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The Prevalence of *Salmonella* spp. In Bovine Carcass at Tabriz Slaughterhouse, Iran

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Abstract: Foods of animal origin are considered to be the major sources of food borne salmonellosis. *Salmonella* cause much of the food poisoning in the world. Salmonella live in the intestinal tracts of humans and other animals. Humans are usually infected by eating foods contaminated with animal feces. For this study, 75 cattle carcasses were randomly sampled from Tabriz commercial slaughterhouse from September 2007 to January 2008. Sample swabbing of the carcasses was performed after evisceration. A surface of about 100 cm^2 per site was swabbed using two swabs for interior and the exterior surfaces of cattle carcass. Swabs were transported to the microbiological laboratory of Islamic Azad University, Shabestar branch and, for the isolation of *salmonella* from the sample was used culture media, supported by biochemical tests. Of all samples *salmonella* was not found.

Key words: *Salmonella* · Cattle · Slaughterhouse · Tabriz

INTRODUCTION

Salmonella are Gram-negative bacteria which belong to the genus *Salmonella*, the family enterobacteriaceae, [1]. They are small facultative anaerobic, straight rods, 0.7 - 1.5 × 2 - 5µm in size [2]. Salmonella cause much of the food poisoning in the world. Salmonella live in the intestinal tracts of humans and other animals, including birds. Humans are usually infected by eating foods contaminated with animal feces. Contaminated foods are often of animal origin, such as beef, poultry, milk or eggs, but any food, including fruits and vegetables, may become contaminated. Contaminated foods usually look and smell normal and the contamination should not be expected to be visible. Salmonellosis in animals always presents a potential zoonotic threat [3]. Microbial contamination of animal carcasses during slaughtering is an unavoidable problem in the slaughterhouse [4]. Fecal matter was a major source of contamination and could reach carcasses through direct deposition, as well as by indirect contact through contamination with clean carcasses, equipment, workers, installations and air [5-7]. The process of removing the gastrointestinal tract during slaughtering of food animals is regarded as one of the most important sources of carcass and organ contamination with *Salmonella* at slaughterhouse [8, 9]. As a first step in developing a microbiological verification of the efficacy of a CCP within a HACCP system, it is necessary to establish baseline data typical of good manufacturing practice. Subsequently, such data become the criterion against which the hygienic efficiency of improved process technologies or antimicrobial interventions can be realistically assessed [10].

The aim of this study was to determine the prevalence and serotype of *Salmonella* isolates on cattle carcasses at Tabriz commercial slaughterhouse.

MATERIALS AND METHODS

This study was a cross-sectional study for microbiological examination of samples from cattle carcasses. 75 cattle carcasses were randomly sampled from Tabriz commercial slaughterhouse from September 2007 to January 2008. Sample swabbing of the carcasses was performed after evisceration. A surface of about 100 cm^2 per site was swabbed using one single sterile swab

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Table 1: The results of biochemical test for *salmonella* positive samples

TSI	Indole	Citrate	MR	VP	Urea	Lysine	Malonate	Dolsitol
ALK	-	+	+	-	-	+	-	+
Acid								
H_2S	±							
Gas	+							

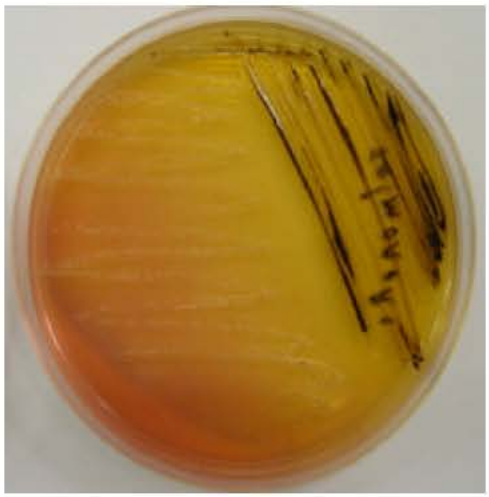

Fig. 1: *Salmonella* colonies on SS agar

Fig. 2: *Salmonella* on TSI

for interior and the exterior surfaces of cattle. Each swab was transferred to 10 ml Selenite cystine (SC) broth (Himedia) as selective enrichment. It incubated at 37° C for 24 h. At the end of the incubation period, a loopful from each of the selective enrichment broths was streaked onto Salmonella-Shigella (SS) agar, and incubated at 37°C for 24 h. The plates were examined for the presence of typical colonies of *Salmonella* (transparent colonies with black centers on SS agar) (Fig. 1). Smears of suspected colonies were stained with Gram's stain and examined morphologically for staining characters. Presumptive *Salmonella* colonies were then subjected to initial screening tests using triple sugar iron agar (TSI) slant(Fig. 2), lysine iron agar (LIA) slant (Merck), urea broth (Merck) and lysine decarboxylase broth (Merck). TSI incubated at 37°C for 24 h and LIA incubated at 37°C for 24-48 h. All biochemical tests were performed at 37°C for 18-24 hrs including citrate utilization, indol production, methyl red, motility, urease and Voges-Proskauer (Table 1) [11].

RESULTS AND DISCUSSION

Of all samples, *salmonella* was not found. It seems that the washing procedure in the slaughterhouse decreases *salmonella* contamination on the cattle carcass at Tabriz slaughterhouse.

From the results of the present study, it could be concluded that *Salmonella* is not widespread in cattle carcass obtained from Tabriz slaughterhouse, Iran. Although it could be a potential vehicle for food-borne infections and implementation of preventive measures and consumer food safety education efforts are needed. Proper cooking of meat products before consumption and improving personal and meat hygiene in the line of meat production from farm to fork should be adopted to ensure the safety of meat and meat products for human consumption.

In Shiraz, Iran, Tahamtan *et al.* [12] reported that of all 150 cattle carcasses, 45(30%) were contaminated with *salmonella* .

Arthur and *et al.* [13] investigated *Salmonella* prevalence in the lymph node of cattle in United States. *Salmonella* prevalence in the lymph node samples was low, with an overall prevalence of 1.6% and a 95% confidence interval of 0.85 to 2.3% [13]. Lymph nodes from cull cattle carcasses had a higher prevalence of Salmonella than did those from fed cattle carcasses.

Lymph nodes from th flanks of cow and bull carcasses had the highest prevalence at 3.86%, whereas lymph nodes from the chuck region of fed cattle carcasses had the lowest prevalence at 0.35% [13]. Three of the 18 Salmonella-positive lymph node samples contained multidrug-resistant Salmonella and all 3 samples were from cull cattle. Several studies have revealed that antibiotic-resistant *Salmonella* can be isolated from cattle [13].

In another study, 40% of the *Salmonella*-positive hide and carcass samples harbored only isolates that were susceptible to all 13 antibiotics tested, but the remaining 60% had Salmonella isolates that were resistant to one or more antibiotics [13]. Sofos *et al*. [14] did not detect *Salmonella* in any of the lymph nodes sampled of cattle carcass . In two studies performed in Australia, *Salmonella* was isolated from several mesenteric lymph nodes [13].

Some authors have reported the absence of *Salmonella* on ovine carcasses, Phillips *et al*. [15] have not isolated *Salmonella* on any of 1117 ovine carcasses tested and Bhandare *et al*. [16] on 144 Carcasses.

In conclusion, our results reflect the absence of *salmonella* contamination on cattle carcasses slaughtering and handling at Tabriz slaughterhouse. According to other studies it seems that the hole line of slaughterhouse should been investigated for salmonella contamination and the sample size should be increased.

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