

## UTILIZATION OF MEXICAN SUNFLOWER (*Tithonia diversifolia*, Hemsley, A. Gray) LEAF MEAL ON THE AVERAGE PRODUCTION COST AND RETURNS OF BROILER CHICKS

### KORIŠTENJE BRAŠNA LISTA MEKSIČKOG SUNCOKRETA (*Tithonia diversifolia*, Hemsley, A. Gray) U PROSJEČNIM PROIZVODNIM TROŠKOVIMA I DOBITI BROJLERA

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#### ABSTRACT

One hundred and fifty (150) white day old Arbor Acres broiler chicks were used in evaluating the utilization of Mexican sunflower meal on the economics of broiler chicks. The broiler chicks were randomly assigned to five treatments A, B, C, D and E. Treatment A served as the control and treatments B, C, D and E received Mexican sunflower leaf meal at 2.5, 5.0, 7.5, and 10.0% levels replacing maize and soymeal respectively. Feed and water were provided *ad-libitum* and routine vaccinations and medications administered. Performance characteristics measured were feed intake and net profit. The results of the experiment showed that there were significant differences ( $P < 0.05$ ) in the live weight and feed intake. However, birds in treatment A performed best by attaining a live weight of 2610.30g in 8 weeks with feed intake of 4,68g per bird. The same birds yielded the highest net profit of € 0.853 or \$1.586 per bird in dressed weight unlike a deficit of € 0.295 or \$0.55 per bird in treatment E (10%MSLM). Birds in treatments B (2.5% MSLM), C (5.0% MSLM) and D (7.5% MSLM) had appreciable level of profits which suggests that in the absence of conventional feed stuff, non-conventional feeds such as MSLM at 2.5% to 7.5% can be optimized in the diets of broilers.

Key words: lesser known sunflower, production cost, broiler chicks

#### INTRODUCTION

There have been an increasing number of poultry farms in Nigeria particularly in the western part of Nigeria and this has resulted in an acute shortage and high cost of poultry feed ingredients, meanwhile, there has not been any appreciable increase in the prices of poultry product. Therefore there is the need to search for a cheaper but quality feed ingredient that will make production cost effective and poultry farmers maximize their profits.

To increase poultry production, much emphasis has been placed on the utilization of agricultural by-products in the poultry feed. These by-products

are grossly unsustainable all year round. This can however be overcome by supplementing the diets with prolific browse plant (Fomunyan and Mboni, 1989). However, some of these have anti-nutritional and toxicological limitations. The use of Mexican sunflower, a cheap locally produced shrub legume is considered because utilization of forbs and shrub as protein supplement has not received much attention, although they constitute large proportions of ruminants diets where grass is not available or dormant (Rafique, 1993). The purpose of this study, therefore, is to investigate the effect of Mexican sunflower leaf (MSL) on the economics of gain of broiler chicks.

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## MATERIALS AND METHODS

**Experimental site:** The experiment was carried out in a deep litter house at Ologuneru village for a period of eight (8) weeks.

**Experimental materials:** One hundred and fifty (150) day old Arbor Acres broiler chicks, drugs (antibiotics, anticoccidials and vitamins), brooms, plastic bucket, vaccines, feeding and drinking troughs etc. were purchased. The building had already been partitioned into various pens.

**Experimental design:** The completely randomized design (CRD) was adopted for the experiment. 150 day old broiler chicks were randomly assigned to five (5) treatments, with 30 broilers in each treatment. (i.e A, B, C, D and E – A being the control).

**Ration formulation:** The starter and finishers diets contained graded levels of Mexican sunflower leaf with the exception of the control diet as shown in Tables 1 and 2.

**Plant materials:** Mexican sunflower "*Tithonia diversifolia*" leaf obtained at the teaching and research farm, University of Ibadan was harvested at approximately 6 weeks by slashing and carrying

after the onset of rains. The stems were cut 50cm above the ground and sorted into leaves (Tarawali et al; 1995). The stems were sun-dried on a clean cemented platform until crisp. The leaves were partially ground and packed into sacks, weighed and stored in a silo. The samples were bulked together and manually mixed to obtain as uniform a product as possible. A representative sample was collected from it for proximate analysis using standard methods (AOAC. 1990) to determine the nutrient composition. The MSL sample was oven dried at 105°C for 24 hours (to constant weight), milled and stored in air tight, sealed polythene bags prior to chemical analysis. The Mexican sunflower leaf meal used in this study contained (%) crude protein, 16.3; crude fiber, 21.8; ether extract, 2.8; ash, 14.7; and nitrogen free extract, 44.4. Anti-nutritional factors in MSLM are shown in Table 3. Five experimental diets were formulated at the starter and finisher phases with graded levels of 0, 2.5, 5.0, 7.5 and 10.0% MSLM in diets A, B, C, D and E respectively that represents the treatments (Table 1 and 2).

**Experimental procedures:** The one hundred and fifty (150) day old Arbor Acres broiler chicks were purchased from CHI farms Ltd., Ajanla, Ibadan.

**Table 1: Ingredient Composition of the Starter Diet**

**Tablica 1. Sirovinski sastav početnih krmnih smjesa**

Ingredients - Sastojci	A	B	C	D	E
Maize - Kukuruz	52.50	51.00	49.50	48.00	46.50
Soya meal – Sojina sačma	23.00	22.50	22.00	21.50	21.00
GNC - Pogača od kikirikija	17.00	16.50	16.00	15.50	15.00
MSLM <sup>1</sup> – Brašno lista meks. suncokreta	0.00	2.50	5.00	7.50	10.00
Fish meal (72%) - Riblje brašno	2.50	2.50	2.50	2.50	2.50
Bone meal – Koštano brašno	2.50	2.50	2.50	2.50	2.50
Oyster shell – Ljuska školjki	1.50	1.50	1.50	1.50	1.50
Vitamin premix – Vitaminski premiks	0.25	0.25	0.25	0.25	0.25
Salt - Sol	0.25	0.25	0.25	0.25	0.25
Methionine - Metionin	0.25	0.25	0.25	0.25	0.25
Lysine - Lizin	0.25	0.25	0.25	0.25	0.25
Total - Ukupno	100.00	100.00	100.00	100.00	100.00
CP – Sirove bjelančevine	24.36	24.18	24.01	23.83	23.65
Energy kcal/kg – Energija kcal/kg	2944.2	2913.2	2882.2	2851.3	2820.3

**Table 2: Ingredient Composition of the Finisher Diet**

**Tablica 2. Sirovinski sastav završnih krmnih smjesa**

Ingredients - Sirovine	A	B	C	D	E
Maize - Kukuruz	59.50	58.00	56.50	55.00	53.50
Soya meal – Sojina sačma	20.00	19.50	19.00	18.50	18.00
GNC - Pogača od kikirikija	14.00	13.50	13.00	12.50	12.00
MSLM <sup>1</sup> – Brašno lista meks. suncokreta	0.00	2.50	5.00	7.50	10.00
Fish meal (72%) - Riblje brašno	1.50	1.50	1.50	1.50	1.50
Bone meal – Koštano brašno	2.50	2.50	2.50	2.50	2.50
Oyster shell – Ljuska školjki	1.50	1.50	1.50	1.50	1.50
Vitamin premix – Vitaminski premiks	0.25	0.25	0.25	0.25	0.25
Salt - Sol	0.25	0.25	0.25	0.25	0.25
Methionine - Metionin	0.25	0.25	0.25	0.25	0.25
Lysine - Lizin	0.25	0.25	0.25	0.25	0.25
Total - Ukupno	100.00	100.00	100.00	100.00	100.00
CP – Sirove bjelančevine	21.73	21.55	21.38	21.20	21.02
Energy kcal/kg – Energija kcal/kg	2995.7	2964.8	2933.8	2902.9	2871.9

**Table 3: Anti-nutritional factors in MSLM**

**Tablica 3. Anti-nutritivni faktori u MSLM**

Component – Sastojak	Quantity – Količina (mg/100g)
Total Alkaloid – Ukupni alkaloidi	6.32
Saponin - Saponin	1.05
Oxalate - Oksalat	5.25
Phytate - Fitat	8.81
Tannin - Tanin	5.19
Glycosides - Glikozidi	0.42
Phenol - Fenol	0.53

Source - Izvor: Ekeocha, A.H. (2009)

The birds were randomly assigned to the five (5) treatments A, B, C, D and E. Feed and fresh water were supplied *ad libitum* on daily basis throughout the experimental period following standard procedures. The daily leftover in the feeding troughs was carefully weighed and deducted from the known weight of feed served at the initial stage to know the actual feed intake. Actual water intake was also determined. The experiment was terminated at the end of the eight week.

Data collection: Data were collected on the following parameters on weekly basis. Feed intake, body weight gain, feed conversion ratio.

Statistical analysis: The data collected were subjected to the analysis of variance procedure of SAS (2000). Significant means were separated using the Duncan Multiple Range Test of the same package.

## RESULTS

The live weight and processing values of broilers fed Mexican sunflower leaf meal is as shown in Table 4. The live weight of experimented birds fed

sunflower leaf meal-based diets significantly decreased from 2641.30 g/bird for birds on the control diet without MSLM to 1754.13 g/bird for those fed 10% MSLM-based diets. The same trend was obtained for the plucked weight (2419.2 – 1582.97

**Table 4: Average General Performance of Broilers given Mexican Sunflower Leaf Meal**

**Tablica 4. Prosječni proizvodni rezultati brojlera hranjenih brašnom lišća meksičkog suncokreta**

Parameters - Pokazatelji	A	B	C	D	E	SEM
Initial weight, g/bird – Početna masa, g/pile	31.0	31.0	31.0	31.0	31.0	0.00
Weight gain at 4 weeks, g/bird – Dnevni prirast do 4 tjedna, g/pile	680.30 <sup>a</sup>	668.00 <sup>b</sup>	651.61 <sup>c</sup>	627.26 <sup>d</sup>	582.12 <sup>e</sup>	15.12
Weight gain at 5-8 weeks, g/bird – D. prirast 5. - 8. tjedan, g/pile	1961.0 <sup>a</sup>	1894.75 <sup>b</sup>	1762.37 <sup>c</sup>	1525.98 <sup>d</sup>	1172.01 <sup>e</sup>	21.13
Live weight (g/bird) - Živa masa (g/pile)	2641.30 <sup>a</sup>	2562.75 <sup>b</sup>	2413.98 <sup>c</sup>	2153.24 <sup>d</sup>	1754.13 <sup>e</sup>	41.26
Weekly water consu. (ml/bird) – Tjedna konz. vode (ml/pile)	1981.08 <sup>a</sup>	1899.12 <sup>b</sup>	1798.88 <sup>c</sup>	1732.72 <sup>d</sup>	1677.84 <sup>e</sup>	59.18
Feed intake 1-4 wks (g/bird) – Konz. hrane 1.-4. tj. (g/pile)	442.04 <sup>a</sup>	440.96 <sup>a</sup>	424.73 <sup>b</sup>	409.46 <sup>c</sup>	356.04 <sup>d</sup>	13.37
Feed Intake at 5-8 wks (g/bird) - Konz. hrane od 5.-8. tj. (g/pile)	2912.40 <sup>a</sup>	2916.54 <sup>a</sup>	2603.69 <sup>b</sup>	2517.74 <sup>c</sup>	2195.71 <sup>e</sup>	40.48
Feed conversion ratio - Konverzija hrane	1.62 <sup>d</sup>	1.67 <sup>c</sup>	1.63 <sup>d</sup>	1.77 <sup>b</sup>	1.90 <sup>a</sup>	0.03

Means in the same row with different superscript are significantly different ( $p < 0.05$ )

Vrijednosti u istim redovima označeni različitim slovima značajno se razlikuju ( $p < 0.05$ )

**Table 5: Break Down of Cost of Starter Diet/100kg**

**Tablica 5. Troškovi sirovina u početnim krmnim smjesama /100 kg**

Ingredients - Sirovine	A	B	C	D	E
Maize - Kukuruz	19.136	18.589	18.042	17.495	16.949
Soya meal – Sojina sačma	8.383	8.201	8.019	7.837	7.654
GNC - Pogača od kikirikija	5.958	5.783	5.608	5.432	5.257
MSLM <sup>1</sup> – Brašno lista meks. suncokreta	0.000	0.175	0.351	0.526	0.701
Fish meal (72%) - Riblje brašno	3.622	3.622	3.622	3.622	3.622
Bone meal – Koštano brašno	0.269	0.269	0.269	0.269	0.269
Oyster shell – Ljuska školjki	0.070	0.070	0.070	0.070	0.070
Vitamin premix – Vitaminski premiks	0.374	0.374	0.374	0.374	0.374
Salt - Sol	0.030	0.030	0.030	0.030	0.030
Methionine - Metionin	1.168	1.168	1.168	1.168	1.168
Lysine - Lizin	0.759	0.759	0.759	0.759	0.759
Total – Ukupno (€)	39.769	39.040	38.312	37.582	36.853

**Table 6: Break Down of Cost of Finisher Diet/100kg**

**Tablica 6. Troškovi sirovina u završnim krmnim smjesama /100 kg**

Ingredients - Sirovine	A	B	C	D	E
Maize - Kukuruz	21.687	21.140	20.594	20.047	19.500
Soya meal – Sojina sačma	7.290	7.108	6.925	6.743	6.561
GNC - Pogača od kikirikija	4.907	4.731	4.556	4.381	4.206
MSLM <sup>1</sup> – Brašno lista meks. suncokreta	0.00	0.175	0.351	0.526	0.701
Fish meal (72%) - Riblje brašno	2.173	2.173	2.173	2.173	2.173
Bone meal – Koštano brašno	0.269	0.269	0.269	0.269	0.269
Oyster shell – Ljuska školjki	0.070	0.070	0.070	0.070	0.070
Vitamin premix – Vitaminski premiks	0.374	0.374	0.374	0.374	0.374
Salt - Sol	0.030	0.030	0.030	0.030	0.030
Methionine - Metionin	1.168	1.168	1.168	1.168	1.168
Lysine - Lizin	0.759	0.759	0.759	0.759	0.759
Total – Ukupno (€)	38.727	37.997	37.269	36.540	35.811

**Table 7: Cost Analysis of Broilers Given MSLM based diet**

**Tablica 7. Analiza troškova brojlera na obrocima na bazi MSLM-a**

Parameters - Pokazatelji	A	B	C	D	E	SEM
Cost of starter feed, €/kg – Troškovi startera, €/kg	0.398	0.398	0.398	0.398	0.398	0.00
Cost of finisher feed, €/kg – Troškovi finišera, €/kg	0.387	0.387	0.387	0.387	0.387	0.00
Starter consumed, g/bird - Konzumirani starter, g/pile	1768.16 <sup>a</sup>	1763.83 <sup>a</sup>	1698.90 <sup>b</sup>	1637.83 <sup>c</sup>	1424.55 <sup>d</sup>	34.66
Finisher consumed, g/bird – Konzumirani finišer, g/pile	2912.40 <sup>a</sup>	2916.54 <sup>a</sup>	2603.69 <sup>b</sup>	2517.74 <sup>c</sup>	2195.71 <sup>d</sup>	40.48
Cost of consumed starter, € - Troškovi startera, €	0.703 <sup>a</sup>	0.689 <sup>a</sup>	0.651 <sup>b</sup>	0.616 <sup>b</sup>	0.525 <sup>c</sup>	0.04
Cost of consumed finisher, € Troškovi finišera, €	1.128 <sup>a</sup>	1.108 <sup>a</sup>	0.970 <sup>b</sup>	0.920 <sup>b</sup>	0.786 <sup>c</sup>	0.05
Total cost of feed, € - Ukupni troškovi hrane, €	1.831 <sup>a</sup>	1.797 <sup>a</sup>	1.621 <sup>b</sup>	1.536 <sup>b</sup>	1.311 <sup>c</sup>	0.09
Cost of feed/ kg weight gain, € /kg live weight – Troškovi hrane/kg žive vage, €/kg žive vage	0.702 <sup>ab</sup>	0.710 <sup>b</sup>	0.680 <sup>a</sup>	0.724 <sup>b</sup>	0.761 <sup>c</sup>	0.02

Means in the same row with different superscript are significantly different ( $p < 0.05$ )

Vrijednosti u istim redovima označeni različitim slovima značajno se razlikuju ( $p < 0.05$ )

**Table 8. Average Production Costs and Returns for broilers given Mexican Sunflower Leaf (Live Weight)**

**Tablica 8. Prosječni troškovi proizvodnje i dobit u tovu brojlera hranjenih brašnom lista meksičkog suncokreta (živa vaga)**

Parameter - Pokazatelj	A	B	C	D	E
Revenue sale of Broiler, € /kg - Prihod od prodaje pilića, € /kg	2.103	2.103	2.103	2.103	2.103
Average live weight (kg) – Prosječna živa masa, kg	2.64130	2.56275	2.41398	2.15324	1.75413
Revenue per broiler Sold, € - Prihod po prodanom piletu, €	5.554	5.389	5.076	4.528	3.689
Variables - Varijable					
Cost of day old chick, € - Troškovi jednodnevnih pilića, €	0.794	0.794	0.794	0.794	0.794
Cost of Feed - Troškovi hrane, €	1.831	1.797	1.621	1.536	1.311
Cost of Drug and Vaccines, € - Troškovi lijekova i cjepiva, €	0.280	0.280	0.280	0.280	0.280
Cost of Labour – Trošak rada, €	0.280	0.280	0.280	0.280	0.280
Transportation – Prijevoz, €	0.374	0.374	0.374	0.374	0.374
Miscellaneous – Razno, €	0.234	0.234	0.234	0.234	0.234
Amortization – Amortizacija, €	0.140	0.140	0.140	0.140	0.140
Rent – Najam, €	0.187	0.187	0.187	0.187	0.187
Total cost profit – Bruto dobit, €	4.120	4.086	3.910	3.825	3.600
Net profit – Neto dobit, € /bird	1.434	1.303	1.166	0.703	0.088
Profit/bird, % of production cost – Dobit/pile, % od proizv. troškova	34.81	31.89	29.82	18.38	2.44

g/bird), dressed weight (1935.02 – 1286.05 g/bird), cost of feed (€ 1.831 – 1.311), net profit on live weight (€ 1.434 – 0.088 /bird), net profit on dressed weight (€ 0.853 to a deficit of - € 0.295 /bird) Tables 8 and 9.

The highest plucked weight (2419.21 g/bird) was obtained for broilers in treatment A (control diet) which was significantly ( $p < 0.05$ ) the highest. The least value for plucked weight (1582.97 g/bird) was obtained for bird in treatment E (10% MSLM). The same trend was observed for dressed weight (1935.02g – 1286.05 g/bird). The highest dressed weight (1935.02g /bird) was obtained for broilers in treatment A (control diet) which was significantly ( $p < 0.05$ ) the highest. The least value for dressed weight (1286.05 g/bird) was obtained for birds in treatment E (10% MSLM). The highest profit on live weight (€ 1.434/bird) was made from sale of birds in treatment A (control diet) which was significantly ( $p < 0.05$ ) the highest. The least profit (€ 0.088 /bird)

was realized from sale of birds in treatment E (10% MSLM). The same trend of profit was observed for dressed weight (€ 0.853 to a deficit of € 0.295 /bird). The highest profit in dressed weight (€ 0.852 /bird) was realized from sale of birds in treatment A (control diet) which was significantly ( $p < 0.05$ ) the highest. The least profit on dressed weight (deficit of € 0.295 /bird) was realized from sale of birds in treatment E (10% MSLM).

Table 7 shows the effect of MSLM on the cost of production. Cost per kg of feed at the starter phase and finisher phase ranged from € 0.398 to € 0.387. On the average, cost of feeding the broilers from day old to eight weeks ranged from € 1.311 to € 1.831. Cost of feed per kg live weight gain ranged from € 0.680 to € 0.761 and this was significant ( $p < 0.05$ ). Average net profit per bird was € 0.938, while net profits (€) of 1.434, 1.303, 1.166, 0.703 and 0.088 were made per bird with increasing level of MSLM in the diet. Cost of feed for and day old chicks ac-

**Table 9. Average Production Costs and Returns for broilers given Mexican Sunflower Leaf (Dressed Weight)**

**Tablica 9. Prosječni troškovi proizvodnje i dobit u tovu brojlera hranjenih brašnom lista meksičkog suncokreta (klaonička težina)**

Parameter - Parametar	A	B	C	D	E
Revenue sale of Broiler, € /kg - Prihod od prodaje pilića, € /kg	2.57	2.57	2.57	2.57	2.57
Average live weight (kg) – Prosječna živa masa, kg	1.94	1.87	1.76	1.60	1.29
Revenue per broiler Sold, € - Prihod po prodanom piletu, €	4.973	4.800	4.501	4.088	3.305
Variables - Varijable					
Cost of day old chick, € - Troškovi jednodnevnih pilića, €	0.794	0.794	0.794	0.794	0.794
Cost of Feed - Troškovi hrane, €	1.831	1.797	1.621	1.536	1.311
Cost of Drug and Vaccines, € - Troškovi lijekova i cjepiva, €	0.280	0.280	0.280	0.280	0.280
Cost of Labour – Trošak rada, €	0.280	0.280	0.280	0.280	0.280
Transportation – Prijevoz, €	0.374	0.374	0.374	0.374	0.374
Miscellaneous – Razno, €	0.234	0.234	0.234	0.234	0.234
Amortization – Amortizacija, €	0.140	0.140	0.140	0.140	0.140
Rent – Najam, €	0.187	0.187	0.187	0.187	0.187
Total cost profit – Bruto dobit, €	4.120	4.086	3.910	3.825	3.600
Net profit – Neto dobit, € /bird	0.853	0.714	0.591	0.263	-0.295
Profit/bird, % of production cost – Dobit/pile, % od proizv. troškova	20.70	17.47	15.12	6.88	-8.19

counted for (44.44 – 36.42 %) and (19.27 – 22.06 %) out of total cost of production.

## DISCUSSION

The live weight obtained for broilers in this study were higher than the value (2480.39±9.75g) reported for broilers by Omojola and Fagbuaro (2005). However, live weight of broilers in treatments C, D and E (1754.13 – 2413.98g) were significantly lower. The significant decrease in live weight, plucked weight and dressed weight observed in broilers across treatments with increasing level of MSLM could be attributed to the presence of anti-nutritional factors like tannin and saponin in MSLM that consequently makes it bitter as it increased across treatments. These could decrease the feed intake and consequently the live weight. Tannin, an anti-nutritional factor can bind dietary proteins and digestive enzymes into complexes which are not readily digestible. It can also bind with the proteins

of saliva and mucosal membranes (Helsper et al, 1993). Prince et al, (1980) had observed depression of growth rates of chicks when fed diet containing high tannin sorghum.

Odunsi et al. (1999) had reported broiler finishers fed wild sunflower leaf meal to show depressed feed intake most especially at 7.5 and 10.0% inclusion level. Studies by (Barry and Manley, 1984) have shown that at regulatory dietary level of 20 – 40 g/kg dry matter intake, condensed tannin may have some beneficial effect on rumen protein metabolism largely by protecting some proteins against microbial degradation in the rumen.

Forage saponins have been reported by Cheeke et al (1978) to cause toxic and anorexic effects in rat and swine by limiting the feeding value of high saponin animal feeds such as alfalfa.

The lowest feed cost per kg body weight gain of € 0.680 was obtained in treatment C (5.0% MSLM) while the highest value of € 0.761 per kg of diet was

recorded in treatment E (10.0% MSLM). Overall performance and profit margin showed that broilers given 5.0 % MSLM (€ 0.550) performed best during the finisher phase while the least was in treatment E (10.0% MSLM) (€0.671). C, A, B and D performed better and in terms of feed conversion gave the lowest cost per kilogram live weight gain (0.550 – 0.603/kg weight gain) unlike treatment E (0.671/kg). The better performance was further confirmed by the higher level of net profit produced by these treatments A, B, C and D (€1.434 – €0.703/ bird). On the average the profit was € 0.938. This shows that the inclusion of MSLM in commercial broiler production for good returns is not only beneficial but also justifiable. Feed cost accounted for (36.42 – 44.44 %) of total production cost. This is not in agreement with the reports of Renkema (1992), Larry (1995) and Nworgu et al (1997) that feed cost accounts for about 50 % of production cost. The lower cost reported in this work is attributed to feed quality, adequate management and more importantly, the inclusion of MSLM in the diets of the birds which yielded good feed conversion and efficient feed utilization at levels within 5.0 %.

The decrease in the cost of feed with increasing level of MSLM in the diet did not transform to an increase in net profit except at 5.0 % MSLM inclusion level.

The increment in the level of MSLM at above 5.0% in the diets did not produce a corresponding linear increase in the profit percentage of experimental birds as those in treatments D and E had significantly lower profit percentage than those in other treatments.

Birds in treatments B (2.5% MSLM), C (5.0% MSLM) and D (7.5% MSLM) have appreciable level of profits which suggests that in the absence of conventional feed stuff, non-conventional feeds such as MSLM at 2.5% to 7.5% can be optimized in the diets of broilers.

#### IMPLICATIONS

Adding Mexican sunflower leaf to concentrate diet for broiler chicks above 7.5% inclusion level had detrimental effects on birds. Based on the results of this experiment and due to substantial decreases in intake, performance and profit margin, the decision to use Mexican sunflower leaf at above 7.5%

inclusion level in feeding programs for broiler chicks should not be recommended.

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## SAŽETAK

U procjenjivanju isplativosti korištenja brašna meksičkog suncokreta u hranidbi brojlera upotrijebljeno je 150 jednodnevnih brojlera Arbor Acres. Brojleri su nasumce podijeljeni u pet tretmana A, B, C, D i E. Tretman A poslužio je za kontrolu a tretmani B, C, D i E dobivali su brašno lista meksičkog suncokreta po 2.5, 5.0, 7.5 i 10.0% u zamjenu za kukuruz i sojinu sačmu. Hrana i voda davani su ad libitum te je primijenjeno rutinsko cijepljenje i lijekovi. Praćena je konzumacija hrane i neto dobit. Rezultati pokusa pokazali su značajne razlike ( $P < 0.05$ ) u vrijednostima žive vage i konzumaciji hrane. Međutim, pilići u tretmanu A bili su najuspješniji postigavši živu masu od 2610.30 g u osam tjedana uz konzumaciju hrane od 4.68 g po piletu. Isti pilići ostvarili su najvišu neto dobit od 0.853 € ili 1.586 \$ za kg klaoničke težine po piletu za razliku od gubitka od 0.295 € ili 0.55 \$ po piletu u tretmanu E (10%MSLM). Pilići u tretmanu B (2.5%MSLM), C (5.0% MSLM) i tretmanu D (7.5%MSLM) postižu značajnu dobit, što govori da se u pomanjkanju uobičajene hrane u obrocima brojlera može koristiti neuobičajena hrana poput MSML-a u količini od 2.5% do 7.5%

Ključne riječi: manje poznati suncokret, troškovi proizvodnje, brojleri