Causes of Broiler Carcasses Condemnation in Nowshahr Poultry Slaughters (North of Iran) with Histopathologic Study of Cases Suspected to Marek's Disease

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Abstract: The causes of broiler carcasses condemnation has been evaluated during November 2005, February, May and August of 2006 (one month in each season) in Nowshahr poultry slaughters. Also the cases suspected to Marek's disease have been studied histopathologically during these months. From all of 380,140 birds have slaughtered in four months, 2,548 of them were rejected. The main reason for condemnation was preslaughter mortality (dead on arrival). The overall average of dead on arrival was 0.172% per total slaughtered birds. The other causes of condemnation were: cachexia, septicemia, air sac infection, ascites, bruising, second contamination, breast blister and other cases. There are positive correlation between some reasons of carcass rejection and season. The seasonal difference of carcass condemnation analyzed statistically by Chi square test. The season of slaughtering significantly ($P < 0.0001$) influenced some reasons of carcass rejection. The rate of dead on arrival and breast blister in summer and the rate of ascites in winter were significantly high. The cases suspected to Marek's disease kept in 10% formalin buffer solution, tissue samples were made by H & E staining method and evaluated histopathologically. From 18 samples, 14 cases were positive for Marek's disease (0.5% of total condemnation).

Key words: Slaughter, carcasses condemnation, broiler, histopathology.

1. Introduction

Many investigations about the causes of poultry carcass rejection have been performed all over the world. Such investigation may be helpful to identify the existed problems in poultry farms, obstacle and difficulties in loading and transport to the slaughter plants and abattoir insufficiencies. Furthermore, these studies can help to reduce mortality rate and rejection in slaughter. Considering all above mentioned notes,

the results of such studies will help to increase profitability and bird welfare.

The most important cause of poultry carcass condemnation in the survey that performed on England was infection [1]. M. Ansari and M. Rezagholi have studied the reasons of rejection of carcasses in Fars province south of Iran from 2002 to 2006. The most common reason for rejection of carcasses was cachexia and septicemia [2].

A study performed in 15 slaughterhouses in western France to estimate the condemnation prevalence and describe the official reasons for condemnation showed

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that the total condemnation rate was 0.87%. The main reasons for condemnation were emaciation and congestion, with rates 0.3% and 0.22% per total birds slaughtered, respectively [3].

The analysis of losses in slaughtered broilers based on the results of poultry meat inspection in a poultry slaughterhouse in 1991-1993 has shown that skin diseases are the main reason for condemnation of carcasses [4].

V. Yogaratnam studied the causes of carcass rejection at a poultry processing plant. The higher rates of carcass rejection were found on the units with an average flock size of over 100,000 birds and from rearing houses with a population of more than 30,000 birds. The main causes of rejection were birds dead on arrival, disease and miscellaneous conditions and the commonest cause of carcass rejection due to disease was coli septicemia [5].

In addition to the all above mentioned causes, Marek's disease (MD) can be considered as one of the causes of poultry carcass condemnation. Marek's disease is a common lymphoproliferative disease of chickens, usually characterized by mononuclear cellular infiltrates in peripheral nerves and various other organs and tissues including iris and skin. The disease is caused by a herpesvirus [6]. The outbreak of Marek's disease in broiler flock may vary in different area. In many countries, the incidence of MD losses can be illustrated through the use of broiler condemnation data, collected at the processing plant. A survey have been performed in Poland from 1996 to 2000 have shown that MD were observed in 101 broiler flocks [7]. In Australian that the tendency to use high weight chicken from early of 1990s decade increased, and rearing of broiler last to 63 days, the case of MD in broiler increased [8].

However this papers aims to study the causes of broiler carcass condemnation in Nowshahr (north of Iran) broiler slaughters and histopathologic study of carcasses suspected to Marek's disease.

2. Materials and Methods

The causes of carcass rejection has been studied in two broiler slaughterhouses of Nowshahr, north of Iran, from autumn 2005 to September 2006. For this reason one month selected from each season (November, February, May and August). During these months all carcasses were inspected daily. Ante mortem inspection was done when birds were in crates and after they had been hung in shackles in the receiving room. In ante mortem inspection the overall condition of the birds has been observed. Diseased birds were segregated for an exact examination and dead birds on arrival rejected. Internal inspection of carcasses and viscera and external inspection of the eviscerated carcasses were performed on post mortem examination [9]. All viscera including intestine, liver, spleen and heart visually examined. Any cases suspected to tumor, were kept in 10% formalin buffered solution and sent for histopathologic examination. Samples were observed microscopically after supplying microscopic slide and H & E staining. Finally for each month, summaries indicating the total slaughter number, the number of birds died on arrival, the condemnation rate, the reasons for condemnation and the number of carcass suspected to Marek's tumor registered. The seasonal difference of carcass condemnation was analyzed statistically by Chi square method. The season of slaughtering significantly ($P < 0.0001$) influenced the carcass rejection.

3. Results

During this study 380,140 birds were slaughtered on two poultry slaughterhouse of Nowshahr. Of these, 2,540 birds (0.67%) were rejected. Preslaughter mortality or dead on arrival (DOA) was the main reason for condemnation (654 birds), corresponding of 0.172% of total slaughtered birds and resulting in 26.6% of total bird rejected in the period of study. The second important cause of condemnation was cachexia that corresponding of 0.123 percent of total slaughtered birds.

The other causes of condemnation and percentage per total slaughter respectively were: septicemia 0.076%, air sac infection 0.067%, bruising 0.053%, breast blister 0.050%, ascites 0.046%, second contamination 0.028%, arthritis and synovitis 0.020%, gumboro 0.012%, cellulitis 0.008%, incomplete bleeding 0.005%, poisoning 0.004%, Marek's disease 0.004%. The number and percentage of main causes of condemnation are given in Table 1.

The cases suspected to Marek's disease (MD) were sent for histopathologic examination. Samples were observed microscopically after supplying microscopic slide and H & E staining. In microscopic observation 14 from 18 specimens had microscopic vision and signs of Marek's disease. These signs included: infiltration of neoplastic cells including lymphocyte, lymphoblast, Marek's cells and a few number of macrophage, plasma cell and hetrofil.

In this study, the season factor affected the carcass rejection rate such as dead on arrival, breast blister and ascites based on some reasons. The percentage of fourteen most frequently observed conditions in each of the four months are given in Table 2.

Table 1 A list of most frequently condition leading to carcass condemnation during the study.

Causes	Number	Percentage per total condemned birds	Percentage per total slaughtered birds
Dead on arrival	654	25.69	0.172
Cachexia	467	18.34	0.123
Septicemia	288	11.31	0.076
Air sac infection	264	10.37	0.069
Bruise	202	7.93	0.053
Breast blister	190	7.46	0.050
Ascites	173	6.79	0.046
Second contamination	105	4.12	0.028
Arthritis, synovitis	75	2.95	0.020
Gumboro	47	1.85	0.012
Cellulitis	32	1.26	0.008
Incomplete bleeding	19	0.75	0.005
Poisoning	16	0.63	0.004
Marek's disease	14	0.55	0.004
Total condemned bird	2,546		0.670
Total slaughtered bird	380,140		

Table 2 The percentage of most frequently carcass condemnation per total slaughtered birds in each of the four months.

Causes of condemnation	November	February	May	August
Dead on arrival	0.127	0.176	0.083	0.276
Cachexia	0.212	0.061	0.108	0.108
Septicemia	0.081	0.099	0.067	0.053
Air sac infection	0.086	0.071	0.072	0.053
Bruise	0.043	0.043	0.062	0.062
Breast blister	0.022	0.027	0.029	0.108
Ascites	0.05	0.077	0.03	0.029
Second contamination	0.033	0.035	0.028	0.018
Arthritis, synovitis	0.022	0.021	0.015	0.021
Gumboro	0.018	0.029	0.006	0
Cellulitis	0.011	0.002	0.017	0.004
Incomplete bleeding	0.005	0	0.009	0.005
Poisoning	0	0.012	0.004	0.002
Marek's disease	0.001	0.003	0.011	0

4. Discussion

The collection of data about disease and other condition noted at slaughter has been recognized as one method of monitoring the disease status of a flock [10]. The results of present study showed that the total percentage of carcass condemnation was 0.67%. Overall 14 causes for rejection of carcass were detected. The preslaughter mortality or dead in arrival (DOA) was the main cause of rejection. A comparison of most frequency cause of carcass condemnation rate is given in Fig. 1.

The season of slaughtering significantly ($P < 0.0001$) influenced some reasons of carcass rejection .The preslaughter mortality and breast blister rate were significantly high in summer and ascites was significantly high in winter (Fig. 2).

The preslaughter rate in the summer was found to be dramatically higher than the preslaughter mortality in other seasons. This result is in agreement with study performed by Petracci et al. in Italy [11]. The results also corroborate the findings of Alshawabkeh and Tabbaa that the percentages of dead chickens fluctuated around the year and the number of damaged chickens and total disposed chickens were highest in

Fig. 1 A comparison of fourteen conditions resulting in carcass condemnation at study plant.

Fig. 2 A comparison of the rate of condemnation during for months in this study.

August [12]. The high percentage of dead on arrival in the present study could be explained by the high environmental temperature and relative humidity in north of Iran during the summer's months compared to the other seasons of the year.

Also there are some studies that showed the highest mortality was found both in the summer and in winter months [13, 14]. In our study the incidence of dead in arrival in winter was also high. Increased mortality in summer and winter months can be linked to ambient temperatures in those months, when too high or too

low temperatures negatively influence welfare of transported broilers [14]. Also the high percentage of breast blister in summer in the study maybe due to wet and poor quality litter due to high relative humidity on those months. The high rates of ascites in winter perhaps reflected the effects of cold temperature stress and limited ventilation during winter months.

This study also demonstrated the presence of Marek's disease in broiler flocks of Iran. From 18 suspected cases, 14 were positive histopathologically for MD. Since the MD virus has immunosuppressive

effects it is recommended to employ effective prophylactic measure in broiler chicken.

5. Conclusion

In this study, there were 14 causes for carcasses condemnation but the main reason was preslaughter mortality or dead on arrival (DOA). Also the season factor affected some carcasses rejection. The preslaughter mortality and breast blister rate were significantly high in summer and ascites was significantly high in winter. Recognition of the different reasons for carcass rejection in slaughterhouse is very important and help to dissolve the problems existing in rearing farm and transport incompetence.

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