PE8.12 Microbial survey on processing of prepared chicken products and its material in the people's republic of China 78.00

Rongrong Liang (1) lrr327@126.com, X Luo(1), Y Zhang 1, Y Mao 1
(1)Shandong Agricultural University, Peoples Republic of China

Abstract: The objective of this paper was to study microbiological quality of prepared chicken product during processing in China. The survey was carried out on the microbiological quality of chicken carcass, parts and prepared chicken products, including the processing. The results showed that chicken carcass and parts were in good condition, however, there were serious contamination problems in chicken prepared products processing. Safety was a big problem for producers and consumer. Keywords Prepared Chicken Product, Microbial Contamination, Processing, Bacterial Counts

I. INTRODUCTION

Prepared meat food is a kind of new meat product, which is nutritional, convenient and easy to eat, standing for the new development way of meat products in the future. Now, the consumers seek food products of upgraded sensory quality and increased functional and nutritional properties combined with a safety but yet less processing, and fewer additives or "technological" inventions. At the same time, they expect extended shelf life and high convenience in preparation and use [2]. So chicken prepared products can commendably meet the demands if the safety is well controlled and shelf life is extended, and besides chicken is rich in protein and cheap in price.

However, the presence of pathogenic and spoilage microorganisms in poultry meat remains a significant concern for producers and consumers. The shortness of shelf life becomes a headache to producers. Moreover, heat treatment isn't always fully done before eating. That affords the chance for many microorganisms to survive, which can cause more disease. Though some assurance systems, such as HACCP, were carried out, there are still some weak links. Many microbial researches have been done on other meat foods, but seldom are found on chicken prepared products, especially on its plants and processing.

II. MATERIALS AND METHODS

The chicken products and microorganism were obtained from the product undergoing processing at a poultry plant on the day of its production. In the slaughter house and segmentation-house, microbial survey was carried out according to GB/T 4789.17-2003 in the People's Republic of China by swab method. Seven important working procedures were selected as sampling points. 15 samples were collected at the same point as repeat. The swabbing area for chicken carcass was 50cm^2, of which 5 cm^2 for head, anus area, wing and the leg respectively; 10 cm^2 for backside, breast and abdomen respectively [1, 3].

In the prepared chicken products processing plants, microbial survey was also carried out according to GB/T 4789.17-2003 with little modification. Chicken balls and chicken fillets were chosen as representative products for their popularity in China. Five important working procedures were chosen as sampling points of each line. Samples (weight: 250g) were taken aseptically and put into sterile plastic bags and packaged immediately.

All samples were transported to the laboratory immediately in an ice chest (0~4**°C**) in no longer than 4 h and tested upon arrival.

For the samples obtained from slaughter house and segmentation house, 50ml sterile water was shaken up entirely, and 1ml solution was taken out into another sterile test tube with 9ml sterile water. Decimal dilutions were carried out in the follows. For the samples from prepared chicken products plants, 25g chicken was taken out aseptically from each 250g sample. And it was rubbed aseptically with 225ml sterile water. 1ml solution was taken out as original diluents. Decimal dilutions were then carried out. Microbial counts were determined using plate count agar(GB/T4789.28-2003) decantation plates incubated at 37**°C** for 72 h(GB/T4789.2-2003).

III. RESULTS AND DICUSSION

Microbial counts of the chicken carcass and chicken parts were between 2.12~3.95 Log10cfu/cm^2 (Table1),

which were under Chinese standard GB16869-2005 (6 Log10cfu/cm^2) for fresh poultry. However, they were some degree higher in parts than in the carcass, and it was significant ($p<0.05$) higher in middle wing than other parts. Additional operation may be the cause. Microbial counts of the chicken guts were 3.87~4.31 Log10cfu/cm^2 (Table1), which was also lower than 6 log10cfu/g. But it was much higher than other parts. So, we can conclude that bacterial counts in chicken carcass and parts are acceptable, while more attention should be paid to chicken guts [4].

Table1. Bacterial counts (cfu/cm^2) found in carcass and different parts (n=15)

Sampling points	Carcass after cooling	Whole wing	Middle wing	Leg	Meat of leg	Breast	Heart	Liver
Bacterial counts /logN	2.12±0.22^{d}	2.34± 0.19^{cd}	3.95± 0.17^{b}	2.61± 0.11^{c}	2.30± 0.22^{cd}	2.46± 0.10^{cd}	4.31± 0.32^{a}	3.87± 0.25^{b}

Table 2 Bacterial counts (cfu/g) found in main working procedures of chicken balls and chicken fillets. (n=15)

Bacterial counts in main working procedures of chicken balls /logN		Bacterial counts in main working procedures of chicken fillets /logN	
Material chicken	4.28±0.01^{d}	Material chicken	4.32±0.087^{c}
After cutting	5.17±0.02^{b}	After tumbling	5.24±0.286^{ab}
After chopping	5.55±0.01^{a}	After freezing and cutting	5.10±0.260^{b}
After cooking and dropping	4.73±0.14^{c}	After inserting skewers	5.46±0.221^{ab}
After packaging (product)	4.27±0.004^{d}	After packaging (product)	5.78±0.181^{a}

Chicken balls and chicken fillets were chosen as representative products for their most familiarity in Chinese market. Microbial counts in chicken balls processing were 4.27~5.55 Log10cfu/g, and it was 4.32~5.78 Log10cfu/g in chicken fillets processing. It was significantly different ($p<0.05$) among working procedures in both chicken balls processing and chicken fillets processing. The Bacterial counts were above 5.0Log10cfu/g in most working procedures, especially in chicken fillets processing. It was 4.27 Log10cfu/g in ultima chicken balls, and 5.78 Log10cfu/g in chicken fillets, which was above GB16869-2005 (5×10^5cfu/g) for frozen chicken products or near to that. So, there were serious contamination problems in chicken prepared products processing. Safety was a big problem for producers and consumer.

IV. CONCLUSION

As materials, chicken carcass and chicken parts are acceptable. The bacterial counts were lower than 6 Log10cfu/cm^2. However, more attention should be paid to chicken guts. The problem is that there are serious contamination problems in chicken prepared products processing, and as a result, the ultima products had a high bacterial counts. It was 4.27 Log10cfu/g in ultima chicken balls, and 5.78 Log10cfu/g in chicken fillets, the latter was higher than 5×10^5cfu/g and should be considered as unacceptable product. So, Safety was a big problem for producers and consumer. And efforts should be taken to the plants and processing. Hurdle technology and microbial prediction technology were needed to further study and apply.

REFERENCES

[1] Fliss, I., Simard, R. E., & Ettriki, A(1991). Microbiological quality of different fresh meat species in tunisian slaughterhouses and markets. Food protection, 54, 773.

[2] Geroge-John E. Nychas, Panos N. Skandamis, Chrysoula C.(2008). Meat spoilage during ditrbution. Meat Science ,78, 77-89.

[3] Gill, C. O., Moza, L. F., Badoni, M., Barbut, S. (2006). The effects on the microbiological condition of product of carcass dressing, cooling and portioning processes at a poultry plant. Food Microbiolgy, 110, 187-193.

[4] Maite Alvarez-Astorga, Rosa Capita*, Carlos Alonso-Calleja, Bntito Moreno, Maria del Carcia-Fernandez(2002). Microbiological quality of retail chicken by-products in Spain. Meat Science, 62, 45-50.