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Report on the activities run during year 2010within the framework of the project:

"Influence of conventional and free-range farming systems on the nutritional-dietetic and sanogenic quality of poultry products (meat, eggs) issued from Gallus domesticus species"

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SUMMARY:

O 1. Evaluating the quality of poultry meat from market / purchased directly from the producer, depending on the system of broiler growth

Activity 1.1. Differential acquisition of biological material (poultry meat from the agri-food market in Romania), depending on the technological system used in broilerfarming

Activity 1.2. Meat sampling and preparation for analysis, usage of chicken carcasses - areas of economic and gastronomy relevance (breast, wings, thighs and shanks)

Activity 1.3. Performing chemical analysis under under Weende schematics (moisture, dry matter, ash, protein, fat). Calculation (determination) of meat caloricity

Activity 1.4. Test for meat content in amino acids, fatty acids and cholesterol (gas/ liquid chromatography)

O2. Investigation of quality of chicken eggs from market / purchased directly from the producer, depending on system growth of laying hens

Activity 2.1. Differential acquisition of biological material (hen eggs from the agri-food market in Romania), depending on the technological system used in laying hens farming

Activity 2.2. Eggs sampling and preparation for analysis, separated on components (albumen, yolk)

O1. Aprecierea calitatii carnii de pasare existenta pe piata/achizitionata direct de la producator, in functie de sistemul de crestere al puilor broiler

Activity 1.1. *Differential acquisition of biological material (poultry meat from the agri-food market in Romania), depending on the technological system used in broilerfarming*

In order to set up researches, the biological material was bought (chicken broiler meat) from „Cobb-500" hybrid private breeders acting in the North East area of the country during July/August 2010.

Those farms used two different versions of the husbandry systems:

a) conventional version, most used nowadays, ***rearing on permanent litter, in isolated halls***, throughout 42 days, till the chickens reach an average body weight of 2.3-2.4 Kg/cap.
b) conventional version still trialed, which is inclusively adapted for the familial small farms, meaning rearing on permanent litter in certain hals which allow the chickens access in outer spaces, fenced and grassed, the so-called free-range system**.** Rearing period lasts 42 days, while the live weight is lower than that achieved in the conventional husbandry system (2.05-2.2 kg/cap)

Overall it was used directly after collection from the slaughterhouse, biological materialderived from each 70 heads, male and female in each breeding technology system. Thus, according to origin, the material used (chilled broiler meat) was conventionallydivided into two groups, this coding will be maintained throughout the research, as follows:

- **lotul C** – meat issued from chickens reared on permanent litter, isolated houses, throughout 42 days;

- **lotul FR –** meat issued from chickens reared on permanent litter, in houses with acces to an outer paddock, throughout 42 days.

From the farm level have collected information on bird nutrition and food recipesemerged that have been prepared in accordance with the recommendations guidetechnology, relying on a standard diet of maize-meal type of soybean. They have been using feed additives that could endanger the health of consumers. Technology also hasbeen consistent growth in the operating provisions hybrid, even free-range systemadapted version there is a close monitoring of the microclimate in the halls.

Activity 1.2. *Meat sampling and preparation for analysis, usage of chicken carcasses - areas of economic and gastronomy relevance (breast, wings, thighs and shanks)*

In every case (70 cases in group C and 70 cases in group FR) were harvested approx.50 g of meat for each anatomical area of technological interest and Gourmet, namely:breast (superficial and deep pectoral muscles), wing (muscles, biceps, deltoid andbrachial triceps), upper legs (semimembranosus muscles, and quadriceps femoralsemitendinos), chicken drumsticks (medial and lateral gastrocnemius muscles, cranialtibial). Carcasses from which samples were taken were further processed on the technological flow of the slaughterhouse, boning and machining, to obtain specific foods.

Meat samples thus obtained were separately packed lots and anatomical regions of origin and were left refrigerated temperature to 48 hours. Next, we proceeded to theweighing and mixing each category of evidence by shredding. And at this stage, the samples were labeled to avoid any errors. The mixture resulting from each category ofsamples was dried at 60 ° C and then prepared as a powder, specific analytictechniques used later to determine the gross chemical composition and content ofdifferent nutrients (amino acids, fatty acids, cholesterol).

The amount of biological material collected and prepared for analysis of 10 repetitionsallowed the analytical determination of gross chemical composition and parameters of 4 repetitions for those who help us to characterize the nutritional value of any food product (amino acids, fatty acids, cholesterol).

Data gathered through investigations conducted have been processed with MSExcelspreadsheet application. Thus, the database corresponding variation with strings,each string being encoded according to specific survey information.

There were calculated the usual statistical estimators – mean ($\bar{x}$), variance (S^2), standard deviation (s), standard error ($\pm S\bar{x}$) and variation coeffcient (CV%) using the software built in algorithm. There follows the mathematical relations used in computation:

- Mean ($\bar{X}$): $$\bar{X} = \frac{\sum x}{n}$$
- Variance (S^2): $$S^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}$$
- Standard deviation (s): $$s = \sqrt{S^2}$$
- Standard error ($\pm s_{\bar{x}}$): $$\pm s_{\bar{x}} = \pm \frac{s}{\sqrt{n}}$$
- Variation coefficient (V%): $$V\% = \frac{s \times 100}{\bar{x}}$$

To test the statistical significance of differences between the characters studied,Single Factor ANOVA algorithm was used, included with Microsoft Excel software.

Activity 1.3. *Performing chemical analysis under under Weende schematics (moisture, dry matter, ash, protein, fat). Calculation (determination) of meat caloricity*

Findings of the amount of water and dry matter (DM) in the muscles studied was doneby the oven drying method at 105 ° C (according to SR ISO 1442/1997). In weighingampoules individualized low, filled with sand and brought to constant weight wereadded to samples of mass ≈ 2.5 g, above which were added 5 ml of absolute alcohol,known as desiccated properties of this reagent. With the sample vials and caps wereplaced in the oven termoreglabilă, set to reach a temperature of 105 ° C, parametermaintained for ≈ 24 hours, until complete evaporation of water from parts, as confirmed by the constant weight obtained at the end of the determination.

Dry matter (%DM) was calculated through difference, in accordance with:

$$\%DM = 100-\%WATER$$

In order to measure the quantity of mineral substances (ash) existing in the musclesstudied, using the method of calcination at 550 ° C (standard ISO 936: 1998). Thus,the porcelain crucibles were individualized and brought to constant weight, after whichthey were filled with the test sample, which was approximately 3 g. each meal beforebeing introduced to the calcined crucible was held in Nice, flame of a Bunsen lamp, tocarbonisation of organic substances. When combustion was complete, the containerswere placed inside the furnace, which was scheduled to reach a working temperatureof 550 ° C, this value is maintained for a period of 5h. Since the ash mass were also reported no traces of organic substances crucibles were maintained in the desiccatorand were weighed successively until reaching constant mass.

Findings of increased fat in the muscles studied was performed using Soxhlet method directly on the quantitative extraction apparatus for separating substances from a mixture by using an organic solvent, Velp Scientific model - SER 148 (method specified by the manufacturer of the equipment, the AOAC Official Methods of analysis/1990 and compatible with ISO 1443: 2008). Samples prepared in advance to 60 ° C drying of meat, each with a mass in the range 2.5-3g were packaged in bags of filter paper and they, in turn, were placed in cartridges device, then attached to the 3 extraction column. In pots of boiling solvent, having been cleaned and brought to constant weight by drying oven was added petroleum ether 30-60 ° C (80 ml / cup) and boiling chips uniformity. The three glasses were placed on the heating plate and to launch the device software. At the time of onset of boiling solvent cartridges were immersed in vessels, being kept in this position about 30 minutes, the solvent bath temperature reached 111 º C (Phase Immersion). In the next phase of the program with a duration of 120 minutes, the sample cartridge vessel arises from solvent washing takes place continuously samples the air vapor circulating closed circuit (Washing Phase). At this stage the fat of the sample solvent at the first immersion period, drain the vessels together with solvent extraction. After two hours, the program enters the recovery phase (Phase Recover), lasting 30 minutes and the last remnants of fat along with the cartridges leaking solvent extraction vessels and the reagent is recovered in a beaker collector at a rate of ≈ 60% of the amount originally introduced.When empty vessels full of ether extraction (volatile under the influence of temperature on the boiling plate), the extraction program is interrupted. Extraction vessels are withdrawn from the device and place the columns in the oven for drying and bringing constant weight.

For the determination of total nitrogen materials (MAT) and protein in the muscles studied using the method of Kjeldahl adapted VelpScientifica system consisting of digestion unit and

distillation unit DK6 UDK7 (method specified by the equipment manufacturer - 981:10, AOAC Official Methods of analysis/1990 compatible with ISO 937:2007). Samples, weighed to ≈ 1 g, were transferred in each of the quantitative -6 digestion-tubes, then adding 5.7 g of catalyst mixture (CuSO4 + K2SO4) and 20 ml 95% H2SO4. Tubes were inserted into the alveoli digestion unit was connected to a vapor collection system was launched in cooking and running device software DK6.Thus, digestion of samples was carried out within 210 minutes, the mixture catalyst + sample + reagent successively three levels of temperature reached 120 ° C, 240 ° C, 420 ° C. At the end of the program was high rack for cooling tubes and, before going on stage distillation in each vial were placed by 20 ml-distilled water.

For each distillation, the module consumes 50 ml UDK7 NaOH33% and 50 ml distilled water, the quantity of food being provided by external Erlenmeyer flasks. Each digestion tube, after cooling, was taken over and attached to the port of distillation. The cup final to capture nitrogen solution was filled with 25 ml 4% H3BO3, which were added 5 drops of Tashiro indicator that turns green in alkaline and from pale pink to deep red in acid. After launching the program, distilling took 3 minutes for each sample.

The next step capture solution in the beaker was subjected to titration with 0.2 N H2SO4, by transferring color from green to pale pink.

Content muscles studied nitrogen-free extractive substances (NFE) has emerged through mathematical calculation, the difference is actually left after that, the SU (%) were low proportions of other chemical components, such as mineral or organic, namely:

% NFE = DM% – Ash% – (Lipids% + Proteins%)

To create a broader picture quality nutritivo poultry-meat diet and the calculation wasperformed caloricităţii muscles studied, using theoretical relationship based on thegross amount of heat released from combustion of 1 g of protein, fats andcarbohydrates in the bomb calorimeter, according to relationship:

GE (Kcal/Kg) =5.70 Kcal x g proteins + 9.50 Kcal x g lipids + 4.2 Kcal x g NFE

The results related to thye chemical composition of the assessed samples are given in table and fig. 1.

Table 1

Chemical composition of the meat issued from chicken broilers reared under intensive and free-range systems conditions

Carcass area	Group	Chemical trait	$\overline{X} \pm s_{\overline{x}}$ (g/100g) (n=10)	V%	Min. (g/100g)	Max. (g/100g)
Breast	C	Water	73,76 ±0,13	0,54	73,14	74,34
		Dry matter	26,24 ±0,13	1,51	25,66	26,86
		Ash	1,20 ±0,06	15,23	0,96	1,46
		Lipids	1,25 ±0,04	9,47	1,12	1,45
		Total nitrogen matters	23,35 [a] ±0,20	2,69	22,65	24,33
		NFE	0,44 ±0,07	47,69	0,15	0,79
	FR	Water	74,34 ±0,29	1,21	73,74	76,16
		Dry matter	26,86 ±0,29	3,58	23,84	26,26
		Ash	1,46 ±0,04	8,82	1,08	1,42
		Lipids	1,45 ±0,03	8,81	0,86	1,16
		Total nitrogen matters	24,33 [b] ±0,29	4,02	21,05	23,70
		NFE	0,79 ±0,02	14,29	0,36	0,51

Carcass area	Group	Chemical trait	$\overline{X} \pm S_{\overline{x}}$ (g/100g) (n=10)	V%	Min. (g/100g)	Max. (g/100g)
Wings	C	Water	72,53 ±0,18	0,76	71,83	73,24
		Dry matter	27,47 ±0,18	2,02	26,76	28,17
		Ash	1,09 ±0,03	8,77	0,93	1,31
		Lipids	4,16 ±0,04	2,79	3,95	4,34
		Total nitrogen matters	21,74[a] ±0,17	2,41	21,14	22,55
		NFE	0,46 ±0,01	7,81	0,41	0,53
	FR	Water	73,42 ±0,26	1,12	72,22	74,40
		Dry matter	26,58 ±0,26	3,10	25,60	27,78
		Ash	1,15 ±0,03	7,38	1,01	1,34
		Lipids	3,98 ±0,06	4,52	3,74	4,27
		Total nitrogen matters	20,91[b] ±0,28	4,20	19,89	22,19
		NFE	0,55 ±0,02	11,15	0,46	0,64
Thighs	C	Water	71,51 ±0,18	0,80	70,60	72,16
		Dry matter	28,49 ±0,18	2,00	27,84	29,40
		Ash	0,91 ±0,03	11,57	0,75	1,06
		Lipids	8,09[a] ±0,06	2,40	7,91	8,52
		Total nitrogen matters	18,98 ±0,19	3,15	18,18	19,82
		NFE	0,51 ±0,05	33,26	0,36	0,79
	FR	Water	72,25 ±0,29	1,29	71,19	74,12
		Dry matter	27,75 ±0,29	3,35	25,88	28,81
		Ash	1,05 ±0,02	7,47	0,93	1,16
		Lipids	7,45[b] ±0,17	7,20	6,90	8,25
		Total nitrogen matters	18,76 ±0,35	5,88	16,24	19,87
		NFE	0,50 ±0,04	25,09	0,31	0,65
Shanks	C	Water	71,08 ±0,40	1,76	69,03	73,67
		Dry matter	28,92 ±0,40	4,33	26,33	30,97
		Ash	0,85 ±0,03	12,10	0,71	0,99
		Lipids	7,27[a] ±0,06	2,64	6,93	7,62
		Total nitrogen matters	20,23[a] ±0,40	6,32	17,40	21,80
		NFE	0,57 ±0,05	29,70	0,22	0,85
	FR	Water	73,07 ±0,39	1,68	70,77	74,24
		Dry matter	26,93 ±0,39	4,57	25,76	29,23
		Ash	1,04 ±0,03	7,67	0,91	1,16
		Lipids	6,93[b] ±0,20	9,31	6,31	8,25
		Total nitrogen matters	18,51[c] ±0,43	7,31	16,89	21,32
		NFE	0,45 ±0,05	38,59	0,02	0,69

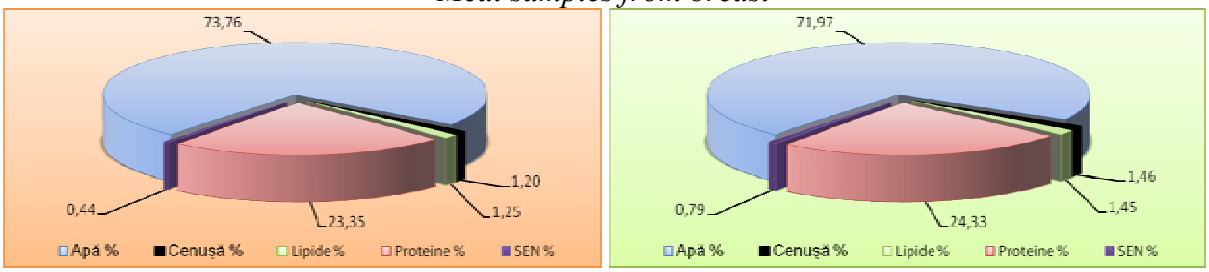
ANOVA: between two groups, for each carcass region and trait:

[ab] significant differences ($\hat{F}$>F. Tab. α 0.05 at 1;18 GL);

[ac] distinguished significant differences ($\hat{F}$>F. Tab. α 0.01 at 1;18 GL).

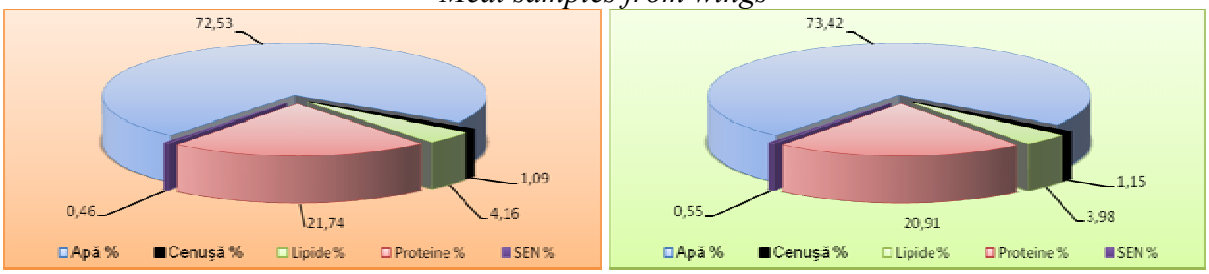
The moisture content ranged between 71.08 ± 0.40 g% (chicken drumsticks, group C)- 74.34 ± 0.29 g% (breast, FR group). The proportion of dry matter varied inverselycompared to that of water (26.86 ± 0.29 g% in breast meat, free-range system - 28.92± 0.40 g% in the meat of the lower legs, from chickens reared in conventional system).This low water content of red meat is linked with a fairly high fat content. However, inthe same areas of housing, the water content was lower in chickens kept in halls blind,the permanent litter.

Meat samples from breast



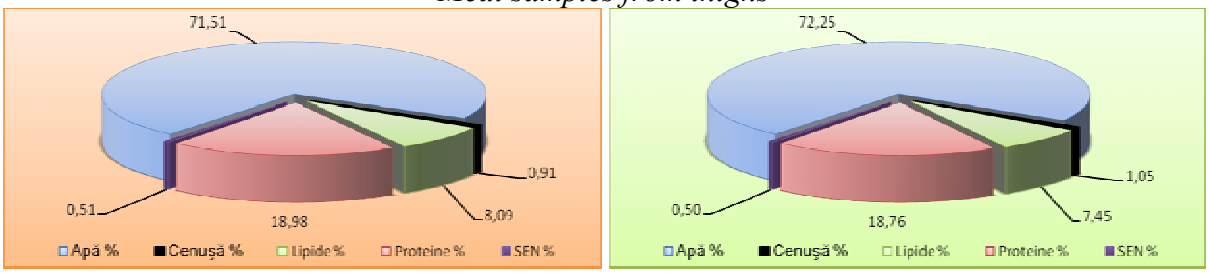
LC LFR

Meat samples from wings



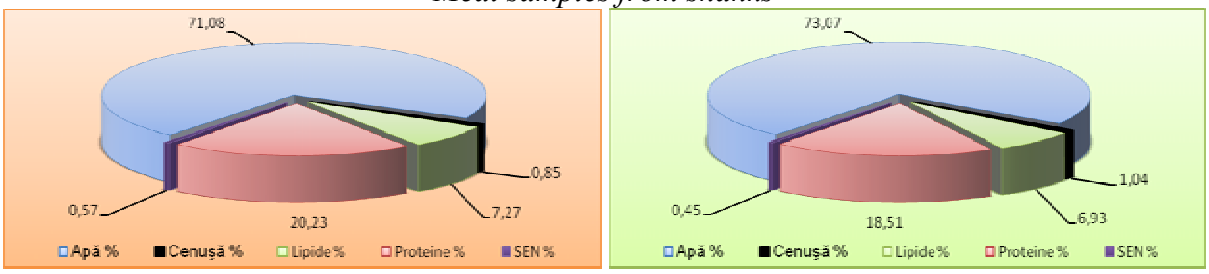
LC LFR

Meat samples from thighs



LC LFR

Meat samples from shanks



LC LFR

Fig. 1 – Proportion of the main chemical constituents in meat samples, issued from chicken broilers reared within the intensive and free-range system

In the dry matter, ash was 0.85 ± 0.03 g% (chicken drumsticks, conventional system maintenance) - 1.46 ± 0.04 g% (pectoral muscle, free range system). Slightly higher proportion of mineral substances in meat chickens had access to grassy paddock may, on the one hand, a better fixing of minerals in the tissues under the influence of solar radiation or a higher intake of these nutrients in the environment. It would be interesting to complete these investigations with a series of determinations of fineness on the amounts of macro and micro nutrients in muscle tissue and

bone, to play better in the flow system to increase the uptake of minerals and their transmission in the finished product, meat poultry.

The proportion of fat per 100 g product varied widely, from a minimum of 1.25 ± 0.04 g% (chest meat) - 8.09 ± 0.06 g% (upper thigh muscles). For the same parameter were no statistically significant differences (> F. Tab. A from 0.05 to 1, 18 GL) between the two groups analyzed, ie samples from the upper thigh (8.09 ± 0.06 g%-group C vs. 7.45 ± 0.17 g%-FR group) and those collected from the lower legs (7.27 ± 0.06 g%, group C, compared with 6.93 ± 0.20 g%-FR group). Although the FR group values are lower, the situation can be explained by higher energy consumption of these birds, the uniformity of nature was better analyzed samples from group C (v = 2.40 to 2.46%) than that calculated the FR group (v = 7.20 to 9.31%). Keeping poultry inside the house closed, the microclimate conditions better controlled and more restricted freedom of movement has contributed to increased uniformity in flocks from which tissue samples were taken.

In terms of protein content were observed with statistically significant fluctuations in value between groups studied. Also, there was a high amplitude of variation of parameters investigated, when the comparison was made between the cut parts of the carcass. For example, for meat taken from the chest, the proportion of total nitrogen was 23.35 ± 0.20 g% in group C, compared to 24.33 ± 0.29 g% in the FR group (difference statistically significant). With the exception of samples from the breast (white meat) for those collected from the wing and thigh were determined analytical values of total nitrogen materials cheaper FR group compared with group C. The differences were statistically calculated protein content of meat from the wings (21.74 ± 0.17 g% in group C vs. 20.91 ± 0.28 g% in group FR) and separately significant (> F. Tab. α from 0.01 to 1 , 18 GL) for the same parameter studied samples from the lower legs (18.51 ± 0.43 g% in group FR protein, compared with 20.23 ± 0.40 g% proteins in group C). Suppose that the lower values of chicken meat which had access to the paddock outside can be made also on account of lower food assimilation due to an intense exercise and thermoregulatory effort. This assimilation has contributed less to obtain a lower body weight at the end of the 42 days of growth, compared with intensive technological variant. It would therefore be recommended several ways to counteract this undesirable situation: a rethinking of the nutritional requirements of broilers reared free-range system, the use of hybrid technology especially created for this alternative, raising broilers for more than 42 days when they have access outside the hall, like the French Label Rouge system.

NFE values varied within normal limits for the food raw matter we studied.

Results on the chemical composition of the samples studied were used to calculate different caloricitatea meat from broiler farming systems. Values are given in Table 2.

Thus, higher values are noted in group C, for all anatomical regions of the carcass, compared with those calculated for samples from the FR group. This difference is due mainly differences in the lipid component of the chemical composition of meat from the two groups investigated. e areas of housing, minimum values were recorded for meat sampled at chest level (165.44 ± 0.83 Kcal/100g in group C and 139.60 ± 1.64 ingroup Kcal/100g FR), while maxima were found at the upper thighs (179.76 ± 1.70 g ingroup C Kcal/100 respectively Kcal/100 187.22 ± 1.21 g in group C). There were nostatistically significant differences.

Table 2

Caloricity of the meat issued from chicken broilers reared within intensive and free-range technological systems

Carcass region	Group	Caloricity $\overline{X} \pm S_{\overline{x}}$ (Kcal/100g) (n=10)	V%	Min. (Kcal/100g)	Max. (Kcal/100g)
Breast	**C**	165,44 ±0,83	1,78	143,50	150,39
	FR	139,60 ±1,64	3,72	131,46	145,88
Wings	**C**	187,22 ±0,99	1,90	160,65	169,41
	FR	159,29 ±1,48	2,94	152,76	167,04
Thighs	**C**	187,22 ±1,21	2,04	182,28	193,72
	FR	179,76 ±1,70	2,94	172,23	188,48
Shanks	**C**	186,78 ±2,37	4,02	171,90	200,21
	FR	173,23 ±2,50	4,57	165,47	188,66

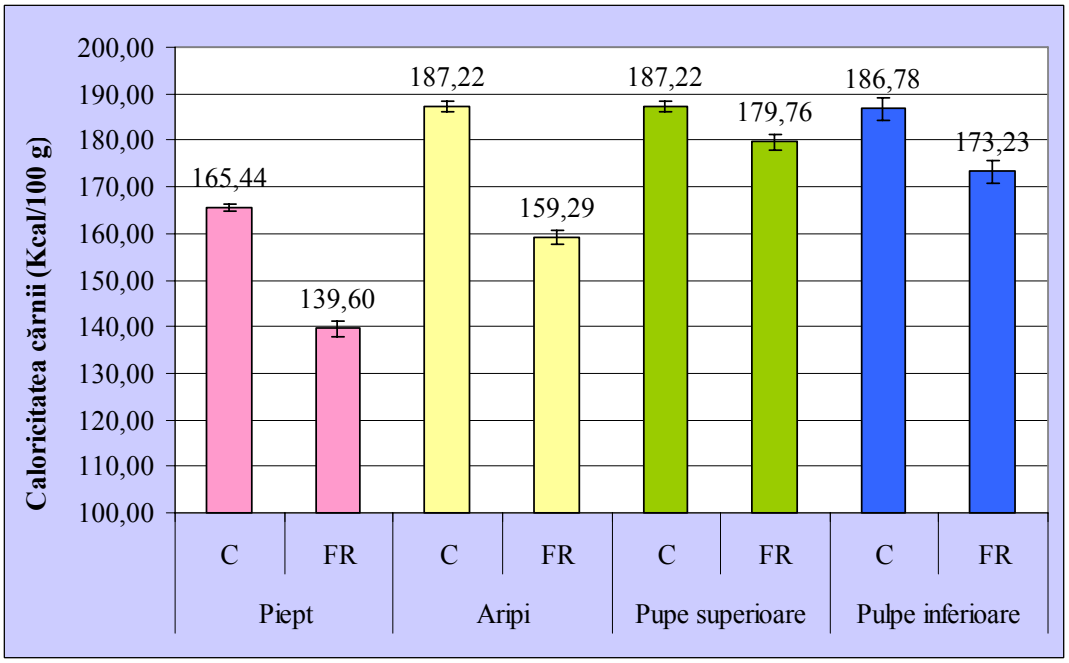


Fig. 2 – Caloricity of the meat issued from chicken broilers reared within intensive and free-range technological systems

Activity 1.4. *Test for meat content in amino acids, fatty acids and cholesterol (gas/ liquid chromatography)*

Amino acid content in meat was determined by liquid-chromatographic analysis methods (High Precision Liquid Cromatography - Thermo Electron), according to SREN ISO 13903:2005. Muscle content of fatty acids and cholesterol studied was assessed in the same laboratory using gas chromatographic methods, according to AOCS What referential 1f-96.

Values on the protein quality of meat samples studied are detailed in Table 3.

Table 3

Aminoacids content of the meat issued from chicken broilers reared in intensive and free-range technological system

Aminoacids	U.M.	C group – intensive technological system												FR group –free range technological system											
		Breast			Wings			Thighs			Shanks			Breast			Wings			Thighs			Shanks		
		$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%	$\overline{X}$	$\pm S_{\overline{x}}$	V%
Glutamic acid	g/100g	0,92	0,02	8,74	1,17	0,02	7,84	1,19	0,03	9,31	3,73	0,14	15,02	0,72	0,03	16,78	1,23	0,08	26,09	1,27	0,08	25,19	3,42	0,11	12,88
Serine	g/100g	9,37	0,25	10,67	9,29	0,28	12,17	10,54	0,33	12,44	6,42	0,31	19,31	9,69	0,35	14,45	9,65	0,42	17,41	11,30	0,42	14,87	6,28	0,46	29,30
Histidine	g/100g	3,48	0,09	10,34	3,89	0,10	10,47	1,66	0,12	28,44	0,85	0,08	37,85	3,48	0,11	12,66	4,05	0,19	18,75	1,80	0,11	24,46	0,85	0,07	33,12
Glycine	g/100g	3,24	0,07	8,63	3,22	0,08	10,00	3,86	0,09	9,67	1,71	0,11	25,73	3,60	0,24	26,69	3,33	0,21	25,24	4,13	0,21	20,34	1,69	0,18	42,70
Alanine	g/100g	1,03	0,04	15,59	1,30	0,04	12,60	0,90	0,05	21,21	1,04	0,11	42,49	1,22	0,15	49,14	1,43	0,12	33,57	0,98	0,07	28,44	0,96	0,08	33,19
Tyrosinw	g/100g	3,30	0,03	3,63	3,44	0,03	4,01	2,16	0,04	6,83	4,00	0,09	9,00	4,34	0,14	12,90	3,56	0,18	20,23	2,32	0,18	31,02	3,70	0,21	22,73
Prolinw	g/100g	0,37	0,02	21,81	0,28	0,02	33,33	0,13	0,01	31,15	0,19	0,01	21,05	0,50	0,02	16,16	0,31	0,02	25,97	0,16	0,01	25,08	0,20	0,01	20,05
Cysteine	g/100g	3,11	0,14	18,03	3,36	0,16	19,18	1,91	0,19	39,05	1,72	0,13	30,24	2,45	0,18	29,35	3,48	0,22	25,32	2,07	0,12	23,21	1,69	0,18	42,58
Threonine	g/100g	1,64	0,06	14,65	1,70	0,07	16,22	1,22	0,08	26,34	0,55	0,06	43,56	1,72	0,09	20,91	1,77	0,16	36,25	1,32	0,08	24,24	0,56	0,06	43,18
Valine	g/100g	0,79	0,05	25,28	1,02	0,06	22,47	0,47	0,03	25,49	0,68	0,08	46,78	0,62	0,05	32,18	1,07	0,08	29,99	0,52	0,05	38,28	0,68	0,03	17,54
Methionine	g/100g	3,33	0,11	13,23	4,01	0,13	12,61	3,97	0,15	14,77	3,26	0,13	15,96	3,65	0,19	20,84	4,14	0,23	22,21	4,27	0,18	16,87	3,19	0,16	20,05
Phenyl-alanine	g/100g	4,92	0,08	6,51	5,70	0,09	6,45	4,72	0,11	9,05	2,99	0,12	16,07	5,68	0,16	11,26	5,89	0,18	12,23	5,04	0,24	19,03	2,74	0,21	30,70
Isoleucine	g/100g	2,11	0,11	20,81	2,36	0,13	21,46	1,78	0,15	33,05	0,50	0,04	31,78	2,32	0,21	36,19	2,45	0,15	24,51	1,91	0,18	37,73	0,50	0,02	15,89
Leucine	g/100g	0,71	0,05	28,33	0,68	0,06	33,90	0,70	0,07	38,25	0,50	0,02	15,96	0,85	0,04	18,77	0,72	0,03	16,66	0,77	0,05	25,97	0,47	0,03	25,52
Lysine	g/100g	3,26	0,14	17,19	3,29	0,14	17,18	5,06	0,17	13,17	6,38	0,18	11,28	3,66	0,11	12,01	3,62	0,23	25,42	5,40	0,23	17,03	6,24	0,26	16,68

Protein's amino acid profile of poultry meat analysis are typical for this food. It is worth mentioning the levels of essential amino acids, such as lysine, methionine, leucine andisoleucine. Thus, it appears, in most cases, higher values for meat from chickensreared free-range system, but with no statistically significant differences. Perhaps thisdistinction in favor of meat from birds that had access to the paddock due to physical movement amplitude and frequency of an intense and possibly turn-over due to ahigher metabolic protein. Investigations must be thorough to find clear correlationsbetween protein profile of meat and breeding system. Such research will be conducted in the following intermediate steps. Worth also noted higher levels of glycine andproline in meat from FR group, indicating a higher collagen content in these birds.

Also, higher amount of glutamic acid in red meat, as evidenced in the presentresearch, contributes to the taste sensation when meat is cooked, especially throughroasting, hence the consumer preference for other parts of the carcass than chest cut.Values for this amino acid were similar when the comparison was made between thetwo farming systems.

In Table 4 are presented results concerning the quality of fat in meat samples studied.

It is noted higher values of cholesterol in red meat to white meat, meat from bothgroups. Comparison between the variations of growth, there is a slight decrease incholesterol content in muscles of chickens have outdoor access to the paddock,compared with those who have been maintained exclusively within the hall. The lowercholesterol content in meat was determined from the chest (LC-58mg%, 56mg%-LFR)and the maximum values in the meat constituent of the upper thigh (LC-79mg%,75mg%).

Table 4

Fatty acids and cholesterol content of the meat issued from the chickens reared within the intensive and free-range system

Assessed compound	U.M.	C group – intensive technological system				FR group – free range technological system			
		Breast	Wings	Thighs	Shanks	Breast	Wings	Thighs	Shanks
Saturated fatty acids:	g/100g	**0,39**	**0,91**	**1,09**	**1,07**	**0,36**	**0,89**	**1,06**	**1,05**
12:0	g/100g	0,01	0,02	0,02	0,05	0,01	0,02	0,05	0,04
14:0	g/100g	0,02	0,05	0,04	0,05	0,03	0,05	0,09	0,02
16:0	g/100g	0,22	0,62	0,51	0,58	0,24	0,07	0,62	0,58
18:0	g/100g	0,14	0,27	0,28	0,29	0,14	0,29	0,34	0,29
Monounsaturated fatty acids:	g/100g	**0,35**	**0,87**	**1,21**	**1,13**	**0,33**	**0,84**	**1,18**	**1,09**
16:1	g/100g	0,03	0,08	0,21	0,13	0,03	0,11	0,19	0,11
18:1	g/100g	0,29	0,75	0,99	0,78	0,26	0,74	0,81	0,21
20:1	g/100g	0,01	0,02	0,01	0,02	0,01	0,03	0,01	0,01
22:1	g/100g	0,01	0,02	0,02	0,01	0,01	0,01	0,01	0,01
Poliunsaturated fatty acids:	g/100g	**0,33**	**0,85**	**0,98**	**0,86**	**0,33**	**0,82**	**0,94**	**0,89**
18:2	g/100g	0,19	0,47	0,71	0,68	0,17	0,39	0,68	0,16
18:3	g/100g	0,02	0,03	0,02	0,03	0,02	0,04	0,04	0,03
20:4	g/100g	0,05	0,05	0,08	0,06	0,04	0,06	0,07	0,04
20:5 ω-3	g/100g	0,02	0,01	0,01	0,02	0,02	0,01	0,01	0,03
22:5 ω-3	g/100g	0,04	0,03	0,03	0,03	0,05	0,04	0,05	0,05
22:6 ω-3	g/100g	0,05	0,04	0,04	0,05	0,05	0,05	0,05	0,05
Cholesterol	mg/100g	**58**	**66**	**79**	**74**	**56**	**62**	**75**	**73**

For fatty acid content, there is an almost balanced ratio of 1:1:1 between the saturated, monounsaturated and polyunsaturated, the breast meat and wings level. It is worth mentioning the slightly increased ω-3 polyunsaturated AG in samples from chickensfree-range system nursery. However, no final conclusion can be drawn based on data filtering obtained so far as they should be supplemented with analytical determinations on meat produced in a pilot experiment, the conditions on the feeding of birds are wellknown and mastered, knowing that diet influences the lipid profile is overwhelmingly opposed, for example, the protein.

O2. Investigation of quality of chicken eggs from market / purchased directly from the producer, depending on system growth of laying hens

Activity 2.1. *Differential acquisition of biological material (hen eggs from the agri-food market in Romania), depending on the technological system used in laying hens farming;*

Acquired biological material was represented by eggs produced by hens in threeversions operating system technology and was divided into three groups needed to carry out research, as follows:

- Lot B - 90 eggs from the maintenance system of hens in battery cages, in the halls blind - super-operating system (indicated by number 3 in the code printed on mineral shell eggs);
- Lot S - 90 eggs from hens system maintenance on land, permanent litter the halls blind - intensive operating system (indicated by number 2 in the code printed on mineral shell eggs);
- Lot FR - 90 eggs from hens maintenance system ground, litter standing in the halls that allow birds access to an outdoor paddock housing (indicated by the code number printed on a mineral shell eggs).

Activity 2.2. *Eggs sampling and preparation for analysis, separated on components (albumen, yolk)*

After a preliminary cleaning of the mineral shell eggs from the 3 lots of experience, separated whites and yolks of 90 eggs for each batch corresponding to B, S and FR.

Next, we proceeded to the dehydration of biological material in an oven at a temperature of 60 ° C in appropriately labeled containers. Following dehydration, samples were ground to powder as specific analytical techniques used later to determine the gross chemical composition and content in different nutrients (amino acids, fatty acids, cholesterol). Samples thus prepared were packed tightly and stored by criogenation, designed research activities included the following single stage 2011.

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