

***E.coli* contamination level in premises of poultry slaughter house with HACCP system**

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Abstract:

Some microorganisms such as Salmonella, Listeria and Campylobacter ... are caused Food Born Diseases in human. That, control and food safety are not able to prevent them. However, it is necessary, to a new system for achieving it's targets. So, evaluation of *E.coli* contamination rate in poultry slaughter house premises is aim of present study.

In this study after validation of principals of system in poultry slaughter house and design process premises diagram and hygiene hazards of poultry studied in slaughter line and detected critical points. Then, 30 samples be taken from slaughtering stages such as 1) cloac swab before scalding. samples of skin and meat 2) after defething 3) after eviscerating 4) after cold water washing 5) after removing of chiller 6) after cutting in super markets; and water samples of: 7) scalding 8) chiller.

Prevalence rate of *E.coli* and contamination level were studied with Standard method of Institute of standards and Industrial Research of Iran, no: 437. Mcnemar test for qualitative data was used. Resulting of 8 stages sampling were showed , that Relative frequency of *E.coli* are 93.3% , 100% , 100% , 86.6% , 100% , 100% , 100% , 93.3% respectively.

E.coli contamination frequency after cold water washing compared with after eviscerating were showed significant decreasing ($p<0.05$).

Finally results were showed that, cold water washing is seriously control point in slaughter house.

Key words: Poultry, HACCP, *E.coli* & Slaughterhouse

INTRODUCTION:

The HACCP (hazard analysis critical control point) system is a systematic approach to the identification, evaluation and control of hazards (whether biological, physical and chemical) in all stages of food production (Codex Alimentarius, 1997 Codex Alimentarius Commission – Joint FAO/WHO Food Standards Program (1997). Hazard analysis and critical control point (HACCP) system and guidelines for its application.[Codex Alimentarius, 1997] and [NACMCF, 1997]). It is widely acknowledged as the best method of assuring product safety and is becoming internationally recognized as a tool for controlling food borne safety hazards ([Khandke and Mayes, 1998] and [Kvenberg et al., 2000]). It reflects the uniqueness of a product and its production method (Panisello & Quantick, 2001) and can be described as a preventive, dependent, dynamic and interventive control system ([Jouve, 1998], [Untermann, 1998] and [Untermann, 1999]).

Nowadays food industries invest considerable part of their resources to ensure the quality of their products, mainly with regard to the hygiene. This is because of the great economic losses which occur as a consequence of microbiological spoilage in food, as well as the appearance of food borne diseases in consumers. Poultry meat is one of the main products involved in food borne

infections, because of the presence of pathogens (Escudero-Gilete, González-Miret, Moreno Temprano, & Heredia, 2007).

E.coli has long been associated with poultry products. Commercial poultry flocks are prone to infection with *E.coli*, especially during the early weeks of life. The presence of *E.coli* in the gut, on the skin and the feathers causes contamination of carcasses during subsequent slaughter and processing. Since January 1997, slaughter plants have also been required to test carcasses for generic *E.coli* as an indicator of the adequacy of the plant's ability to control fecal contamination, the primary avenue of contamination for pathogenic microorganisms. Generic *E. coli* is present in animal feces and, thus, is a good proximate indicator of fecal contamination.

Escherichia coli O157:H7 is not commonly associated with chicken products. The organism was not recovered from any of the 1297 broiler carcasses analyzed in a US nationwide baseline survey (USDA FSIS, 1996a). Currently, there are no data available on the prevalence of *E. coli* O157:H7 on raw poultry products processed in New Zealand.

Methods:

30 samples are taken in each of slaughtering stages of poultry slaughter house in the city of Tabriz. Samples were: A) 50ml water of scalding. B) cloacal swab. C) meat sample after defeathering. D) meat sample after eviscerating. E) meat sample after cold water washing. F) 50ml water of chiller. G) meat sample after chilling. H) meat sample from markets.

Standards method of Institute of standards and Industrial Research of Iran, no: 356, 437 for preparation, culture and detection of *E.coli* in samples were used (1, 2). Mc nemar test for qualitative data were used.

Results and discussion:

E.coli contamination prevalence rate in each of poultry slaughter premises is showed in chart 1 and contamination frequency after cold water washing compared with after eviscerating were showed significant decreasing ($p < 0.05$).

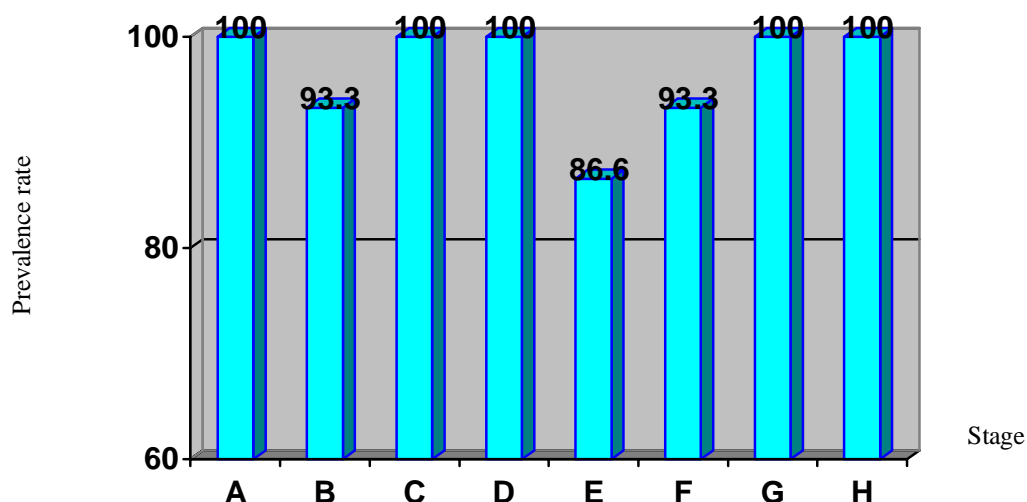


Chart 1: frequency of *E.coli* in A) water of scalding, B) cloac swab, C) meat sample after defeathering, D) meat sample after evisceration E) meat sample after cold water washing, F) water of chiller, G) meat sample after chilling, H) meat sample from market

In New Zealand, carcasses are spray washed after defeathering and after evisceration. Some premises also have a final inside/outside wash before immersion chilling. Several premises use 20 to 100 ppm chlorinated water for washing. Spray washing or other forms of rinsing are used to remove organic material and some of the microorganism that may have been acquired during defeathering and evisceration. This step helps reduce bacterial levels on carcasses (Bremner and Johnston, 1996). Immediate spray washing has been demonstrated to be as effective as trimming for removal of faecal contamination acquired during evisceration (Blankenship et al., 1975; 1993). The sprays can decrease the aerobic plate count, Enterobacteriaceae and coliforms by 50 to 90% (Sanders and Blackshear, 1971; May 1974; Mulder and Veerkamp, 1974; Thomas et al., 1987; CFIA, 1997). The incidence of salmonellae can also be decreased by immediate spray washing (Morris and Wells, 1970; ICMSF, 1998).). The Canadian standard requires that spray washing of carcasses occur within fifteen seconds after defeathering and after carcass transfer (rehang) in order to reduce the attachment of Salmonella and other bacteria to the skin (CFIA, 1999). Frequent multiple sprays from bleeding to chilling are more effective in reducing bacterial levels than a single final wash (Noterman et al., 1980; Mulder, 1985). The cleaning process before immersion chilling also ensures that high numbers of organisms are not introduced into the chill water. A high organic load at the start of chilling reduces the activity of chlorine against bacteria (Mead and Thomas, 1973). Lower bacterial numbers on carcasses can be achieved when chlorine is added to the spray water (Sanders and Blackshear, 1971). Chlorinated water sprays used to rinse chicken carcasses at the end of the evisceration line do not reduce the number of Salmonella-positive carcasses, indicating that Salmonella already on the carcass is not accessible to the chlorine (James et al., 1992). Studies show that once Salmonella becomes firmly attached to the muscle or carcass surface through entrapment or specific binding mechanisms, they resist removal by normal processing methods such as rinsing or washing (Lillard, 1989a; Benedict et al., 1991). Immediate and effective washing after a contamination step provides an opportunity for the reduction of microbiological contaminants on carcasses. Effectiveness of washing is dependent on water volume and pressure, spray patterns and bactericide levels (NACMCF, 1997).

Conclusions:

The results indicated that most stages might strongly be considered a critical point during the course of slaughtering procedures and cold water washing is seriously control point in slaughter house. If this stage is not controlled it might lead to increased level of *E.coli* contamination.

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