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OCCURRENCE OF SALMONELLA AND YERSINIA ENTEROCOLITICA IN SOME MEAT PRODUCTS

(With 4 Tables)

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تواجد السالمونيلا واليرسينيا انتيروكوليتيكا في بعض منتجات اللحوم

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أجريت هذه الدراسة على مائة عينة من اللانشون بواقع ٤٠ عينة ، ٣٠ عينة لكل من اللحم المفرى والأرباع الأمامية والخلفية للفراخ وذلك بعد تجميعها من منافذ البيع المختلفة بأسيوط وذلك بهدف التعرف على تواجد السالمونيلا واليارسينيا انتيروكوليتيكا ولقد تبين من الدراسة أن جميع العينات إيجابية للبرسينيا بالنسب الأتية على الترتيب (٣٣,٣٣ ، ١٦,٦ ، ٧,٥٪) من الفراخ ، اللحم المفرى، اللانشون ولم يتمكن عزل ميكروب السالمونيلا من جميع هذه العينات. ولقد تم عزل ١٨ عترة لليارسينيا انتيروكوليتيكا وعند اختبار ضراوة هذه المعزولات اتضح أن ١٤عترة بنسبة (٧٧,٧٧٪) حققت قدرتها على التهاب العين اليمنى لحيوان خنزير غينيا وحدوث الاسهال الاسود فى الفئران وكذلك احداث تعكير وتجلط فى أنابيب الاختبار المحفوظة عند ٣٥ درجة مئوية بينما لم تحقق اربع عترات فقط بنسبة (٢٢,٢٢٪) كفاءتها وقدرتها على إحداث نتائج إيجابية فى الاختبارات السابق ذكرها وقد تمت مناقشة الأهمية الصحية للميكروبات المعزولة والاحتياطات الواجب إتخاذها لتقليل تواجدها والتخلص منها فى منتجات اللحوم والفراخ .

SUMMARY

Hundred random samples of meat products and chicken quarters including Luncheon (40), minced meat and chicken quarters (30 samples each) were collected from different localities in Assiut city. The samples were examined for existence of *Salmonella* and *Yersinia enterocolitica*. The obtained results revealed that *Y. enterocolitica*

was isolated from (33.33, 16.6 and 7.5%) of the examined chicken quarters, minced meat and luncheon samples respectively, while no *Salmonellae* were recovered from the samples. The virulence tests were carried out on *Y.enterocolitica* "18 strains) recovered in this study. The obtained results proved that 14 (77.77%) out of 18 strains were virulent depending on Guinea pig conjunctivitis tests mouse diarrhoea model and auto agglutination test. On the other hand, only 4 strains (22.22%) recovered from chicken quarters were non pathogenic. The public health significance and suggested measures for improving the quality of meat and chicken products were given.

Key words: *Meat products - Salmonella and Yersinia*

INTRODUCTION

Salmonellae are high-profile organisms and probably constitute the food poisoning bacteria best known to the general public in the world. Although around 2000 serotypes of *Salmonellae* are known, most cases of food poisoning are caused by a much more restricted range of strains, for example *Salmonella typhimurium* and *Salmonella newport* are of significance public health hazard and implicated in several food poisoning outbreaks due to consumption of meat or meat products in Egypt (Ramadan and Sadek, 1971).

Salmonellae do not release toxins into food in which they multiply; rather, the ingested cells multiply in the small intestine of the victim, causing illness. This illness is characterised by diarrhoea, vomition and abdominal pain after an incubation period of 12 - 36 hours (Waytl, 1992).

These organisms are distributed over the world.. The primary source of Salmonella is the intestinal tract of animals, whether there are acute cases are carriers. A variety of raw and processed foods have been found to carry Salmonella, including raw meat poultry as well as meat and poultry (Committee on Salmonella, 1969 and Foster, 1969).

Y. enterocolitica is a pathogen capable of causing a food born infection. The incubation time is 24 - 36 hours and longer. The

symptoms and signs consist of abdominal pains, similar to that of acute appendicitis; fever, headache, and malaise; nusea, vomiting, and diarrhea. The illness so far has been more prevalent in Japan and Europe than in the United States and Canada. Asakawa et al., 1973; Toma and Lafleur, 1974).

Y. enterocolitica is Gram negative facultative anaerobic rods, ubiquitous throughout the animal world. It has been suggested that cattle and swine may be important reservoirs of yersinia, Leistner et al., 1975; Toma and Deidrick, 1975). It has been isolated from various foods such as beef and chicken meats (Stern and Oblinger, 1980).

Therefore, this work was planned to asses the occurrence of *Salmonella* and *Y. enterocolitica* in some meat products and chicken quarters available at retail outlets.

MATERIAL and METHODS

I- Collection of samples:

A hundred random samples of meat and chicken products including 40 samples of lunchon, 30 minced meat and 30 frozen chicken aquarters samples, were collected from different supermarkets and groceries in Assiut city. The samples were marked and aseptically transferred to the laboratory without undue delay, where they were immediately examined.

II- Preparation of samples:

Each sample was aseptically freed from its casing. The samples of luncheon as well as pectoral and thigh muscles of chicken quarters, were cut into very small pieces while minced meat were mixed thoroughly in sterile morters.

III- A) Isolation and identification of *Salmonella* organisms:

20 g of the prepared samples were inoculated into 10 ml of peptone water and incubated at 37°C for 24 h. Then 10 ml of the incubated peptone water were inoculated into 100 ml of selenite F. broth. After incubation at 37°C for 18 h, a loopful of the incubated enrichment broth was streaked onto MacConkey, Brilliant green and S.S. agar media. Inoculated plates were incubated at 37°C for 24

The incidence of *Y. enterocolitica* in frozen chicken quarters examined was 33.3%. As far as we know, little available literatures were dealing with the incidence of *Y. enterocolitica* in chicken, but generally Warnken et al. (1987) detected the organism in 4 out of 5 giblets samples of chicken.

These variations in results, may be attributed either to the incorrect hygienic measures during preparing and processing of these products and/or to various temperatures used in storing the products, as freezing at -18°C results in 7% cell inactivation, while -75°C resulted in 42% cell inactivation (Greez and El-Zawahry, 1984).

Y. organisms are usually isolated by using a cold enrichment method followed by plating onto a selective medium because of its ability to multiply rapidly at temperatures near 4°C, and therefore, this methodology was chosen in this study.

The virulence tests were carried out on *Y. enterocolitica* (18 strains) recovered from the examined products, and the obtained results proved that 6 out of the 18 strains recovered gave a severe conjunctivitis (+++ve) in the form of eye ball depression of Guinea pigs, sever black diarrhoea in mouse diarrhoea model and also showed a strong reaction of autoagglutination which was graded as +++ve for both tubes incubated at 22°C and 35°C, while most strains were graded as mild (++ve) or weak (+ve) depending on their reaction. On the other hand, four strains were negative for all tests. Higher findings were reported by Feeley et al. (1979) who found that 54.6% of *Y. enterocolitica* strains caused sever conjunctivitis, while lower findings were stated by Laird and Cavanaugh (1980) who reported that 25 (13.9%) out of 180 *Y. enterocolitica* strains induced mice diarrhoea. Furthermore, lower findings were stated also by Warnken et al. (1987) who found that 4 (26.66%) out of 15 strains of *Y. enterocolitica* showed autoagglutination.

On conclusion, in view of the limited numbers of samples studied in this investigation, failure to isolate *Salmonellae* organisms should not infere with that these products (Luncheon, minced meat and chicken quarters) are not a source of Salmonella organisms. Investigations of these organisms in these products were previously reported by Safwat et al., (1985) and Holbrook et al. (1989).

Also, the results of this study emphasized that luncheon, minced meat and chicken quarters examined were contaminated with *Y. enterocolitica* and this may reflect the lack of hygienic supervision, therefore, to improve quality of these products bacteriologically and prevent consumers from being infected with this products many steps should be taken in consideration such as attention to hygienic handling practices as well as, using freezing and proper heat treatment.

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Table 1: Typical reactions of pathogenic *Yersinia enterocolitica.*

Test	incubation temperature	Test results
Kliger iron agar	35°C	Alkaline / acid but no gas or H2S positive
Urea hydrolysis	35°C	Positive
Sucrose fermentatiion	35°C	Positive
Salicin fermentation	35°C	Negative

Table 2: Wauters biotyping of *Yersinia enterocolitica.*

	1	2	3	4	5
Lecithinase	+	-	-	-	-
Indol	+	+	-	-	-
Trehalose	+	+	+	+	-

Table 3: Incidence of *Yersinia enterocolitica* in some meat and chicken products.

Type of samples	No. of examined sample	Number of positive	Percentage	Biotyping
Luncheon	40	3	7.5	3
Minced meat	30	5	16.6	3 & 4
Chicken	30	10	33.3	3 & 4

Table 4. Virulence of Yersinia enterocolitica strains recovered from the examined samples.

Types of samples	No. of strains	Tests of detection of virulence											
		Guinea pig conjunctivitis grade of reactions				Mouse diarrhoea model grade of reactions				Autoagglutination test grade of reactions			
		+++ve	++ve	+ve	-ve	+++ve	++ve	+ve	-ve	+++ve	++ve	+ve	-ve
Luncheon	3	-	2	1	-	-	2	1	-	-	2	1	-
Minced meat	5	2	3	-	-	2	3	-	-	2	3	-	-
Chicken quarters	10	4	2	-	4	4	2	-	4	4	2	-	4
Total	**18**	**6**	**7**	**1**	**4**	**6**	**7**	**1**	**4**	**6**	**7**	**1**	**4**