukocytes - by direct microscopy in Goryayev counting network, medium - by Nevodov, viscosity - viscometer (HAAKE Viscotester 2plus), erythrocyte sedimentation rate - Panchenko detected in the apparatus. The results were not included in the table because there were no significant changes in these blood counts.

For wildlife, sand consumption was estimated according to the soil absorption equation. Soil absorption equation for wildlife: $x = (b) y + ay) / (ay) c + b$. The soil fraction (x) in the food is expressed as where y is the acid-insoluble ash concentration in the feed (g / kg dm), a is the digestibility of the dry matter in the feed, b is the acid-insoluble ash concentration in the feed (g / kg). at dm) and c is the concentration of insoluble ash in the acid in the sand (at g / kg dm) (Beyer et al., 1994).

RESULTS

By enriching the feed of hens that meet the standard requirements of our local conditions with sand, the results were obtained on their egg production, eggs weight, their body weight, nutrient content and some physiological parameters of the blood.

At the beginning of our experiments, the amount of feed was standard. For feedings with 0 to 30% sand content, there was no significant difference between the five groups of hens in egg laying, i.e., the maximum difference between sandless and sandy feedings was 1% (Table 2).

Table 2
The effect of sand consuming on digestion and productivity

Amount of sand (%)	0	10	20	25	30	E.K.F.*
Laying eggs (%)	96	95	96	97	97	1
Egg weight (gr)	67,6	67,7	67,8	68,3	68,8	1.2
Total nutrient intake (gr) (gr / t / 1) *	137	146	152	161	174	37
Ratio of total feed to egg weight (gr / gr)	2.03	2.16	2.24	2.36	2.53	0.5
Nutritious feed (sandless feed) (gr) (gr / t / 1) *	137	123	122	121	122	16
Ratio of nutritious feed (sandless feed) to egg weight (gr / gr)	2.03	1.82	1.80	1.77	1.77	0.26

* E.K.F. — The biggest difference

* (gr / t / 1) - The weight of feed consumed by one hen per day in grams.

There was almost no difference in egg weight between groups (maximum difference 1.2 g), (Table 2). One hen consumed 137 g of feed per day in a sand-free diet and 174 g in a 30% sandy diet (Table 2). Hence, nutrient uptake in sandy soils improved in proportion to non-sandy feeds. There was almost no difference between the ratio of total feed weight and nutritious feed (sand-free feed) to egg weight between the five groups.

The weight of nutritious feed (sandless feed) in sandy feeds was reduced to 16 g compared to sandless feeds. For hens fed 0% and 10% sand, the weight gain was more than 120 g. Body weight gain was significantly lower for hens fed 20% and 25% sand, and even increased by 37 g in the 30% sand-fed group of hens (Table 2).

Table 3
Effects of sandy consuming on digestion.

Amount of sand in feed (%)	Increase in digestion of sandy feed relative to the digestion of feed in the control group (%)
0	0
10	10,6
20	11,1
25	11,8
30	12,7

As the amount of sand in the feed increased, the digestion of the feed also improved. These results were compared with the original standard (sand-free feed). (Table 3). Feed digestion improved by 10.6% compared to standard feed consumption only when the feed content was 10% sand, including 11.1% at 20% sand content and 11.8% at 25% sand content. It was found to increase to 12.7% at 30%.

Table 4: Heterophilic/lymphocyte ratio in the blood of hens consuming 0 to 30% sand-enriched feed.

Amount of sand in feed (%)	Heterophilic / lymphocyte ratio
0	0,330
10	0,336
20	0,350
30	0,362

The heterophil / lymphocyte ratio was altered, albeit slightly. Initially, when hens were fed a standard feed, the H / L ratio was 0.330. The amount of sand in the feed increases to 0.336 at 10%, 0.350 at 20% and 0.362 at 30%. The ratio in sandy (30%) feed increased by 0.032 compared to sandless feed. There were no abnormal changes in blood counts, so none of our experiments had health problems.

DISCUSSION

The addition of sand to the feed had a small effect on productivity by ensuring that large amounts of nutrients were digested. There was a decrease in body weight. The increase in body weight of hens fed with more than 10% sand was reduced compared to hens fed with sand or with 10% sand. The rate of digestion of nutrients with sand supports the positive effects of grit, (Moran, 1982; Bennett and Classen, 2003).

Assessing soil consumption according to the soil absorption equation for wildlife is an appropriate method to determine soil absorption for space and home-raised hens under experimental conditions. For this purpose, hens manure can be collected only from the place of laying, because the acid-insoluble ash content in the dry matter of the litter does not differ between light and dark periods, however, differences in the dry matter content of the waste may be due to differences in fluid intake.

Using a standard procedure for soil sampling (Mahaney and Krishnamani, 2003) and the digestibility of dry nutrients, it is necessary to estimate soil absorption according to the soil absorption equation for wildlife. In this study, the amount of sand that hens received was higher than that of wild turkeys and hens (Beyer et al., 1994; Stephens et al., 1995).

CONCLUSION

In this study, their feeds were enriched with 0%, 10%, 20%, 25%, and 30% sand to determine the effect of sand on egg productivity of hens in the egg direction. Feed digestion, egg production, egg weight and body weight gain, and some physiological parameters were measured among hens under the same conditions and age over 3 weeks. With the increase in the amount of sand in the diet, a significant increase in feed consumption (egg production and egg theft) was achieved by achieving a significant increase in feed consumption.

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