Detection of Salmonella In Some Red and White Frozen Meat Obtained From Local Market.

Sudad J. Mohammed BVM&S, MSc

Abstract:
Background: Salmonella spp. are one of the most frequently reported causes of bacterial foodborne outbreak in the world.
Objective: This study has been conducted to detect salmonella as a major public health problem worldwide.
Methods: A total of 12 samples including 8 white meat (chicken) and 4 red meat (beef) samples were collected randomly from each sample; 25gr was separated and treated with 225ml of buffered peptone water, incubated at 37C°and 42C° for 24 hours. Samples were streaked on selective enteric agar.
Result: Totally 4 out of 8 chicken meat and one out of 4 red meat samples were contaminated with Salmonella spp.
Conclusion: These results confirmed the previous findings stating the proper packaging of meat products can effectively decrease the rate of microbial contamination.

Key words: Salmonella, Meat product, local market.

Introduction:
Food borne diseases are one of the serious problems in developed and developing countries (1). Food borne disease is a widespread public health concern (2). More than 100 million people are afflicted by food borne and waterborne disease in the world (3). Salmonella is gram negative rod, mostly non lactose fermenter, facultative anaerobic, non-sapote forming, produce acid and gas from glucose, belonging to the family Enterobacteriace (4). Salmonella is one of the most commonly reported causes of food borne diseases in the European Union which show the highest disease burden on the population scale among bacterial food-borne pathogen (5). Salmonella contaminated in animal, entering the slaughterhouse can be attributed to several sources such as lairages, holding pens, transport, contaminated slaughterhouse equipment, floor and personnel, animal’s viscera and processing facilities (6). Food borne salmonella infection is an important cause of morbidity and mortality worldwide. In this study detection of salmonella in some Red and White meat products obtained from market were investigated.

Materials and Methods:
Collection of samples: A total number of twelve meat samples including 8 white meat (Chicken) and 4 red meat (Beef) were obtained randomly from different food outlets during the period from March to June 2014. All these frozen samples were immediately transferred to the microbiology laboratory at Market Research and Consumer Production Center, Baghdad University, and kept at -18C° at deep freezer until use (table1).

Preparation of samples: 25g of meat was taken from each meat production sample in sterile stomacher bag, grinded, was used to inoculate 225ml of peptone water and mixed with stomacher. Prepared samples were serially diluted (10⁻¹) in sterile water and used to enumerated Salmonella spp. in specific culture medium.

Estimation of microbial count: This was carried out according to the methods described by (7 and 8), which include the following methods:
a) Total Plate count: Diluted samples were cultured on plate count Agar by using one ml of each dilution (10⁻¹) which added to petri-dish and incubated at 37C° for 24 hours, colonies were counted.
b) Total coliform Bacteria: Diluted samples were plated onto Violet Red Bile agar by using one ml of (10⁻¹) dilution which added to agar then another layer of medium was added to make anaerobic atmosphere. Plates were incubated at 37C° for 24 hours, developed colonies were counted.

Isolation and Identification of Salmonella: Prepared samples with (10⁻⁹) dilution, (0.1ml) mixture was used to inoculate culture media, Salmonella Shigella agar (SSA) and Deoxycholate citrate agar (DCA) and incubated at 42C° overnight. All suspected colonies were submitted to the standard biochemical reactions as Triple sugar iron (TSI). agar, Lysine decarboxylase (LIA), Urease, Indole, methyl red, simmon citrate utilization to confirm whether they belong to Salmonella spp. ISO(2002)(9). Many cultures of Salmonella may produce colonies with large, glassy block centers or many appear as almost completely block colonies.
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**Results:**
Table (1) shows the total plate count among samples of chickens and beef meat. High total count were recorded among sample frozen chicken (Halal) $44 \times 10^3$ CFU/g and low total count was recorded among sample frozen chicken wings (Banvit) $9 \times 10^3$ CFU/g. While high total count were recorded among frozen beef meat (Al-Anwar) $28 \times 10^3$ CFU/g and the low total count was recorded among frozen beef meat (Kurat-Baraka) $2 \times 10^3$ CFU/g (Table2). High coliform bacteria count was recorded among chicken at frozen chicken leg (Halal) $23 \times 10^3$ CFU/g and low coliform bacteria count was recorded among frozen chicken frank (Keskinoglu) $6 \times 10^3$ CFU/g. While High coliform bacteria count was recorded among frozen beef meat (Kurabara) $9 \times 10^3$ CFU/g and low coliform bacteria count was recorded among frozen beef meat (Al-Anwar) $28 \times 10^3$ CFU/g and low bacterial beef was recorded among frozen beef meat (Al-Halal) $2 \times 10^3$ CFU/g (Table3). Table(2and3) also show that culture method identified 4 samples of chicken as contaminated by Salmonella, while only one samples of beef meat sample was contaminated by Salmonella.

Statistical Analysis: Statistical significance was assessed by using least significant differences – LSD (T-test) P – value < 0.05 was considered significance.

**Table (2): Detection of Salmonella and Coliform bacteria from white frozen meat.**

<table>
<thead>
<tr>
<th>No</th>
<th>Sample of Chicken</th>
<th>Total Bacteria CFU/g</th>
<th>Total Coliform Bacteria CFU/g</th>
<th>Salmonella</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Akpilic</td>
<td>$12 \times 10^3$</td>
<td>$9 \times 10^3$</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>Halal</td>
<td>$44 \times 10^3$</td>
<td>$23 \times 10^3$</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Sadia</td>
<td>$32 \times 10^3$</td>
<td>$11 \times 10^3$</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>keskinoglu</td>
<td>$41 \times 10^3$</td>
<td>$6 \times 10^3$</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>Banvit</td>
<td>$9 \times 10^3$</td>
<td>$51 \times 10^3$</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>Beyza</td>
<td>$15 \times 10^3$</td>
<td>$36 \times 10^3$</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Al-Bayader</td>
<td>$56 \times 10^3$</td>
<td>$24 \times 10^3$</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>Al-Faris</td>
<td>$47 \times 10^3$</td>
<td>$35 \times 10^3$</td>
<td>+</td>
</tr>
</tbody>
</table>

Table (3): Detection of Salmonella and Coliform bacteria from red frozen meat

<table>
<thead>
<tr>
<th>No</th>
<th>Sample of Beef</th>
<th>Total Bacteria CFU/g</th>
<th>Total Coliform Bacteria CFU/g</th>
<th>Salmonella</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Kirat-Baraka</td>
<td>$9 \times 10^3$</td>
<td>$11 \times 10^3$</td>
<td>--</td>
</tr>
<tr>
<td>10</td>
<td>Halal - Al</td>
<td>$98 \times 10^3$</td>
<td>$2 \times 10^4$</td>
<td>--</td>
</tr>
<tr>
<td>11</td>
<td>Al-Anwar</td>
<td>$28 \times 10^3$</td>
<td>$40 \times 10^3$</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>Al-masria</td>
<td>$31 \times 10^3$</td>
<td>$21 \times 10^3$</td>
<td>--</td>
</tr>
</tbody>
</table>

(--) Salmonella not detected (+): Salmonella detected

**Discussion:**
Salmonellosis is one of the most important food borne diseases (10). High prevalence of salmonella spp. In chicken and beef samples obtained in this study was similar to the previous studies (11, 12, 13). Salmonella spp. infections are usually caused by handing on consuming contaminated food products (14). Cutting boards surfaces used for preparation of meat and equipment like meat grinds, mincers blender are considered an important source of meat contamination by salmonella (15). Other study mentioned that tracks lairages, Slaughter line, quartering knives and surface of table are main sources of salmonella contamination of meat and meat products (6,16). Contaminated water used to clean equipment and cutting slicing machines leading to cross-contamination especially if used with raw foods, handlers not practicing proper sanitation and faulty monitoring devices (17).
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Conclusion:
Meat and chicken products like, frozen chicken, beef meat, buyer, minced meat are considered important sources of pathogenic salmonella spp. which causing severe gastroenteritis in human good cooking of meat products before eating can tremendously decrease the incidence of salmonella.

Reference:
1-Higgs,J.D. Leaner Meat: An overview of the compositional changes in real meat over the last 20 years and how these have been achieved. Food ,Sci. and Technology.2000,14:22-26.
7-AOAC. U.S. Food and drug Administration Bacteriological Analytical Manual. 1998, 8thd. ADAC international USA.