

SLAUGHTER YIELDS AND MEAT QUALITY CHARACTERISTICS OF BROILERS HYBRO-N PRODUCED IN ESTONIA

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Keywords: poultry meat, slaughter yields, quality factors, Hybro-N broilers

Background. Poultry meat production and marketing has undergone great changes during the last 20 years. Advances in poultry breeding have caused economical advantages to increase production of poultry meat. Consumption of poultry meat is more and more popular. The reasons of popularity of poultry meat are as follows:

- economical characteristics of producing poultry meat are better than for other kinds of meat;
- prime cost of poultry meat is comparably low;
- circle of producing is quick;
- poultry meat fits to all religion groups contrary to pork and beef;
- poultry meat is easily digestible, has low fat content (except skin) and therefore can be considered as healthy meat or of dietary product;
- assortment of semimanufactured and ready made products has been increased due to the new types kinds of marinades etc.

Increased quantities of poultry meat resulted with new approach to quality of carcasses and to way of preparing of carcasses for food. The amount of poultry meat sold as carcasses is decreasing. Customers prefer certain cuts deboned meat and convenience food. This has changed the requirements to carcasses, for example: the conformation of bird/carcass or technological faults (damages of skin) are not relevant factors any more. New quality characteristics are important from the other side as well: tenderness, juiciness, color, flavor and functional properties such as water holding capacity and driploss.

The biggest producer of broilers and poultry meat in Estonia is Tallegg Ltd. Slaughter weight of broilers and layers was 2783 tons (incl. 2425 tons of broilers) at 1996.

Objectives. The quality of poultry meat is underinvestigated in Estonia. The aim of the present research work was to determine:

- the slaughter yields of broilers Hybro-N bred in Tallegg Ltd;
- morphological composition of carcasses – content of skeletal muscles, fat and connective tissues, bones, skin;
- chemical composition of soft tissues—breast muscle (*Pectorales major*) and thigh muscle (*Biceps femoris*), fat, skin; protein, water and ash content was measured;
- content of some minerals (Fe, Zn) was determined too.

The final aim is to increase the competitiveness of Estonian poultry meat and to improve the economical characteristics of Tallegg Ltd.

Material and methods. Broilers Hybro-N for experiments were bred in Tallegg Ltd. They were slaughtered in age of 41 days ($n = 10$); 42 days ($n = 10$) and 45 days ($n = 10$) in poultry slaughter house of Tallegg in common way.

1. Determination of slaughter yields. Live birds (each separately) were weighed on PH—3113V with measuring zone 5...3000 g. After that broilers were hanged on the conveyor of slaughtering where they were stunned electrically in water bath (110 V, 6 second), stucked-deblooded. Blood was collected into plastic bags and weighed. Then followed scalding in water baths (58 °C, 4 min) and defeathering. The next operations were done manually: removing heads, trachea, gullet, legs, evisceration, neck. Liver, heart and gizzard were separated from the intestines. Content of gizzard and cuticula were removed from gizzard. All parts of carcasses, incl. unedible parts (blood, guts with content, crop, gullet, content of gizzard and cuticula) were weighed. Broiler carcasses with lungs and kidneys were weighed after chilling in water bath 20 min to 2—3 °C.
2. Morphological composition of carcass was determined by means of weighing after dissection of carcasses and dividing of tissues.
3. Chemical analyses were done with the accordance of next methods or standards: water content – ISO 14472-73; fat content – GOST 23042-85; ash content – ISO 936-78; determination of crude protein according to Hach company method using Digesdahl apparatus with spectrophotometer DR-400; determination of mineral components: iron – Hach company Ferrozone Method No 8147, zinc – Hach company Zincon Method No 8009.

Results and discussion. Yields of carcasses of broilers and slaughter products are given in table 1. The average slaughter yield of chilled carcasses with lungs and kidneys was 68,6%; yield of edible slaughter products (liver, heart, neck, gizzard) was 4,9% from live weight. Analogical figures for Euribrid /Euribrid/ are 69,6 and 6,6%. Yield of unedible products in our study was 24,9% and for Euribrid – 23,8% from live weight. It is obvious that broilers Hybro-N bred in conditions of Tallegg Ltd. are best for slaughtering during 41—42 days. The weight of carcasses ($n = 30$) in average was 1273 g (1030—1845 g).

Chemical composition of muscles, fat and skin are given in table 2. Protein content was higher in pale muscles (21,5%). Red muscles consisted 15,2% of protein. The content of iron in red muscles was 1,9 times higher to compare with pale muscles. The last statement is logical because of higher myoglobin content in red muscles. Zinc content was 1,6 times higher in red muscles.

Morphological composition of carcasses is given in table 3. Muscles were separated accordingly to color. Content of red muscles in carcasses was 30,6%, pale muscles – 24,6% from carcass weight. The amount of edible tissues in average was 70,7%. Increasing of carcass weight caused increasing of weight of muscles, fat and relative decreasing of weight of bones.



Table 1. Yields of carcasses and slaughter products (% from live weight)

Slaughter product	Slaughter yield (n=30)				Euribrid Ltd.
	min g	max g	average g	average %	
Live weight	1520,0	2480	1855,0		2250
Chilled carcass weight	1030,0	1845	1273,0	68,6	69,6
Liver	15,0	50	25,7	1,4	2,1
Heart	5,0	17	10,1	0,5	0,5
Trimmed gizzard	21,0	37	28,7	1,5	3,0
Neck without skin	17,0	48	28,1	1,5	3,0
Edible products in all	58	152	92,6	4,9	6,6
Blood	40	60	50,5	2,7	4,5
Feather	45	72	56,4	3,0	6,5
Legs	30	120	82,8	4,5	3,0
Head	24	60	37,8	2,0	2,5
Guts	90	260	185,5	10,0	7,3
Content of gizzard + cuticula	35	59	43,6	2,4	
Unedible parts in all	375	566	461,7	24,9	23,8

Table 2. Chemical composition of muscles, fat tissue and skin (n = 30)

Tissues	Water content, %	Protein content, %	Fat content, %	Ash content, %	Zinc content, mg/kg	Iron content, mg/kg
Pale muscles	75,0	21,5	2,3	1,2	59,0	62,3
Red muscles	73,3	15,2	10,5	1,0	92,0	117,1
Skin	47,0	21,3	31,3	0,4	52,0	60,0
Fat tissue	19,1	-	80,0	-	-	-

Table 3. Morfological composition of carcasses (n = 20)

Tissues	Yield			
	min g	max g	average g	average %
Mass of chilled carcass	1050	1560	1200	
Red muscles	320	530	367,4	30,6
Pale muscles	200	285	296	24,6
Muscles in all	528	925	663,2	55,2
Fat tissue	20	37	28	2,3
Skin	135	205	158,3	13,2
Edible tissues in all	691	1165	849,4	70,7
Bones	205	365	250,9	20,2
Sinews	15	55	43,6	3,6
Unedible trimmings	14	95	62,4	5,2
Unedible tissues in all	253	400	348	29,0

Conclusions.

1. Broilers Hybro-N bred in conditions of Tallegg Ltd. are the best for slaughtering in the age of 41—42 days.
2. Average yield of edible tissues in broilers from Tallegg Ltd. was 70,7%.
3. Iron and zinc content in red muscles was higher 1,9 and 1,6 times than in pale muscles accordingly.
4. Slaughter yields and morfological composition of broilers Hybro-N bred in Tallegg Ltd. have good nutritional and technological characteristics.

References.

1. Euribrid Ltd, introducing leaflet.
2. ISO 1442-73 Meat products. Methods for determination of moisture content.
3. ISO 936-78 Meat products. Methods for determination of ash content.