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INFLUENCE OF APPLYING BROILER WELFARE LAWS ON UNIT COST

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Abstract

European Union and especially some national governments have gradually increased production costs by political decisions of introducing new rules concerning food safety, protection of environment and animal welfare. This paper has been performed to assess economical consequences of applying broiler welfare laws on unit cost by kg live weight. The study was performed during four years with production data from six top poultry farms from Romania before (V_1) and after the introduction ob broiler welfare rules (V_2 and V_3).
Percentage of savings and losses was calculated for each variant based on unit cost which was found before welfare rules came into action based on expenses categories in same economical conditions to emphasize economical consequences of applying broiler welfare rules. Analyzing these percentages has revealed that unit cost is 1.81% higher in variant V_2 than in variant V_1 and 3.43% higher in variant V_3 compared to base variant. Highest losses by expense category have been noted for lightning (48.22% - V_2 and 105.50% - V_3) followed by fuel, amortisements and labour force expanses. Lowest losses are in other expenses category with values between 4.86% in variant V_2 and 16.16% in variant V_3. These losses are due to more lamps used for lightning. Besides these losses welfare rules also brings savings in unit costs between 1.12% for biological material and feeds – V_2 and 37.50% for ventilation energy – V_3.

Key words*: evolution, milk production, NW Region, Romania, trends.*

INTRODUCTION

Concern for animal welfare aspects has appeared in many countries and especially in the strong developed ones due to introduction and extension of the intensive animal production system to supply food needed for an ever growing human population.
Importance of animal welfare for parts of human society is having ethical, social, political and economical motivations. Social motivation is actually triggering the others by making consumers aware that their welfare and health are dependent on quality of material factors of the environment in which they are living and on the safety of food they are eating in close relationship welfare level of animals from which their food is coming (Custura et al., 2010).
European Union and especially some national governments in the North-west of European Union have gradually increased production costs by political decisions of introducing new rules concerning food safety, protection of environment and animal welfare.
This paper was perform to assess economical consequences of applying broiler welfare legislation (Directive 43/2007/CE and Edicts MADR 239 and 264/2012 – Measure 215), on unit cost by kg live weight.

MATERIALS AND METHODS

The study was performed during four years with production data from six top poultry farms from Romania before and after the introduction ob broiler welfare rules. Resulting data were recorded and statistically processed by known classical procedures and differences significance was tested by multiple Student test.
Influence of these rules on unit cost in poultry meat was studied by simulating two working conditions. The first involved the minimal requirement (V_2) - Directive 43 (average density 35 kg live weight/sqm and light intensity of 20 lux/sqm) and the other involved the higher requirement (V_3) – Measure 215 (average density 32 Kg live weight/sqm and light intensity of 30 lux/sqm) and results were

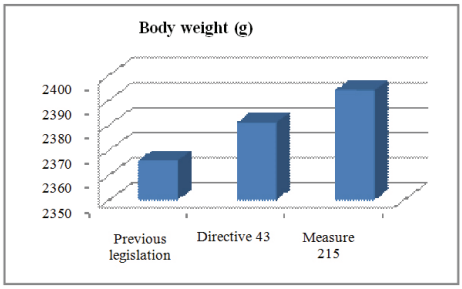
compared with those obtained before these rules came into force (V_1) - (average density 44 kg live weight/sqm and light intensity of 10 lux/sqm).
Unit costs by kg live weight were find based on structure, consumption and cost of used feeds and consumption and cost of other resources and final production performances for each working condition and income lost and supplementary expenses were calculated based on these costs.

RESULTS AND DISCUSSIONS

Cost is value expression for consumption of income yielding factors. Expense became cost by consumption so cost is consecutive to consumption. Reducing production costs is a priority so detailed analyses of cost forming expenses and studying their efficiency and studying relationship between production cost and yield are compulsory.
Analyze of final production parameters is of major significance as their size has an influence on final production costs. Results from the six poultry farms during four years are showing that values are different by variant for each studied parameter (Table 1, Figure 1).
Body weight is between 2365.89 ± 174.34 g in V_1 and 2393.93 ± 176.62 g in V_3; specific consumption is between 1.76 ± 0.14 kg in V_3 and 1.79 ± 0.12 kg, la V_1; mortality is between 3.18 ± 1.22 % V_3 and 4.45 ± 0.12 % in V_1.

Table 1. Broiler production performances based on welfare conditions

Specification	U. M.	Previous legislation		Directive 43		Measure 215	
		Average	StDev	Average	StDev	Average	StDev
Average live weight	g	2365.89	*174.34*	2381.01	*126.65*	2393.93	*176.62*
Average daily gain	g	55.38	*4.15*	55.74	*3.01*	56.03	*4.21*
Cumulative mortality	%	4.45	*0.97*	3.95	*0.8*	3.18	*1.22*
Specific intake	g	1.79	*0.12*	1.77	*0.14*	1.76	*0.14*
BPI	points	300.69		307.64		313.47	



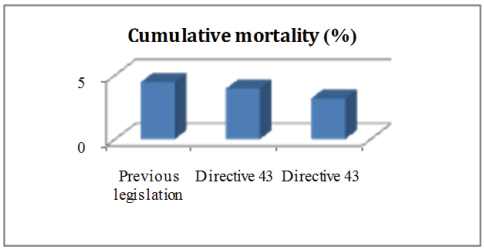


Figure 1. Final production performances

Production index (BPI) was used at the end of the experimental period for a more complex quantification of results. This index of assessing broiler production efficiency based on broiler's age at slaughtering, livability, live weight and feed efficiency has values between 300.69 points in V_1 and 313.47 points in V_3.
In Table 2 are shown results obtained by testing differences for analyzed parameters. Analyze of these data reveals no significant differences between working variants.

Table 2. Significance of differences between average production performances (Student test values)

Specification	Previous legislation / Directive 43	Previous legislation / Measure 215	Directive 43 / Measure 215
Average live weight	0.1719^{NS}	0.2708^{NS}	0.1388^{NS}
Average daily gain	0.1720^{NS}	0.2693^{NS}	0.1373^{NS}
Cumulative mortality	0.9741^{NS}	1.9959^{NS}	1.2928^{NS}
Specific intake	0.4899^{NS}	0.3985^{NS}	0.8831^{NS}

Table 3. Influence of biological material on unit cost

Specification	Previous legislation	Directive 43	Measure 215
Meat production/house (tons)	44	35	32
Chicks delivered (heads)	422.67	419.98	417.82
Cumulative mortality (%)	4.55	3.95	3.18
Chicks placed (heads)	441.47	436.56	431.10
Unit price (lei/heads)	1.52	1.52	1.52
Unit value (lei/ton)	671.03	663.57	655.27
Savings (lei/ton)	-	8.34	17.62

Unit cost means cost by product or by utile effect. Production unit costs for product „live meat productions" found in these researches comprise both direct and indirect production expenses. When unit cost is concerned fixed cost becomes also variable by decreasing when products amount increases and increasing when products amount decreases.

Therefore influence of direct and indirect expenses on cost at product „live meat productions" was found based on average prices of used raw materials taking legislation into account (Van et al., 2003). Main direct expenses influenced by welfare conditions are shown in Tables 3, 4 and 5. Analyzing these data reveals that biological material has a positive influence on unit costs of between 8.34 lei/ton in variant V_2 and 17.62 lei/ton in variant V_3 especially because of a better variability recorded at lower densities. Lightning has a negative influence on unit cost of between 38.48 lei/ton in variant V_2 and 84.19 lei/ton in variant V_3 due to both hour consumption and supplementary daily consumption. Also lamp number is having a negative influence due to supplementary used number and values between 2.37 lei/ton in variant V_2 and 7.88 lei/ton in variant V_3.

Table 4. Influence of lightening on unit cost

Specification	Previous legislation	Directive 43	Measure 215
Meat production/house (tons)	44	35	32
Consumption/hour/house (kHz)	2.04	4.02	6.00
Lightning difference (kHz)	-	1.98	3.96
Supplementary consumption/day (kHz)	-	35.64	71.28
Supplementary consumption house/cycle (kHz)	-	1496.88	2993.76
Unit price (lei/kw)	-	0.9	0.9
Value of supplementary electrical energy	-	1347.19	2694.38
Supplementary unit cost (lei/ton)	-	38.48	84.19

Percentage of savings and losses was calculated for each variant based on unit cost which was found before welfare rules came into action based on expenses categories in same economical conditions to emphasize economical consequences of applying broiler welfare rules (Table 6). Analyzing these percentages has revealed that unit cost is 1.81% higher in variant V_2 than in variant V_1 and 3.43% higher in variant V_3 compared to base variant. Highest losses by expense category have been noted for lightning (48.22% - V_2 and 105.50% - V_3) followed by fuel, amortisements and labor force expanses. Lowest losses are in other expenses category with values between 4.86% in variant V_2 and 16.16% in variant V_3. These losses are due to more lamps used for lightning. Besides these losses welfare rules also brings savings in unit costs between 1.12% for biological material and feeds – V_2 and 37.50% for ventilation energy – V_3.

Table 5. Influence of lamps number on unit cost

Specification	Previous legislation	Directive 43	Measure 215
Meat production/house (tons)	44	35	32
Lamps number / house (pieces)	34	67	100
Working period (hours/lamp)	279	549	820
Number of supplementary lamps (pieces)	-	270	541
Unit price (lei/piece)	2	2	2
Value of supplementary lamps (lei/house)	-	540	1640
Supplementary unit cost (lei/ton)	-	2,37	7,88

Table 6. Influence of welfare rules on unit cost

No.	Specification	Previousl y	Legislation			
			Directive 43		Measure 215	
		%	Savings	Losses	Savings	Losses
			%	%	%	%
A	Direct expenses	100	-	1.87	-	3.55
I	Material expenses	100	-	1.47	-	2.98
1	Biological material	100	1.12	-	2.40	-
2	Feeds	100	1.12	-	1.70	-
3	Medicines	100	-	-	-	-
4	Energy. fuel. water	100	-	11.59	-	24.91
4.1.	Fuel	100	-	25.70	-	37.49
4.2.	Feeding energy	100	25.86	-	35.55	-
4.3.	Ventilation energy	100	25.71	-	37.50	-
4.4.	Lightning energy	100	-	48.22	-	105.50
5	Amortisements	100	-	25.71	-	37.49
6	Other expenses	100	-	4.86	-	16.16
II	Working force expenses	100	-	25.70	-	37.48
B	Indirect expenses	100	-	-	-	-
C	Total production expenses	100	-	1.81	-	3.43

CONCLUSIONS

Following conclusions were drawn from studies performed in this paper:

- final production performances are different by working variant and they

are usually better in variant with lower density and higher lightning intensity;

- in variant V_2 unit cost is 1.81% higher than in variant V_1 and in variant V_3 unit cost is 3.43% higher compared to base variant;
- highest losses by expense category have been noted for lightning (48.22% - V_2 and 105.50% - V_3);
- lowest losses are in other expenses category with values between 4.86% in variant V_2 and 16.16% in variant V_3;
- highest savings in unit cost are noted for ventilation energy (37.50% - V_3).

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