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SUMMARY OF Ph.D. THESIS

RESEARCH ON SOME HYGIENIC FACTORS INFLUENCE ON BROILERS HEALTH, PRODUCTIVITY AND MEAT QUALITY

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The „Research on some hygiene factors influence on broilers health, productivity and meat quality” study has proved to be at the end a complex multi- and interdisciplinary research. The problems of technological feature have joined the hygiene problems because of the wide range of poultry farming types: the intensive-industrial system, the semi-intensive household system, the half-free ecologic system and the free extensive system. Thus, there has been possible to track down the basic similarities and differences between all raising systems, mainly refering to the productivity and meat quality issues.

Studies and tests have been done in many industrial farms and smaller households, as following:

- Ave Impex Ltd. Satu Mare, a company member of the “broiler” chain, having separate units for incubation, heavy breeders reproduction, broiler raising sector, slaughterhouse, meat processing plant and private stores. The company has modern breeding facilities with Big Dutchmann technology and is relying on a high meat quality chicken cross-breed – Cobb 500. The environmental conditions and feeding are automatically controlled and the general management is up-dated having the SREN ISO 22000 and ISO 9001:2000 quality management systems implemented.

- Adrian Farm – Livada, Satu Mare district, has a semi-intensive raising system in a 1000 square meters raising unit; the main operations are being manually done; meat chickens are slaughtered at 56-60 days in the conventional system and 81-90 days in the ecological system.

- Family farms with traditionally extensive system, using very heterogeneous biologic material, local breeds and cross-breeds, slaughtering chickens at 3-6 months of age upon the family needs, being tested also the Cobb 500 cross-breed with 81 days slaughtering period under these breeding conditions. The raising facilities are of traditional type, no exta-heeting. As a general rule, under this system chickens are bred only in spring-summer time; feeding is of household type with acces to grassyards.

The researches done at Ave Impex Ltd. Satu Mare, a company using an intensive breeding system, regarding the technology and hygiene influence on chicken welfare, productivity and meat quality, have highlighted the following aspects:

- At Ave Impex Ltd. Satu Mare, having both breeding and processing units, there have been implemented the EU regulations and NAVSFS rules as regarding the
demarcation of operating areas and protection zone, traffic control, sanitation area existence, visitors restricted access and wild and domestic predators control.

- In this unit there is implemented a severe indemnity program including vaccination, vitamins administration and antistress therapy, the program being approved and supervised by VSFSD Satu Mare.

- Hygiene control is done under the NAVSFS norms and the EU legislation through the Staphylococcus test and TGN test on 10 assays from different raising hall points of 100 cm² each. The tests have been done for 58 raising halls and results have been unsatisfying and tests have been repeated in 8 halls representing 13.8% of those previous examined. At least 70% of the assays have been taken from surface in contact with chickens, such as: floor, walls, pillars, fences, feeding and water supplying system, a.s.o.

There has been studied the environmental conditions evolution on 54 breeding halls for different chicken lots and time periods. All the environment parameters have been measured: temperature, humidity, ventilation, lightness, noxious gases (CO₂, NH₃, H₂S) and sanitary indicators (TGN/m³); also, there have been tested the main germs of hygiene impact: Staphylococcus, Streptococcus, Gram-negatives and fungi and it has been estimated the harmful potential of the microorganisms through the share of hygiene indicators clusters in the overall TNG/m³. The test results have driven to the following conclusions:

- Evaluated after Petkov key, adapted by Man C. (1986), the microclimate in the 54 raising halls (32 halls in Vetiş and 22 halls in Botiz) has shown the following ranking:
  - excellent (95-100 points) – 6 halls (19%) in Vetiş and 4 halls (18%) in Botiz;
  - good (90-95 points) – 16 halls (50%) in Vetiş and 10 halls (46%) in Botiz;
  - satisfactory (70-90 points) – 6 halls (19%) in Vetiş and 5 halls (23%) in Botiz;
  - unsatisfactory (below 70 points) – 4 halls (12%) in Vetiş and 3 halls (13%) in Botiz.

The general observation is that 36 breeding halls (67%) have good and excellent environment conditions while raising the chickens, no matter the time period.

The overall data regarding the indoor environment in these modern endowed and up-dated technology breeding halls have proved good hygiene and welfare conditions which are enhancing competitive outputs both at national and European level.
The researches done as regarding **the feeding hygiene** of **Cobb-500** cross-breed, in respect of the feeding system, techniques and recipes (the nutritional value) in corelation with the chicken demands have driven to the following conclusions:

- At Ave Impex Ltd. Satu Mare the whole feeding process is controlled: fodder recipes are computer optimized, also the feed distribution. Chicked are fed on demand. The fodder consumption is permanently monitorized and 2% of chicken are weighted to check the growth rate.

- As regarding the feeding program, beside the „Cobb 500 – Technical guide” and the „Cobb-500 performancesc et recommendations nutritionnelles” brochure, this company is applying a modified scheme, like below:
  - Starter fodder days 1-20
  - Growing fodder days 21-33
  - Finishing fodder from day 33 until slaughtering (days 39-42)

- The different fodder recipes are compiled after the most up-dated requirements on poultry breeding:
  - The *starter formula* for Cobb 500 (days 1-20) contains: maize, wheat, soybean grit, fish flour, maize germs, calcium carbonate, natrium chloride, natrium bicarbonate, essential amino acids of chemical origin, enzymes, acid controllers and other nutitional additives. The nutritive value is correspoding to EMP 3150 Kcal/Kg, R.P. 22.5%, index EMP/R.P. 140 and the EMP/Lysine, MDL/LDP, TRD/LDP, TIP/LDP indices are optimum, showing fodder digestion and conversion efficiency
  
  - The *growing formula* (days 21-33) consists of 60% maize, soybean, gluten, maize oil, vitamin and mineral premix (1%), amino acids, enzimes, other additives including funghi, Coccidia parasite and acid controllers. The nutritive value is moderate: EMP 3200 Kcal/Kg, R.P. 20%, index EMP/R.P. 160, EMP/Lysine 2.67, MDP/LDP 0.58, MCD/LDP 0.79, TIP/LDP 0.2.
  
  - The *finishing formula* (day over 33) contains 59% maize, soybean, flour, maize oil, amino acids, enzimes and 1% vitamin-mineral premix. The nutritive value is EMP 3118 – 3341 Kcal/Kg, R.P. 19.5%, index EMP/R.P. 171. Other nutritive indices have also optimal values and, in addition, this formula expels from the ingredients list those which are of consumers awareness, like drugs, fish flour, meat flour and
Coccidia controllers.

The researches done as regarding the drinking water hygiene, also in respect of the chicken water consuming influence factors determination, have driven to the following conclusions:

- The water source and the water distribution outlet is of ultimate generation, thus the water quality is organoleptically, physically, chemically and bacteriologically corresponding.
- The daily water consumption is depending on the chicken age, feed quantity and quality and indoor environment conditions (temperature and humidity). Observations have highlighted the following:
  - Chicken up to 7 days are consuming 161 g (23 g/capita/day), 210 ml water (30 ml/capita/day) and the fodder : water index is 1.3 : 1.
  - In the next few weeks the same coefficient is inbetween 1.44 : 1 and 1.7 : 1.
  - In the growing period (39 days for the autumn period lots), helped by the good indoor environment, 20000 chickens have consumed 87800 kg fodder and 133400 l of water, the fodder : water index being 1.52 : 1, which value is normal.
  - Compared to the „Cobb 500 Technical guide” the water consumption has been a little bit higher, but the guide takes the 21°C temperature as reference while the indoor temperature has had smooth fluctuations during our study.
- Besides the fodder quality and intake, another factor which is influencing the daily water consumption is the inside temperature, especially in the over 30 days chicken case. For several 31 - 39 days chicken lots there has been monitored the fodder and water consumption and the fodder : water index in different environment conditions (L1 = 20–24°C; L2 = 25–29°C; L3 = 30–32°C). The results have been the following:
  - The comparative lot L1 has consumed fodder and water in normal quantities, the fodder : water index being 1.6 : 1;
  - L2 - raised at higher temperature (25–29°C) has had a lower fodder consumption (by 5.2%) and a higher water consumption (2.4 times more) compared to the check lot, the fodder : water index being 4.1 : 1. The differences are statistically highly significant (p < 0,001);
L3 - raised at excessive high temperatures (over 30°C) has had dramatically reduced the fodder consumption (by 21.6%) while the water consumption has increased 2.8 times, the fodder : water index being 5.1 : 1. The differences are statistically highly significant (p < 0.001), too.

The efficiency as regarding the weight gain and fodder consumption in the Cobb-500 chicken intensive breeding shows that:

- In 2002 – 2004, when units were not yet modernized and HYBRO and ISA cross-breeds were raised, there have been obtained the following performances:
  - HYBRO: body weight 1702–1892 g at 42 days; daily weight gain 37–42.9 g; fodder consumption rate 1.99–2.05 kg/kg live weight; the results being smoothly below the biologic potential;
  - ISA: body weight 1911–2013 g at 42 days; daily weight gain 45.9–50.2 g; fodder consumption rate 1.72–1.80 kg/kg live weight; the results being appreciated as satisfactory, taking account the breeding conditions.

- In 2005 – 2007 the farms have switched to Cobb-500 and the breeding sheds have been modernized and the technology up-dated for 1,000,000 chickens. The results have been better: body weight at 39–40 days was 2050–2099 g, daily weight gain 47.87–51.29 g and fodder consumption rate 1.82–1.88 kg/kg live weight.

- In 2008 – 2009, for the approximately 5,000,000 raised chicken, there have been obtained slaughtering weights of 2212–2286 g, which are considered to be very competitive;

- The daily weight gain in the growing period has been 57.4 g, by 4.2% below the biologic potential („Cobb-500 Technical Guide”), but very good compared to other poultry farms in Romania. In its evolution, the daily weight gain is passing through several interesting stages. The acknowledgement of these stages could lead to breeding system improvement. For instance:
  - The startup period (5–10 days) is by 3.8 – 14.2% behind standard. At 15–20 days the daily weight gain is by 4–8% ahead standard. After day 25 the daily weight gain is dropping compared to standard due to some negative factors.
  - The highest daily weight gain has been 59.769 g and the lowest 46.770 g, in compliance with indoor welfare conditions, showing that improvements are still available.
• **The fodder consumption** and **consumption rate** has been satisfactory. Compared to the standard consumption of 4200 g, when the resulted body weight is 2456 g with a rate of 1.719 kg/kg live weight, the fodder consumption in the company has been inbetween 3500 and 4500 g and the slaughtering body weight 1.864 – 2.372 kg, with a consumption rate of 1.701 kg; the mean annually rate being inbetween 1.78 and 1.86 kg, considered to be satisfactory.

• Among the efficiency influencing factors there have been studied also the indoor environment conditions and season. The researches driven in the most appropriate and unappropriate sheds have driven to the following conclusions:
  - In exceptional sheds (98 points under the Petkov key) chicked have achieved in 39 days an average body weight of 2.372 kg and a mean daily weight gain of 59.769 g at a fodder consumption rate of 1.701 kg and mortality losses of 2.56%.
  - In the most unappropriate sheds, due to some undesired accidents, chicken have yield an average live weight of 1.864 kg, a mean daily weight gain of 46.77 g at a consumption rate of 1.960 kg and mortality losses of 14.06%.
  - The efficiency differences between the excellent and poor breeding conditions are statistically highly significant (p < 0.001) for all the studied indicators.
  - There were no significant differences between the standard „Cobb-500 Technical Guide” efficiency indicators and those obtained for the studied breeding unit.

The researches as regarding the **interdependence of hygiene and technology level, farm biosecurity, chicken welfare and mortality losses** in the intensive breeding system have driven to the following results:

• *The mean mortality losses* in 2004 – 2009 has been below 5%, most frequently in between 3.5–4.4% in Vetiş farm and 2.97–3.3% in Botiz farm. The lowest mortality losses/lot have been of 3.62% and the highest of 5.12%. The lowest overall losses/shed have been of 2.97% and the highest of 14.06%, except of three accidents.

• *The seasonally mortality losses* shows no significant influence of the season in poultry breeding. In Vetiş farm the highest losses are being recorded in spring and winter and the lowest losses in summer time while in Botiz farm the summer losses are smoothly higher than the annualy mean. The general observation is that small chickens (1–2
weeks) are mostly dying in winter and spring while the older chickens (5–6 weeks) are mostly dying in summer time.

- **The dynamic of losses induced by poultry age** study has driven to interesting conclusions, some being „standard deviations”. Thus:
  - The losses recorded in the first week-life were 16.7% (Vetiş) and 24.6% (Botiz) of the overall mortalities per lot and per farm, compared to 50% cited in the speciality references.
  - In Vetiş farm, for four chicken lots raised in 2008, the share of losses by chicken age (in weeks) of the overall losses has been as following: 1 week - 16.7% (15.8%–18.3%), 2 weeks - 16.1% (11.4%–21.0%), 3 weeks - 24% (21.9%–27.9%), 4 weeks - 16.2% (13.9%–18.0%), 5 weeks - 18% (15.0%–23.1%), 6 weeks - 9% (7.3%–10.3%). There is obvious the highest loss rate at 3 weeks age, mainly for the spring lots where the poultry density was higher.
  - In Botiz farm the losses induced by age have been rather balanced: 1 week - 24.6% (19.5%–30.7%); 2 weeks - 16% (14.7%–17.7%); 3 weeks – 18.7% (18.3%–19.2%); 4 weeks – 14.9% (11.8%–16.8%); 5 weeks – 15.8% (11.3%–19.1%); 6 weeks - 10% (9.0%–11.4%). It can be noticed the result of the lot 4 (winter time) where 70% of the overall losses have been recorded in the first 3 weeks, after that losses being rather small.

- **As regarding the mortality losses dynamic induced by the welfare and environment conditions** in the breeding halls, the results have been as following:
  - In the most appropriate halls the recorded losses were inbetween 2.97% (Vetiş) and 2.56% (Botiz) while in the opposite case the losses were of 14.06% (Vetiş) and 13.62% (Botiz).
  - For both farms the differences between best and worst condition figures have been statistically highly significant (p < 0.001). The differences between the best and the worst results compared to the mean have been statistically significant (p < 0.5).
  - The **mortality main reasons** study, done by clinical and anatomopathological examination and bacteriological tests has highlighted the following conclusion: the most mortality cases are induced by the so called „technopaties”, meaning the disorders arisen from the disparities between the physiological demands of this so called „anabolic monster” which is Cobb 500 and the factors contingence.
The overall conclusion as regarding the Ave Impex Ltd. Satu Mare sanitary conditions is that results in this respect are outstanding, the European Economic Factor (EEF) being of 280 – 290 points compared to the Romanian mean EEF of 251.65 points, however below the Cobb 500 standard of 300 points.

The researches as regarding the **hygiene and technology influence on Cobb 500 chicken** raised in semi-intensive system (L1 and L2) and extensive (L3) have driven to the following partial conclusions:

- **Except for the days 1-20 temperature which was below the confort standard, all the other parameters have been excelent; this is not feasible in the intensive system.**

- **As regarding the fodder consumption in the growing period (60 days), L1 has recorded 8.40 kg fodder/capita; L2 – 9.40 kg mixed fodder (1:1 growing formula + farm mix (70% maize + 30% wheat); L3 - 7.28 kg farm mix (ground cereals + alfalfa). The energy and protein demand has been fulfilled 100% in teh L1 case, 85% in the L2 case and 60% in the L3 case.**

- **As regarding the chicken live weight dynamic in semi-intensive and extensive system, the results show the following situation: L1 has achieved 3.491 ± 0,036 kg live weight at 60 days, L2 2.484 ± 0,025 kg and L3 1.280 ± 0,030 kg . The differences between the three lots have been statistically highly significant (p < 0,001).**

- **As regarding the daily weight gain in the growing period, the results were as following: L1 – 57.1 g; L2 – 40.73 g; L3 – 20.67 g; the general assessment is „good” in the L1 case, „satisfactory” for L2 and „unsatisfactory” for L3 compared to Cobb 500 biologic potential. The differences between the three lots have been statistically highly significant (p < 0,001).**

- **As regarding the fodder consumption rate, the results have been as following: 2.41 kg/kg in the L1 case; 3.62 kg/kg in the L2 case and 4.12 kg/kg in the L3 case; all records have been appraised as normal. The differences between the three lots have been statistically highly significant (p < 0,001).**

- **As regarding the mortality losses, the records have been as following: 4% in the L1 and L2 cases and 5.60% in the L3 case; the differences have no statistically significance.**
The researches as regarding the **hygiene and technology influence on poultry** raised in traditional extensive system have driven to the following conclusions:

- In over five decades of poultry breeding development worldwide and in Romania, there is still in place the traditional way of poultry farming in our country. The traditional farming model is the free range, outdoors system.

- The study of the „traditional poultry farming model” in Satu Mare region has highlighted four main meat chicken raising methods:
  - **Method A:** breeding with hatching hens (chickens born from eggs incubated by broody hens);
  - **Method B:** breeding the hatched broods in heated spaces;
  - **Method C:** breeding chickens born from eggs incubated in domestic incubators;
  - **Method D:** breeding broods purchased from intensive farms.

- The main traits of sanitary and technology issues in the traditional breeding system:
  - **Method A:** the farmer is collecting 50-60 eggs and distributes them to 3-4 hatching hens; the broods are then reared by the hens. Feeding is done with traditional fodder: grain flour, boiled eggs, cow cheese, green forage. Rearing is done outside in day time and inside the shed by night. Normally, the lots are spring-summer poultries. Slaughtering is made at 4-5 months, when chickens are reaching 1.3-1.6 kg live weight, for the family needs.
  - **Method B:** 5-6 hatching hens are gathered together, so there will be about 60-120 broods born; a heated shed is prepared having natural and artificial light source and a straw litter. Feeding is identical to the A method; at 4-5 months of age chicken gain 1.2-1.6 kg.
  - **Method C:** broods are beared 4 weeks in heated sheds on litter, than trasferred outside on grassyards and another series is started. Feeding is done partialy with formulated forage and partialy with farm mix. After 8-10 weeks chickens gain 1.60-1.87 kg at a fodder consumption rate of 3.3-4.0 kg.
  - **Method D:** Cobb 500 purchased 1 day-old chickens have been reared with no extra heating indoors and outdoors. Feeding is done with starter formula for 14 days, afterwards with farm mix + pasture, green alfalfa and scraped carrots; 81 days-old chicken have gained 2.445 kg at 4.18 kg fodder consumption rate.
• Except for method D, in the household system are reared slow growing local breeds and feeding relies on the farm sources. Inputs are rather low and the meat quality satisfies the family demands. There is no difference between breeding for meat or eggs, thus using mixed low-keyed and disease resistant breeds.

The researches and concerns in the **organic poultry breeding** method under the Council Regulation (EC) No 834/2007 and the national legislation have driven to the following results:

- There has been a successfully trial on organic breeding for one lot raised semi-intensive for 81-90 days (12-13 weeks) in compliance with the European and Romanian organic legislation;

- **Technology applied**: a semi-intensive method with 4 weeks indoors housing afterwards free access to grassyard. Slaughtering has been done at 81-90 days; stocking density: 8.3 birds/m² indoors and 12.5 birds/m² in the paddock; 4.25 m²/bird of grassyard.

- **Feeding** has been made on a bio-grain recipe basis, the cereals being purchased from a certified farm; for rough protein content improvement in the first 3 weeks there have been added the following ingredients: powder milk, boiled eggs and cow cheese (organic certified); the feeding recipe has contained maize, wheat, sunflower, pea and minerals; the protein content of 17-18% has enhanced a reduced growth rate and avoided the over-feeding.

- The **chicken yield efficiency** has been lower compared to the intensive system and closer to the semi-intensive conventional breeding system; generally speaking, there have been better results compared to the traditional household system. Some figures to support these assertions:
  - Live body weight at 84-90 days - 1.946 ± 0.04 kg; mean daily weight gain rate - 22 g; fodder consumption rate - 4.6 kg; mortality losses - 3.8 %. Cost price has been 29.6 RON/capita and 15.1 RON/kg.
  - Slaughtering efficiency - 64.7%; the carcass weight - 1.620 ± 0.02 kg.
  - Anatomical cutting parts share: breast (with skin and bones) - 20%; wings 13.2% ; legs (thighs + drumsticks) 37.3%; pickings 27.5%; fats 2%.
  - Chemical content of organic breast and legs:
    - breast : water 65.4%; D.M. 34.6%; protein 24.9%; fats 7.9%; ash – 1.10%; pH 5.74
- legs (thighs + drumsticks): water 65.1%; D.M. 34.9%; protein 23.8%; fats 8.0%; ash 1.01%, pH 6.02

The researches as regarding the share of different anatomical cutting parts, the slaughtering efficiency and ready-to-sell chicken parts have driven to the following conclusions:

• In the case of intensive-industrial breeding system:
  - The anatomical parts related to the live body weight (2387 g) shares: heads - 2.3%; necks - 3.2%; liver - 2.5%; heart - 0.60%; spleen - 0.25%; viscera - 2.9%; bowels - 8.6%; blood - 4.3%; plumage – 7.8%. Data are close to the values cited in the Cobb 500 references;
  - Results on anatomical parts cutting: bone breasts 28.79%; wings 10.11%; thighs 16.54%; drumsticks 13.22%; pickings 31.34%; overall commercial efficiency 82.05%; these results being excellent.

• In the case of semi-intensive and extensive breeding system, the results have been as following:
  - The anatomical parts related to the live body weight shares: heads 2.82-3.59%; legs 4.43-4.69%; gizzard 1.61-2.97%; liver 2.17-3.13%; heart 0.56-0.94%; spleen 0.24-0.31%. The results are related to a live body weight of 2484 g, respectively 1280 g;
  - Results on anatomical parts cutting: bone and skin breasts 21.1-17.8%; thighs 14.1-13.9%; drumsticks 13.8-12.8%; wings 12.8-13.0%; pickings 38.2-42.5%. These results have been obtained at a commercial efficiency of 75.93-72.03%, being smoothly lower than in the intensive breeding system;
  - The marketing is much different compared to the intensive farming: chicken are often wholly sold and only in exceptional cases as cuttings.

The reasearches as regarding the carcass depreciation incidence and factors of this depreciation, also on the meat organoleptical, physical and chemical traits in correspondence with the breeding system, have driven to the following results:

• As regarding the carcass depreciation incidence and the reasons of this phenomenon, the results have been as following:
  - 24,611 (98.41%) carcasses with no visible fouls and 398 (1.59%) carcasses with major fouls out off 25,009 butchered chickens;
− The main reasons of carcass depreciation have been: severe blood suffusions and outflows; breast hygromas; leg breaks; contusions and injuries; ascites; wide skin losses; insufficient bleeding; virulent cahexia;
− From the carcass depreciation reasons and injuries age analysis we may assert that 63.3% of depreciations are due to the raising conditions and 36.7% to handling and slaughtering reasons.

- The organoleptic meat traits, including tenderness, juiciness, consistency, colour, savour and aspect depend on the butchering age, feeding type and raising conditions, being important to acknowledge the following remarks:
  − The intensive bred chicken’s meat (butchered at 39 days) is very tender, too juicy, has poor adherence to the skeleton; bones are immature, marrow is red colour, meat is too fat; sometimes, raw chicken has unpleasant odour;
  − The semi-intensive bred chicken’s meat (butchered at 60 days) has more firmness, medium juiciness, a better adherence, bones are grey to white colour, also marrow is grey; meat has specific odour and fatt deposits are moderate;
  − The extensive 3-5 months bred chicken’s meat is very firm, dark red colour, low juice content and good bone’s adherence. Bones are firm and white colour, marrow is grey, taste and odour are exceptional, under-skin and internal fats have good yellow colour;
  − The organic bred chicken’s meat (butchered at 81-90 days) is very much alike the extensive chicken’s meat, only consistency is less firm.

- As regarding the meat physical and chemical tests (done for breast and thigh muscles) of chickens from different breeding systems, the following conclusions have been withdrawn:
  − pH has been normal for all assays, inbetween 5.71 and 6.11, no matter the breeding system;
  − As younger the chickens are slaughtered as high is the meat water content: 70.1-70.3% when butchered at 39 days; respectively 64.1-64.9% in the extensive bred chickens (150 days); protein content is lower (18.1-18.6%, respectively 25.3-26.0%); fat content is higher (10.1-10.5%, respectively 7.2-7.4%); ash content (minerals) is lower (0.98-1.03%, respectively 1.04-1.13%);
– There are differences between breast and legs as regarding the chemical content and organoleptic traits;
– There is a tight corelation between meat chemical content and main organoleptic traits.

The differences in the biologic material, feeding, housing and slaughtering age in between the intensive, semiintensive and household poultry farming determine important differences as regarding the economic performance and meat quality. Some of the main differences are listed bellow:

• Chickens bred in intensive-industrial systems are most efficient in term of productivity (slaughtering age, live body weight, growing rate and fodder consumption rate, slaughtering efficiency, cost price and marketing price) compared to broilers raised in semiintensive, extensive and organic breeding systems;
• The extensive and organic bred chickens are superior to intensive broilers in terms of meat quality (nutritional value, organoleptic traits and gastronomy issues);
• The market growth, therefore the organic rared broilers growth, is actually important due to the increasing demand and favourable conditions and it’s sustained at least by the following arguments:
  – Organic broilers are less hazardous to human health;
  – Organic breeding system is complying to animal health and welfare issue;
  – Organic breeding – better environment protection;
  – Organic breeding – more profitable in rural areas;
  – The worldwide increasing demand for „clean technologies” development, alternatives to the industrial intensive farming.
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