Selection of an effective sampling plan for the post mortem inspection of poultry

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Abstract

Poultry industry has been gaining prominence in the field of Animal Agriculture during the recent years; along with that there is a trend of consumers to buy the best food at a least cost. Inspection is a major process, which is commonly used by poultry manufacturing agencies as a promising technique assuring the quality of broiler meat. Therefore this study was conducted, to find out an effective sampling plan for post mortem inspection of poultry. Random and systematic sampling methods were selected for testing, while visual observations of characters were selected for the checklist. Visual observations were done to observe on pathological defects, emaciation, ammonia burns, bruising, breaking of wings and legs, inadequate bleeding, dark coloured carcasses, fecal and bile contamination. Control charts were drawn for wing tip bruises, breast bruising, bile contamination, fecal contamination and wing bone breaking. There was no significant difference (P>0.01) between the two sampling methods and however the systematic sampling was considered as easier than random sampling. Inadequate bleeding and ammonia burns were almost absent in bird carcasses on arrival at the plant. The upper limit of average fraction defectives determined for wing tip bruises, breast bruising, bile contamination, fecal contamination and wing bone breaking were: 0.3185, 0.2837, 0.0746, 0.1356, and 0.1433 respectively. Fecal contamination and leg bruising had over controlled points, so they should be statistically controlled. Further studies are required for determination of upper control limits for other important characters.

Introduction

Animal products have been gaining popularity among people. Inspection of meat and meat products is one of the major steps in the quality control procedures. In poultry processing plants there are many measures taken in order to reduce the risk of contamination. Hazard Analysis Critical Control Point (HACCP) is the most recent and trusted worldwide system, which is being used for the assurance of the quality of animal products.

This study will be helpful in promoting further experiments for evaluating sampling methods, which will lead to the identification of an effective sampling method for post mortem inspection of poultry. There fore the objectives of the study were: to select an effective sampling method for post mortem inspection of poultry, to identify the characters to be statistically controlled at the postmortem inspection, and to identify the relation between bruising and before slaughter factors.

Materials and methods

The experiment was conducted at Ceylon Agro Industry, Seeduwa and Samples were selected according to the lot size and the general inspection level ii, which is relevant to the ISO-2859 standards. The normal lot size arriving at the slaughter plant was nearly 3000, hence the tables the size code letter was "k". Sample size was matched with the accepted quality level (AQL) of iso-2859 standards of 2.5% level of AQL the letter "k" was 125.

Treatment 1 was random sampling and treatment 2 was systematic sampling attributes were tested for pathological defects, ammonia burns, emaciation, dark colored carcasses, bruises of; wings, wing tips, breast, shoulder, leg and thumbs, processing defects involving; fecal contamination, broken legs, broken wings, inadequate bleeding.

Defective characters were determined according to the guidelines of "Canadian food inspection agency". (Manual of Post mortem Inspection of Poultry (MPIP) of Canadian Food Inspection Agency, 2000)

Statistical Analysis was done by using the following equation z values were calculated for each character separately.

Results and Discussion

'Z' test shows that there was no significant difference between the random and systematic sampling methods at the probability levels of $0.05(z=+1.96)$ and $0.01(z=+2.33)$. Therefore both sampling methods act in a similar manner in sampling for post mortem inspection of poultry.

A significant ($p< 0.05$) positive correlation (0.7326) was observed between breast bruising and duration of transportation, in addition, the road conditions and the speed at which birds transported could be considered as minor effects. Correlation coefficient of leg bruising and duration of transportation was 0.2455 and there was no positive relationship, possible reasons for the leg bruising may be the live animal handling and the tightening of the leg to the shekels. Correlation coefficient between average dressed weight and the birds with broken legs was 0.21 and the relationship was positive but not insignificant. Live animal handling at catching; transporting, etc. could be reasons for breaking of legs.

Setting Control Limits

The upper control limit for the wingtip bruising was, 0.3185 average fraction defectives was 0.2093; wing tip bruising exhibited a statistical control. The upper control limit for the breast bruising was 0.2831 average fraction defectives 0.18; breast bruising exhibited a statistical control. The upper control limit for the fecal contamination was 0.0746 and average fraction defective was 0.0203. There was a point over the upper limit so fecal contamination didn't exhibit a statistical control. The upper control limit for the bile contamination was 0.1356 and average fraction defective was 0.068; bile contamination exhibited a statistical control. The upper control limit for the broken wings was 0.1433 and average fraction defectives was 0.0733; broken wings, exhibited a statistical control.

Conclusions and Recommendations

According to the results obtained for the post mortem inspections of poultry, either the random or systematic sampling could be adopted depending on the convenience of drawing carcasses. However, the systematic sampling was more convenient which could not make mistakes at the drawing. The breast bruising largely occurred during transportation of long duration and also it was affected by the harsh conditions of the roads. Fecal contamination in the processing plant must be statistically controlled as it had points over the upper limit.

Wing tip bruises must be controlled using breast comforts (plastic strips that are hung on parallel to the line which the birds rub against as they are conveyed to the stunner), dimming the lights and ensuring that there are no sharp contrasts in lighting.

References

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