

THE EFFECT OF CELLULOSIC CATEGORIES FROM COMBINED FORAGES WITH SUNFLOWER MEAL ON BROILER CHICKENS

EFECTUL CATEGORIILOR CELULOZICE DIN FURAJELE COMBinate CU SROT DE FLOAREA SOARELUI LA PUII DE CARNE

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In this experiment we have studied the effect of cellulosic categories from combined forages with sunflower meal on nutritive and bioproductive indices at broiler chickens. The experiment was carried out on 90 broiler chickens divided in three experimental groups: CG, EG1 and EG2. At control group was incorporated in combined forage 20% barley, at EG1 was incorporated 20% barley and 10% sunflower meal of good quality (36% CP) and at EG2 was incorporated 20% barley and 10% sunflower meal of poor quality (27% CP). At the age of 3 and 6 weeks were determined the nutritive and bioproductive indices. The highest forage consumption is registered at CG at which in the structure of combined forages was incorporated barley in proportion of 20% and was with 12.02% higher comparative with EG1 and with 5.9% higher comparative with EG2. The incorporation of barley and sunflower meal in the structure of combined forages fed to broiler chickens determines the reduction of body weight with 11.18% at EG2 and with 9.55% at EG1. The highest specific consumption is registered at EG2 and is with 6.52% higher comparative with control group.

Keywords: cellulosic categories, sunflower meal, broiler chickens

Introduction

Sunflower meal if is properly processed has valuable protein with similar amino acid availability to that in soybean meal (Green, 1989; Villamidae, 1998). Nevertheless, conflicting data were reported regarding the nutritive value of SFM

in broilers (Roth-Maier, 1995; Arija, 1998). These controversial results reported by several authors regarding the nutritive value of sunflower meal were attributed to the differences in variety, method of processing, age of birds and feed formulation techniques employed in these studies (Senkoylu, 1999). The only apparent disadvantages of this feedstuff are that it contains relatively high level of fiber (NDF, ADF and ADL) and low level of lysine (Carre, 1986).

Materials and Methods

The experiment was carried out from eclosion to 42 days on broiler chickens divided in three experimental groups: CG, EG1 and EG2. The hybrid used was Ross 308. The chickens from experimental groups were fed in the first period of growth from eclosion to 3 weeks with combined forage who assured 3162-3197 kcal ME and 22.54-22.91% CP. In the second period of growth from 3 to 6 weeks the combined forage assured 3173-3218 kcal ME and 20.04-20.14% CP (NRC 1994).

The forage content of NDF, ADF and ADL were established by tabular values (Englyst H., 1989) and chemical determinations.

The experimental scheme is presented in table 1.

Table 1

The experimental scheme

	CG	EG1	EG2
Period 0-3 weeks			
	Combined forage 0-3 weeks + 20% barley	Combined forage 0-3 weeks + 20% barley + 10% sunflower meal (36% CP)	Combined forage 0-3 weeks + 20% barley + 10% sunflower meal (27% CP)
ME (kcal/kg forage)	3197	3170	3162
CP (%)	22.91	22.85	22.54
Period 3-6 weeks			
	Combined forage 3-6 weeks + 20% barley	Combined forage 3-6 weeks + 20% barley + 10% sunflower meal (36% CP)	Combined forage 3-6 weeks + 20% barley + 10% sunflower meal (27% CP)
ME (kcal/kg forage)	3218	3185	3173
CP (%)	20.04	20.21	20.14

Results and Discussion

On tabular data basis and on chemical determinations we established the combined forage content in NDF, ADF and ADL, values presented in table 2.

From table 2 data it can be seen that the greatest rising of NDF content (with 2.92% in the first growth period and with 2.93% in the second growth period) was registered at the experimental group at which was incorporated 20% barley and 10% sunflower meal (27% CP) in the structure of combined forages (EG2). Regarding the ADF content, the greatest rising was also registered at experimental group at which was incorporated 20% barley and 10% sunflower meal (27% CP) in the structure of combined forages with 2.3% in the first growth period and with 2.33% in the second growth period. The ADL content register a rising with 0.63% at the experimental group with 20% barley and 10% sunflower meal (27% CP) in the structure of combined forages.

Table 2

The content of combined forages in cellulosic categories

Period	Specification	NDF* (%)	Percentage points	ADF** (%)	Percentage points	ADL*** (%)	Percentage points
Period 0-3 weeks	Combined forage 0-3 weeks	11.35	-	5.32	-	1.12	-
	Combined forage 0-3 weeks + 20% barley + 10% sunflower meal (36% CP)	12.77	1.42	6.32	1.0	1.59	0.47
	Combined forage 0-3 weeks + 20% barley + 10% sunflower meal (27% CP)	14.27	2.92	7.62	2.3	1.75	0.63
Period 3-6 weeks	Combined forage 3-6 weeks	11.52	-	5.18	-	1.16	-
	Combined forage 3-6 weeks + 20% barley + 10% sunflower meal (36% CP)	12.93	1.41	6.18	1.0	1.63	0.47
	Combined forage 3-6 weeks + 20% barley + 10% sunflower meal (27% CP)	14.45	2.93	7.51	2.33	1.79	0.63

* Neutral detergent fiber

** Acid detergent fiber

*** Acid detergent lignin

In order to establish feed consumption of chickens in the experimental groups, we weighed the feed quantities allocated to each experimental group and those remained when the chickens reached the age of 3 and 6 weeks. We calculated the feed consumption on period per chicken and the medium daily consumption for each period. The data obtained are presented in Table 3.

Table 3

Feed consumption of broiler chickens from experimental groups

Specification	CG	EG1	EG2
Period 0-3 weeks			
Consumption on period/chicken (kg)	0.89	1.03	1.05
Daily medium consumption/period/chicken (g)	42.7	49.27	50.45
Percentage differences (%)	100	115.73	117.97
Period 3-6 weeks			
Consumption on period/chicken (kg)	3.51	2.84	3.08
Daily medium consumption/period/chicken (g)	167.18	135.35	147.09
Percentage differences (%)	100	80.91	87.74
Period 0-6 weeks			
Consumption on period/chicken (kg)	4.41	3.88	4.15
Daily medium consumption/period/chicken (g)	104.94	92.31	98.77
Percentage differences (%)	100	87.98	94.1

From table data it can be seen that on entire growth period the smallest forage consumption is registered at EG1 at which was incorporated 20% barley and 10% high quality sunflower meal (36% CP) in the structure of combined forages. The highest forage consumption was registered at CG at which in the structure of combined forage was incorporated 20% barley and was with 12.02% greater than EG1.

In order to establish the evolution of body weight we weighed the chickens at one day, at 3 weeks and 6 weeks of age. The obtained results are presented in Table 4.

From table data it can be seen that at 42 days of age the smallest body weight was registered at EG2 and was with 11.18% smaller than CG. This difference is statistical significant. The experimental groups EG1 registered a smaller body weight than CG with 9.55%, difference that is statistical insignificant. Therefore it can be said that the incorporation barley in the structure of combined forages has no significant influence on body weight.

Table 4

The evolution of body weight at chickens from experimental groups

Specification	CG	EG1	EG2
n	30	30	30
Weight at eclosion (g)	39±0.34	39±0.32	39±0.38
n	29	27	28
Weight at 3 weeks (g)	657.5±22.1	702.4±28.1	666.0±23.7
Percentage values	100	106.82	101.29
CV (%)	13.43	15.99	14.26
Statistical differences		NS	NS
n	16	16	16
Weight at 6 weeks (g)	2421.8±80.2	2190.6±95.5	2151.1±67.2
Percentage values	100	90.45	88.82
CV (%)	12.82	16.31	12.09
Statistical differences		NS	*

NS – $p > 0.05$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Corroborating the consumption data with body weight we obtained the specific consumption. The evolution of specific consumption is presented in the table 5.

Table 5

The evolution of specific consumption at chickens from experimental groups

Specification	CG	EG1	EG2
Period 0-3 weeks			
Consumption on period / chicken	0.89	1.03	1.05
Gain / period / chicken (g)	618.5	663.38	627.0
Specific consumption (kg feed / kg gain)	1.45	1.56	1.69
Percentage differences	100	107.58	116.55
Period 3-6 weeks			
Consumption on period / chicken	3.51	2.84	3.08
Gain / period / chicken (g)	1764.3	1488.2	1485.13
Specific consumption (kg feed / kg gain)	1.99	1.91	2.08
Percentage differences	100	95.97	104.52
Period 0-6 weeks			
Consumption on period / chicken	4.41	3.88	4.15
Gain / period / chicken (g)	2382.8	2151.57	2112.13
Specific consumption (kg feed / kg gain)	1.84	1.8	1.96
Percentage differences	100	97.82	106.52

On the entire growth period the smallest specific consumption was registered at EG1 (1.8 kg) at which was incorporated in the structure of combined forages 20% barley and 10% sunflower meal (36% CP). The others experimental groups register a higher specific consumption, with 2.18% at CG at which was incorporated 20% barley and with 6.52% at EG2 at which was incorporated 20% barley and 10% sunflower meal (27% CP).

Therefore it can be said that the rising of NDF, ADF and ADL content determines a rising of specific consumption at broiler chickens.

Conclusions

- the incorporation of 20% barley and 10% sunflower meal with 36% CP, respectively 27% CP, in the structure of combined forage determines the rising of NDF, ADF and ADL content,

- the inclusion of sunflower meal in the structure combined forages fed to broiler chickens determines a decrease of forage consumption with 12.02% at EG1 which have in the structure of combined forage 20% barley and 10% high quality sunflower meal (36% CP) and with 5.9% at EG2 which have in the structure of combined forage 20% barley and 10% poor quality sunflower meal (27% CP),

- the rising of NDF, ADF and ADL content in the combined forage fed to broiler chickens determines a decreasing of the body weight with 11.18% at EG2 at which was incorporated in the structure of combined forage 20% barley and 10% poor quality sunflower meal (27% CP), difference that is statistical significant and with 9.55% at EG1 at which was incorporated in the structure of combined forage 20% barley and 10% high quality sunflower meal (36% CP), difference that is statistical insignificant,

- the specific consumption rises at experimental group who consumed forage with 20% barley and 10% poor quality sunflower meal in their structure (with 6.52% at EG2),

- the incorporation of 20% barley and 10% sunflower meal with 36% CP, respectively 27% CP, in the structure of combined forage determines the rising of NDF, ADF and ADL content, which leads to inferior nutritive and bioproductive indices comparative with the control group at which was not incorporated barley.

References

1. Arija, I., A. Brenes, A. Viveros and R. Elices, 1998. Effects of inclusion of full-fat sunflower kernels and hulls in diets for growing broiler chickens. *Anim. Feed Sci. and Tec.*, **70**: 137-149.
2. Bach Knudsen, K.E. 1997, Carbohydrate and lignin contents of plants materials used in animal feeding. *Animal Feed Science Technology* **67**: 319-338
3. Carre, B. and J.M. Brillouet, 1986. Yield and composition of cell wall residues isolated from various feedstuffs used for non-ruminant farm animals. *J. Sci. Food and Agri.*, **37**: 341-351.
4. Green, S. and T. Kiener, 1989. Digestibility's of nitrogen and amino acids in Soya-bean, sunflower, meat and rapeseed meals measured with pigs and poultry. *Anim. Prod.*, **48**: 157-179.
5. Englyst, H., 1989, *Animal Feed Sci. Technology*, 23-27
6. Roth-Maier, D.A. and M. Kirchgessner, 1995. Feeding of full-fat flax seed and sunflower seed to fattening chickens. *Archiv-fur-Geflukelkunde*, **59**: 319-322
7. Senkoylu, N. and N. Dale, 1999. Sunflower meal in poultry diets: A review. *World`s Poult. Sci. J.*, **56**: 153-174.
8. Villamidae, M.J. and L.D. San Juan, 1998. Effect of chemical composition of sunflower seed meal on its true metabolizable energy and amino acid digestibility. *Poult. Sci.*, **77**: 1884-1892.
9. *** NRC, 1994, Nutrient Requirements of Poultry, 9th edn. National Academy of Sciences, Washington, DC.