Evaluation of Chicken Broiler Carcasses Condemnation in Damietta Province Abattoir- Egypt

Abdelrahman, Hosny Abdellatief, Shimaa Sabry Mohamed Elsadek and Heba Mohamed Ali Shaheen

Department of Food Hygiene, Faculty of Veterinary Medicine, Suez Canal University, Egypt

Hrahman69@yahoo.com
hebashaheen@ymail.com
shimaaelsadekvetgmail.com

Abstract

The yearly increasing of the economic losses in poultry meat industry due increasing in the chicken broiler carcasses condemnation, therefore this study was conducted to evaluate the rate of chicken broiler condemnation in a poultry slaughter plant from January 2019 to December 2020.The chicken broiler arrived Poultry abattoir was 5181189 and the Dead-on Arrival (DOA) and condemned chicken broiler were 49638 (0.95%) and 16382 (0.32%) respectively. The incidence of DOA and condemned chicken broiler carcasses were 49638 (0. 95%) and 16382 (0.32%), respectively. The frequency percentages of the DOA causes were ; Lung congestion 10860 (21.8%), E.coli infection 10662(21.5%), Septicemia 5890(11.9%), Endocarditis5760(11.6%), Cachexia 4669(9.4%), Fractures 4570(9.2%), Ascites 2860(5.8%), Hepatitis 2750(5.5%), Arthritis 857(1.8%) and Miscellaneous 760 (1.5%).Meanwhile the frequency percentages of condemnation causes were Cellulitis 1831(11.2%), Ascites 1721 (10.5%), Septicemia 1600 (9.7%), Emaciation 1510(9.2%), Airsaccullitis 1500 (9.1 %), Breast Blister 1410 (8.6%),Trauma 1369 (8.4%), Broken bone 1321 (8.0 %),Odema 1220 (7.4%), Arthritis 1170 (7.1%) ,Imperfect Bleeding 1000 (6.1%), and Over scalding 730 (4.5 %).The estimated annual economic loss during the two years survey was 1980556.2 EC/P for DOA and 688044 EC/P for the condemned chicken broiler carcasses with total economic loss by 2668600.2 EC/P.

Keywords: chicken broiler, dead on arrival, postmortem abnormalities, disease condition, economic loss.

Introduction

Poultry production is considered throughout the world one of the most important part of the agriculture section, whatever the differences in the production techniques from that of the free range raring in some countries to the highly intensive system which is used in other regions of the world ***(FAO, 2010).*** Worldwide the Poultry meat is considered one of the popular foods. It has several nutritional factors such as high level of protein, good source of phosphorus and other minerals, and of B-complex vitamins, in addition to low fat content and favorable amount of unsaturated fatty acids which contribute to the popularity of poultry meat. This fatty acid % in chicken broiler meat suggests that it may be a healthier when compared to red meat ***(FAO, 2009).***

Over the last sixty years a dramatic improvement was introduced in the growth rate and yield in chicken broilers by using an intensive genetic selection, improvement of broiler chicken nutrition and management led to repaid growth of the birds which finally led to serious abnormalities and disease conditions that influenced the meat quality of chicken broiler in addition to it left a serious negative effect on broiler meat industry by increasing the economic losses ***(Aviagen, 2014).*** All abnormalities and disease conditions recorded in poultry industry were associated with the improvement mainly in the growth rate which led finally to changes in the structure, metabolism and repair mechanisms in chicken muscles , sudden death syndrome (SDS) , ventricular arrhythmia (AV), arthritis and ascites ***Olkowski and Classen (1998); Olkowski et al. (2008) and Velleman and Clark (2015)***. In addition to the increase in condemnation rate due to cellulitis, Death on Arrival and breast abnormalities led finally to great economic losses in poultry industry, ***Kittelsen et al. (2017).*** Several reports attributed the incidence of high mortality rate due to metabolic diseases**,** ***Siddiqui (2009).*** Cellulite, ascites and fractures can be considered as one of the most important cause of condemnation of chicken broiler worldwide related to rapid growth with high carcass yield, and bad harvesting and transport managements ***Santana et al. (2008) and Kalmar et al. (2013).***

Due to yearly increasing in the economic losses in poultry meat industry which monitored by the increasing in the chicken broiler carcasses condemnation in addition to different reasons and factors which led to carcass rejection, therefore this study was carried out in order to evaluate the rate and causes of chicken broiler condemnation in a poultry slaughter plant during two years.

Materials and Methods

1. Study Area: The study was done at Damietta poultry abattoir, Damietta governorate, Egypt.

2. Aim of the study

The investigations were conducted on broiler chicken at an age of 35-40 day with average live body weight of about 2.5 Kg and nearly 1.900 Kg carcass yield from January 2019 to December 2020 for evaluation of total slaughtered and inspected chicken broiler, dead chicken broilers on arrival and total condemned chicken broiler to stand on the condemnation reasons in addition to estimate the annually economic loss.

3. Inspection of chicken broilers

The antemortem and postmortem inspections for chicken broilers waiting slaughtering, during unloading and hanging on the shackles; slaughtering and further processing, during whole carcasses and partially eviscerated carcasses inspection were carried out according to the methods recommended by **Bremner and Johnson (1996)** and the **Egyptian organization for Standards and Quality**: **517/1986.**

4. Assessment of the financial loss

The direct economic loss was determined by the formula described by **Khanjari *et al.* (2010).**

DEL= N × P× W DEL: Direct economic loss; N: number of condemned carcasses; P: Average price of carcasses (Kg /Egyptian pound); W: average carcasses weight (Kg).

Results and Discussion

1. Total inspected chicken broilers

The results given in Table (1) revealed that 5181189 was the total number of slaughtered chicken broiler with a minimum, maximum and mean values ± SE 402210, 517288 and 458584.7±10552.7 respectively, for Dead on Arrival (DOA) and condemned chicken broilers were 402210, 517288 and 4 4858407 ±10552.7 ; 3319, 4614 and 3967.3±155.7 and 979,2247 and 1427.6 ±104.5 respectively.

2. Incidence of DOA and condemned chicken broiler carcasses

The incidence of DOA chicken broiler Table (2) were 49638 (0.95%) while in condemned was 16382(0.32%) From the above obtained result, the results obtained were lower than those reported by **Gholami *et al*. (2013); Ghaniei *et al*. (2016) and Mwimali *et al*. (2018)** while higher than those reported by **Buzdugan *et al*. (2020) and Hosseini *et al*. (2011)** for the total number of slaughtered chicken broiler. This variation in the total number of slaughtered chicken broiler results was attributed to number of daily slaughtered chicken broiler allowed, capacity of slaughter house and market demand.Meanwhile in the DOA chicken broiler the values obtained were lower than those reported by **Lund *et al*. (2013) and Mwimali *et al*. (2018)** and higher than those reported by **Gregory a**nd **Austin (1992); Warriss *et al.* (1992); Ekstrand (1998) ; Nijdam *et al.*, (2004); Ritz *et al. (*2005); Petracci *et al. (*2006); Hosseini *et al*. (2011); Aral *et al. (*2014); Vecerek *et al.* (2016); Jacobs *et al*. (2017) and Kittelsen *et al. (*2017).** Mortality rate of chicken broilers from catching time to the moment of slaughtering is of great economic impact in poultry industry. Several authors determined the incidence of DOA and found that it was varying from 0.05 to 0.57% but it cans reach up to 26%. These variation in the results obtained was attributed to several factors as heat stress, harvesting methods, density of the number of chicken broiler in Crates, duration of transportation journey, method and type of transportation, health of the flock and environmental condition.

3. Frequency % of DOA cause

The results given in Table (3) showed the result of the DOA causes in which the lung congestion and *E. coli* infection were the most cause of DOA with 10860 (21.9%) and 10662 (21.5%) respectively. Meanwhile Septicemia and Endocarditis frequency percentages were 5890 (11.9%) and 5760 (11.6%) respectively. On the other side Cachexia with 4669 (9.4%) , fractures 4570 (9.2%) , Ascites 2860 (5.8%), Hepatitis 2750 (5.5%), Arthritis 857 (1.8%) and Miscellaneous with 760 (1.5%).The results obtained were lower than reported by **AAFC (2010) and Hosseini *et al*., (2011)** and higher than that reported by **Petracci *et al*., (2006).** The results obtained were lower than that

reported by **Hosseini *et al*., (2011); Alloui *et al*. (2012); Ghaniei *et al*. (2016) and Salines *et al*., (2017)**. Nearly similar results were reported by **Gholami *et al*. (2013).** The variation in the results obtained were attributed to healthy condition of the flock, adjustment of the machinery according to weight of the slaughtered chicken carcasses, method of slaughtering, scolding time / temperature, and handling of the live chicken before slaughtering.

4. Frequency % of condemnation causes

The result given in table (4) showed the frequency percentages of condemnation causes in which cellulitis with 1831(11.2%), Ascites 1721(10.5%), Septicemia 1600 (9.7%), Emaciation 1510(9.2%), Air saccullitis 1500(9.1%), in addition to Breast blister 1410(8.6%), Trauma 1369(8.4%), broken bone 1321(8.0%) odema 1220(7.4%), arthritis 1170(7.1%), imperfect bleeding 1000(6.1%) and overscalding 730(4.5%). The result obtained was higher than those reported by **Ansari-Lari and Rezagholi (2007)**, **Hosseini *et al*. (2011) and Mwimali *et al*. (2018)** while lower than those reported by **Khodaei-Motlagh *et al.* (2014) and Radwan *et al*. (2018)** and the nearly similar to that reported by **Salines *et al.* (2017) and Muchon *et al*. (2019)**. These variations were attributed to the health status of the chicken broilers, the system of rearing and fattening in chicken coops and veterinary medical supervision. The results of chicken broiler postmortem inspections revealed that the total number and cause of condemnation are varied from country to other as a result of different ecologic, epidemiologic states, management practice and health condition in each country **(Ansari-Lari and Rezagholi, 2007).**

Conclusion

From the results obtained it could be concluded thatthere is a steady increasing in the economic losses inchicken broilers at poultry slaughterhouse level due toincreasing in the DOA chicken broiler which constitutes a high percent when compared with the condemnedchicken broiler. Increasing of the chicken broilers welfare and disease control are recommended. More studies were recommended to reduce DOA of chicken broilers to safe the economic loss in the field of poultry industry.

Table (1): *Total inspected chicken broilers*

Total number of slaughtered chicken broilers	Slaughtered	DOA	Condemned
Minimum	402210	3319	979
Maximum	517288	4614	2247
Mean value	458584.7	3967.3	1427.6
SE	10552.7	155.7	104.5

Table (2): *Incidence of DOA and condemned chicken broiler carcasses*

No. of slaughtered chicken broilers	DOA		Condemned	
	No.	%	No.	%
5181189	49638	0.95	16382	0.32

Table (3): *Frequency % of DOA cause*

DOA cause	No.	%
Lung congestion	10860	21.8
E. coli lesions	10662	21.5
Septicemia	5890	11.9
Endocarditic	5760	11.6
Cachexia	4669	9.4
Fractures	4560	9.2
Ascitis	2760	5.8
Hepatitis	2750	5.5
Arthritis	857	1.8
Miscellaneous	760	1.5
Total	**49638**	**100.0**

Table (4): *Frequency % of condemnation causes*

Condemnation cause	No.	%
Cellulitis	1831	11.2
Ascites	1721	10.5

Septicemia	1600	9.8
Emaciation	1510	9.2
Air saccullitis	1500	9.2
Breast Blister	1410	8.6
Trauma	1369	8.4
Broken one	1321	8.0
Odema	1220	7.4
Arthritis	1170	7.1
Imperfect bleeding	1000	6.1
Overscalding	730	4.5
Total	**16382**	**100.00**

Table (5): *Annual financial assessment of DOA and condemned chicken broiler carcasses during two Years*

Period	DOA chicken broiler (kg)x Price	Condemned chicken broiler (Kg) x Price	Total EC/P
2019 -. 2020	49638x 1.9x 21*= 1980556.2	16382x 1.2x 35*= 688044	2668600.2

EC/P=Egyptian currency in pounds.

References

AAFC (Agriculture and Agri-Food Canada) (2010): Poultry Condemnation Report by Species for Federally Inspected Plants. (Report 050P). Available from: https://agriculture. canada. ca/ en/ canadas-agriculture-sectors/animal-industry/ condemnations.

Alloui, N., Guettaf, L., Djeghouri, F., Alloui, M. N. and Lombarkia, O. (2012): Quality of Broilers Carcasses and Condemnation Rate during the Veterinary Control in the Batna https://almalnews.com* Slaughterhouse. Journal of Veterinary Advances, 2(1), 70-73.

Ansari-Lari , M. and Rezagholi, M. (2007): Poultry abattoir survey of carcass condemnations in Fars province, southern Iran. Preventive Veterinary Medicine Journal, 2007 May 16; 79(2-4):287-93.

Aral, Y., Arikan ,M.S., Akin, A.C., Kaya, C.Y., Guloglu, S.C. and Sakarya, E. (2014): Economic losses due to live weight shrinkage and Mortality during the broiler transport. Ankara Universitesi Veteriner Fakultesi Dergisi, 61, 205-210.

Aviagen, (2014): Ross 308 broiler: Performance objectives. In-house publication, global. Aviagen Ltd., Newbridge, UK.

Bremner, A. and Johnston, M. (1996): Poultry meat hygiene and inspection. (Royal Veterinary College, North Mymms, AL9 7TA (United Kingdom)) W. B. Saunders Company Ltd.

Buzdugan, S. N., Chang, Y. M., Huntington, B., Rushton, J., Guitian, J. and Alarcon, P. and Blake, D. P. (2020): Identification of production chain risk factors for slaughterhouse condemnation of broiler chickens. Preventive Veterinary Medicine Journal,181,105036.

Egyptian organization for Standards and Quality (517/1986. Law no.517): concerning slaughter of animals and trade of meat issued by Ministry of Agriculture and land Reclamation for surveillance authority of general organization for veterinary services.

Ekstrand, C. (1998): An observational cohort study of the effects of catching method on carcass rejection rates in broilers. Animal Welfare Journal, 7, 87-96.

FAO (Food and Agricultural Organization) (2009): Poultry development review 1-120. www.fao.org/avianflu/en/farming systems.htm.

FAO (Food and Agricultural Organization) (2010): Agribusiness handbook; Poultry Meat and Eggs. Vialedelle Terme di Caracalla, 00153 Rome, Italy.

Gregory, N. G. and Austin, S. D. (1992): Causes of trauma in broilers arriving dead at processing plants. Veterinary Record, 131,501-503.

Gholami, F., Saied, B., Ali, k. h., Hossein, E. and Adel ,M. (2013): A retrospective survey of poultry carcass condemnation in abattoirs of Tehran province, Capital of Iran, Iran (2009-2011) International Journal of the Bioflux Society. Human and Veterinary Medicine; Cluj-Napoca 5(3), 114-116.

Ghaniei, A., Mojaverrostami , S.P. and Sepehrnia , A. (2016): Survey of Poultry Carcass Condemnations in Abattoirs of West Azerbaijan Province (North West of Iran). Journal of the Hellenic Veterinary Medical Society, 67(3),183-188.

Hosseini Aliabad, S. A., Mortazavi, R., Khoshbakht, R. and Mousavi A. S. (2011): Causes of Broiler Carcasses Condemnation in Nowshahr Poultry Slaughters (North of Iran) with Histopathologic Study of Cases Suspected to Marek's Disease. Journal of Agricultural

Science and Technology, 1069-1073.

Jacobs, L., Delezie, E., Duchateau, L., KlaraGoethals, K. and Tuyttens, F.A.M. (2017): Broiler chickens dead on arrival: associated risk factors and welfare indicators. *Poultry Science Journal*, 96(2), 259-265.

Kalmar, D.I., Vanrompay, D. and Janssens, G.P.J. (2013):Broiler ascites syndrome: Collateral damage from efficient feed to meat conversion. The Veterinary Journal, 197(2), 169-174.

Khanjari, A., Partovi, R., Abbaszadeh, A., Nemati, G., Bahonar, A., Misaghi, A., Basti, A., Ilanjegh, A. and Motaghifar, A. (2010): A Retrospective Survey of Fasciolosis and Dicrocoeliosis in Slaughtered Animals in Meisam Abattoir, Tehran, Iran (2005-2008) Slaughtered. Veterinary Research Forum, 1, 174 -178

Khodaei-Motlagha, M., Yahyai, M., Rezaei, M., Eidi, A., Moazami-godarzi M.R. and Hajkhodadad, I. (2014): Determination carcass condemnation causes of broiler chickens (Gallus Domesticus) at industrial slaughter house of Shazand, Markazi province of Iran. Scientific Journal of Animal Science, 3(5), 147-151.

Kittelsen, K.E, Moe, R.O., Hoel, K., Kolbjørnsen, Ø., Nafstad, O. and Granquist, E. G. (2017): Comparison of flock characteristics, journey duration and pathology between flocks with a normal and a high percentage of broilers 'dead-on-arrival' at abattoirs. Animal Journal, 11(12), 2301-2308.

Muchon, J. L., Garcia, R. G., Gandra, E. R. S., Assunção, A. S. A., Komiyama, C. M., Caldara, F. R., Nääs, I. A. and Santos, R. A. (2019): Origin of broiler carcass condemnations. Revista Brasileira de Zootecnia Journal, 48: e20180249. https://doi.org/10.1590/rbz4820180249.

Lund, V. P., Kyvsgaard, N. C., Christensen, J. P. and Bisgaard, M. (2013): Pathological manifestations observed in dead-on-arrival broilers at a Danish abattoir. British Poultry Science Journal,54, 430-440.

Mwimali, M.I., Kitaa, J.M.A. and Osoro, L.N. (2018): An Analysis of the Causes of Poultry Condemnations at A Nairobi Slaughter House, Kenya (2012-2014). International Journal of Veterinary Science, 7(3): 121-126.

Nijdam, E., Arens, P., Lambooij, E., Decuypere, E. and Stegeman, J. A. (2004):

Factors influencing bruises and mortality of broilers during catching, transport, and lairage. Poultry Science Journal, 83, 1610-1615.

Olkowski, A.A. and Classen, H. (1998): High Incidence of Cardiac Arrhythmias in Broiler Chickens. Journal of Veterinary Medicine Series A, 45(2), 83-91.

Olkowski, A.A., Wojnarowicz, C., Nain, S., Ling, B., Alcorn, J.M. and Laarveld, B. (2008): A study on pathogenesis of sudden death syndrome in broiler chickens. Research in Veterinary Science, 85, 131-140.

Petracci, M., Bianchi, M., Cavani, C., Gaspari, P. and Lavazza, A. (2006): Pres-laughter mortality in broiler chickens, turkeys, and spent hens under commercial slaughtering. Poultry Science Journal, 85, 1660-1664.

Radwan, I.A., Abed, A.H., Abd Allah, M.M. and Abd El-Latif, M.A.A. (2018): Bacterial pathogens associated with cellulitis in chickens. Journal of Veterinary Medical Research, 25 (1), 68-79.

Ritz, C. W., Webster, A. B. and Czarick, M. (2005): Evaluation of Hot Weather Thermal Environment and Incidence of Mortality Associated with Broiler Live Haul. Journal of Applied Poultry Research,14, 594-602.

Salines,M., Allain, V., Roul , H., Magras, C.S. and Le Bouquin, S. (2017): Rates of and reasons for condemnation of poultry carcasses: harmonized methodology at the slaughterhouse. Veterinary Record, 180(21), 506524.

Santana, A.P., Murata, L.S., Freitas, C.G., Delphino, M.K. and Pimentel, C.M. (2008): Causes of condemnation of carcasses from poultry in slaughterhouses located in State of Goiás, Brazil. Ciência Rural, Santa Maria, 38(9), 2587-2592.

Siddiqui, M. F., Patil, M.S., Khan, K.M. and Khan, L.A. (2009): Sudden Death Syndrome. An Overview. Veterinary World, 2(11), 444-447

Velleman, S.G. and Clark, D.L. (2015): Histopathologic and myogenic gene expression changes associated with wooden breast in broiler breast muscles. Avian Diseases Journal, 59,410-418.

Vecerek, V., Voslarova, E., Conte, F., Vecerkova, L. and Bedanova, I. (2016): Negative trends in transport related mortality rates in broiler chickens. Asian-Australasian Journal of Animal Sciences, 29 (12), 1796-1804.

Warriss P. D., Bevis, E. A., Brown, S. N. and Edwards, J. E.

(1992): Longer journeys to processing plants are associated with higher mortality in broiler chickens. British Poultry Science Journal, 33,201-206.

تقييم اعدامات الدجاج اللاحم بمسلخ محافظة دمياط ـ مصر

حسني عبداللطيف عبدالرحمن – شيماء الصادق محمد- هبة محمد علي شاهين
كلية الطب البيطري- جامعة قناة السويس – قسم الرقابة الصحية علي الاغذية

الملخص

تتزايد الخسائر الاقتصادية السنوية في صناعة لحوم الدواجن بسبب زيادة اعدامات ذبائح الدجاج اللاحم ، لذلك فقد أجريت هذه الدراسة لتقييم معدل اعدام دجاج التسمين في ملسخ للدواجن في الفترة من يناير 2019 إلى ديسمبر 2020.وقد بلغ العدد الاجمالي للمذبوحات هو 5181189 والنافق عند الوصول والدجاج اللاحم الذي تم اعدامه بعد الكشف البيطري هو 49638 (0.95٪) و 16382 (0.32٪) على التوالي. وكانت نسبة حدوث ذبائح الدجاج اللاحم 49638 (0 .95٪) و 16382 (0.32٪) على التوالي. النسب المئوية لتكرار أسباب النفوق عند الوصول كانت ؛ احتقان الرئة 10860 (21.8٪) ، اعراض عدوى الإشريكية القولونية 10662 (21.5٪) ، تسمم الدم 5890 (11.9٪) ، التهاب الشغاف 5760 (11.6٪) ، الدنف 4669 (9.4٪) ، الكسور 4570 (9.2٪) ، الاستسقاء 2860 (5.8٪)) ، التهاب الكبد 2750 (5.5٪) ، التهاب المفاصل 857 (1.8٪) متنوع 760 (1.5٪) ، بينما النسب المئوية لتكرار أسباب الاعدامات كانت التهاب النسيج الخلوي 1831 (11.2٪) ، الاستسقاء 1721 (10.5٪) ، تسمم الدم 1600 (9.7٪).) ، الهزال 1510 (9.2٪) ، التهاب الاكياس الهوائية 1500 (9.1٪) ، بثور الثدي 1410 (8.6٪) ، الصدمة 1369 (8.4٪) ، العظام المكسورة 1321 (8.0٪) ، أوديما 1220 (7.4٪) ، التهاب المفاصل 1170 (7.1) ٪) والادماء غير المكتمل 1000 (6.1٪) والسمط الزائد 730 (4.5٪). بلغت الخسارة الاقتصادية السنوية المقدرة خلال السنتين 1980556.2 جنية مصري النفوق عند الوصول و 688044 جنية مصري لذبح الدجاج اللاحم الذي تم اعدامه بإجمالي خسارة اقتصادية بلغت 2668600.2 جنية مصري.