Isolation and identification of *Salmonella* species from local cheeses in Sulaimani province

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Abstract

A total of 120 random samples of local (Fresh, non- salted) cheese were collected from different markets of Sulaimani city during the period from October 2009 to June 2010. The results showed that three 2.5% out of the total 120 cheese samples were found contaminated with *Salmonella* species. *Salmonella enteritidis* was the only serotypes that have been found.

عزل وتمييز انواع السالمونيلا من الجبن المحلي في مدينة السليمانية

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الخلاصة

اجريت هذه الدراسة على مئة وعشرون عينة عشوائية من الجبن المحلي (الطري وغير المملح) والتي جمعت من اسواق مدينة السليمانية خلال الفترة من شهر تشرين الأول 2009 ولغاية شهر حزيران 2010 ولقد أظهرت النتائج ان 3 فقط من هذه العينات كانت ملوثة بالسالمونيلا وبنسبة 2.5%. تم عزل نوع واحد فقط وهو *Salmonella enteritidis*.

Introduction

During the last 25 years, there has been a continued increase in milk production and consumption of fermented dairy products (1). Fermented dairy products are cheese, yogurt and fermented milk. They are fermented by the addition of a starter culture such as lactic acid bacteria which are responsible for the production of lactic acid from lactose that gives the product its characteristic flavor. Cheese is one of the most consumed milk products (2). Cheese is an excellent source of protein, fat and minerals such as calcium, iron and phosphorus, vitamins and essential amino acids and therefore is an important food in the diet of both young and old people (3, 4). Family of *Enterobacteriaceae* contains many species which cause hazard to the consumer, other species are important from economic point of view as milk products. Salmonellosis may causes an outbreak of gastroenteritis (5, 6). Such infection not only has economic importance in agriculture and animal husbandry but also is believed to be major factor in the transmission of *Salmonella* to humans via food chain (7). Cheese like other types of food is exposed to contamination with microorganisms during the production process. Fresh cheese such as cottage and white cheese may be subjected to spoilage by coliforms, yeast and molds that enter as post-pasteurization contaminants (8). During cheese processing stages microbes can be introduced by cross-contamination from raw milk which is the raw material or from infected humans handling the food (9). The aim of this study was to investigate the contamination of locally-produced non fermented soft white cheeses with *Salmonella* species.

Material and Methods

A total of 120 samples of local Fresh-non salted white cheese were collected randomly from local markets in Sulaimani city during the period from October 2009 to June 2010. The Samples were directly transferred by refrigerated containers to the laboratory and analyzed immediately without further storage. Briefly, Twenty five grams of cheese were suspended in 225 ml of buffered peptone water and incubated for 24 h at 37° c for pre-enrichment. One milliliter of pre- enrichment broth was transferred to 10 ml of tetrathionate broth (Selective Enrichment) and incubated for 24 h at 42 °c. One loop-full of tetrathionate broth was streaked onto *Salmonella Shigella* agar and Brilliants green agar (Selective media) and incubated at 37° c for 24 h incubation. Following that, the suspected *Salmonella* colonies were transferred simultaneously to Kligler and Urea agar base tubes by stabbing the butt and streaking the slope, and incubated for 24 h at 37° c (10). Slide agglutination test was performed for the tubes showing reactions typical of *Salmonella*, using somatic polyvalent *Salmonella* serum (11). The isolated *Salmonella* strains were undergone serotyping at the Institute of Public Health, Baghdad, Iraq.

Result and Discussion

The results showed that three out of the total 120 cheese samples were found to be contaminated with *Salmonella* species. A total of 2.5% *Salmonella* serotypes were identified. *Salmonella enteritidis* was the only serotypes that have been found. The contamination of cheese may be due to the low Quality of raw milk used in cheese making or could be due to unsanitary conditions during processing and handling of cheese (12). The presence of the bacteria is inversely related to the presence of salt in cheese, the cheese used in this study was unsalted so it was not surprise to find *Salmonella* contaminants. The low percentage of contamination may be due to the season in which the study was performed, where the low temperatures of winter can affect the growth of *Salmonella* species that usually grow out 37° c (13). This study recommends the consumers to pasteurized and salted cheese rather than unsalted type which encourage the growth of *Salmonella* especially in bad stored cheese. Since diary products manufacturing, handling and distribution in Iraq are carried out under primitive conditions therefore *Salmonella* contamination was expected and, so it's highly recommended that strict hygienic conditions should be adopted during manufacturing and handling of such products, besides that local markets and processing should be periodically inspected by specialists (10). In addition to that, pasteurized milk should be used for the manufacturing of local soft white cheese with its preservation inside the brine.

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