STUDY OF CONTAMINATION VARIATION LEVEL OF STAPHYLOCOCCUS AUREUS IN POULTRY SLAUGHTER PREMISES WITH HACCP SYSTEM

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Background

Staphylococcus aureus is part of the microflora of chickens, commonly associated with bruised or infected tissue, nasal passages, skin surfaces, and arthritic joints (Mead and Dodd, 1990; NACMCF, 1997). Low levels of *S. aureus* are commonly found on the surface of poultry and throughout poultry processing premises (Thompson *et al*., 1980; Noterman *et al*., 1982; Mead and Dodd, 1990). Typically, these are poultry-associated strains which can be differentiated from human isolates (Gibbs *et al*., 1978a,b). Poultry strains do not seem to be important in the aetiology of poultry product-associated staphylococcal intoxications and may be considered as unimportant in terms of food safety (Isigidi *et al*., 1992). Instead, most staphylococcal outbreaks appear to be related to contamination of cooked products by infected food handlers followed by improper holding temperatures (Bryan, 1980). Prevalence of *S. aureus* in broiler carcasses in the United States was found to be 64% based on a nationwide baseline survey (USDA FSIS, 1996a). The survey did not identify whether the isolates were poultry-associated strains or human strains. A New Zealand survey found *S. aureus* to be present in 3.6% of 48 ready-to-eat poultry product samples tested with 7 samples (0.5%) found to contain excessive numbers (Campbell and Gilbert).

Objectives

The purpose of this study was to detect of prevalence rate, variation of contamination level contamination frequency of *Staphylococcus aureus* and critical points on slaughtering line.

Materials and methods

30 samples is taken in each of slaughtering stages of poultry slaughter house in the city of
Tabriz. Samples were :
  A. 50ml water of scalder.
  B. $25cm^2$ skin swab
  C. meat sample after defethering
  D. meat sample after eviscerating
  E. meat sample after cold water washing.
  F. water of chiller.
  G. meat sample after chilling.
  H. meat sample from markets.

For sample preparations and culture of *Staphylococcos aureus* with standard plate count is used standard methods of Institue of standards and Industrial Research of Iran, no: 356,1194. T-test for quantitative data and Mc nemar test for qualitative data are used.

Results and discussion

Staphylococcus aureus count (spc) in each of premises sampling indicated in table 1

Table 1: A) water of scalder, B) skin swab, C) meat sample after defethering , D) meat sample after eviscerating E) meat sample after cold water washing, F) water of chiller, G) meat sample after chilling, H) meat sample from market

Sampling stage	sample	mean	*Std. Deviation*	*Variation*
A	30	$10^3 \times 1$	$10^3 \times 2.61$	$10^6 \times 1.6$
B	30	$10^3 \times 2.88$	$10^3 \times 2.6$	$10^6 \times 6.8$
C	30	$10^4 \times 1.23$	$10^4 \times 1.5$	2.24E+8
D	30	$10^4 \times 3.42$	$10^4 \times 3.9$	1.54E+9
E	30	$10^4 \times 1.97$	$10^4 \times 2.19$	4.82E+8
F	30	$10^3 \times 8.5$	$10^4 \times 2.19$	4.82E+8
G	30	$10^4 \times 1.06$	$10^4 \times 1.02$	1.06E+8
H	30	$10^4 \times 1.55$	$10^4 \times 1.79$	3.21E+8

Increasing the mean of *staphylococcus aureus* contamination level after each of premises such as defethering, eviscerating and immersion chilling is significant ($p<0.05$). But, decrease of staphylococal contamination level in cold water spray washing is not significant ($p>0.05$)(chart1)
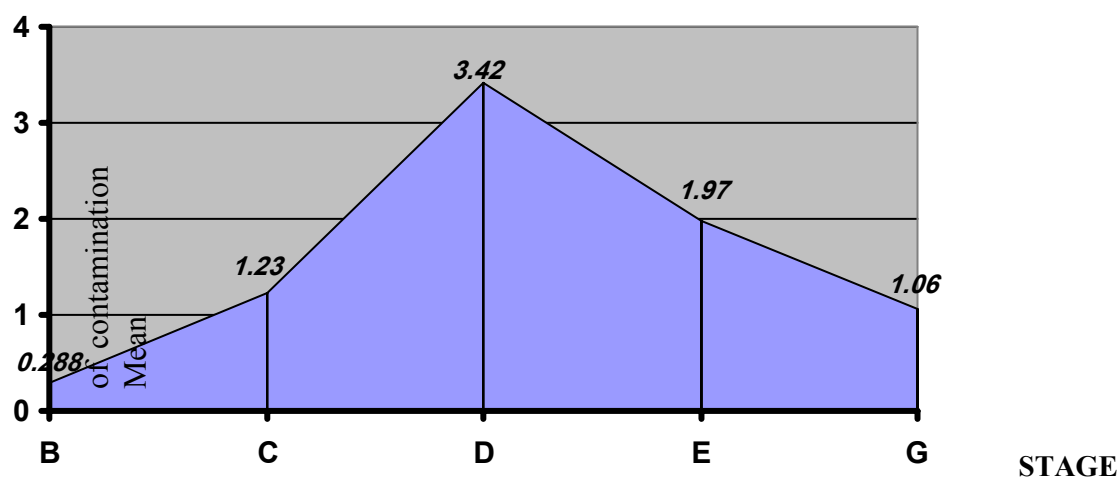

CHART 1: Variation of *staphylococcus aureus* contamination level in B) skin swab, C) meat sample after defethering , D) meat sample after eviscerating E) meat sample after cold water washing, G) meat sample after chilling,
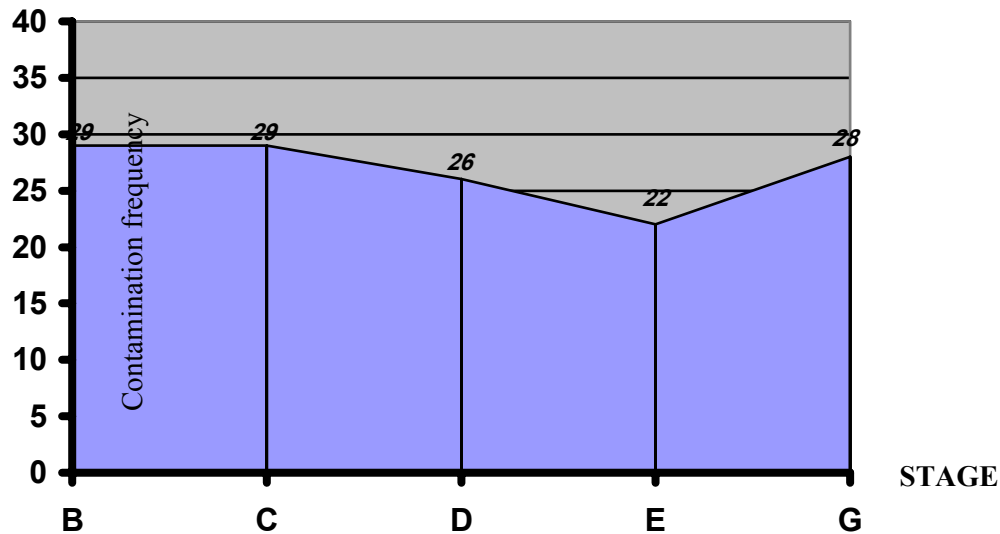
CHART 2: Variation of *staphylococcus aureus* contamination frequency in B) skin swab, C) meat sample after defethering, D) meat sample after eviscerating E) meat sample after cold water washing, G) meat sample after chilling,

Staphylococal contamination frequency after immersion chilling compared with cold water spray washing was showed significant increase (p<0.05)(chart 2). Finally *Staphylococcus aureus* contamination prevalence rate in each of poultry slaghter premises is showed in chart 3.
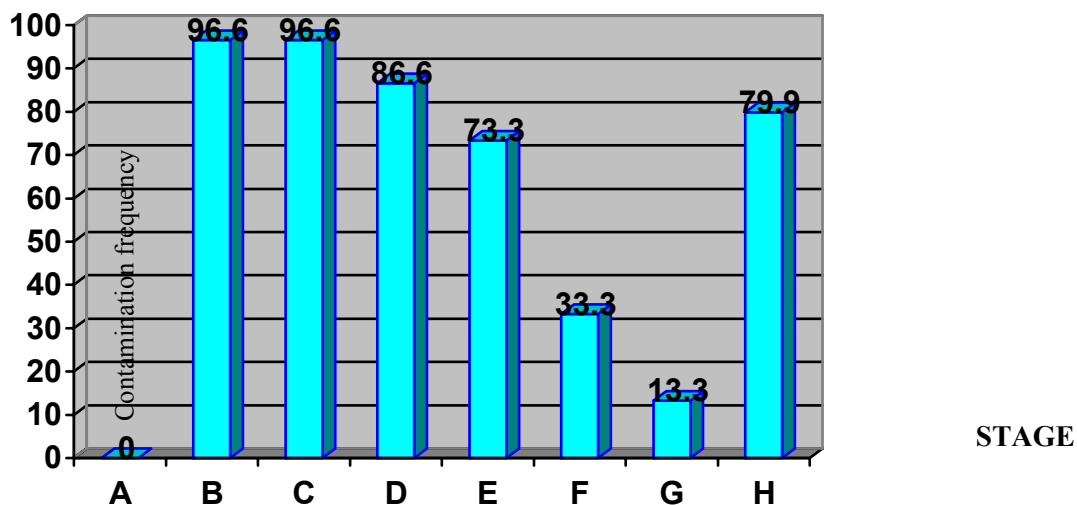

Chart 3: A) water of scalder, B) skin swab, C) meat sample after defethering , D) meat sample after eviscerating E) meat sample after cold water washing, F) water of chiller, G) meat saple after chilling, H) meat sample from market

Conclusions

Finally results show that, stages of defethering, eviscerating cold spray washing and immersion chilling are seriously critical points in slaughter houses. Any control processes were not applied on them. Thus, they result in increasing contamination in poultry meat.

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