Evaluation of Salmonella contamination in packed Mazafati dates

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Abstract

Introduction: Diseases caused by Salmonella in human and animals have existed since the ancient times, but its detection from the other diseases has been difficult. Salmonella organism is mostly pathogenic for humans and many animals. This bacteria influence the digestive tract of vertebrates spreading from human and animal feces and causing water, food and environment contamination.

Materials and Methods: One hundred 500gr packages of Mazafati dates were randomly sampled from the distribution centers and tested for the detection of Salmonella using BPW, for pre-enrichment in non-selective liquid medium, RV,TT test as the first and second selective enrichment media, and XLD, BGA for solid selective plating-out media.

Results: After evaluation of the result, only one of the samples showed Salmonella contamination confirming the antibacterial effects of, although requiring further research.

Key words: Date, Salmonella, Microbial contamination.

1 Introduction:

The immunity of nutrition is related to the dangers imposed on edible foods. Since the emergence of immunity dangers of nutrition can occur in every stage of nutrition chain, it is necessary to have adequate precautions along the nutrition chain. Therefore, the immunity of nutrition is guaranteed by all relevant parties of nutrition chain. Nutrition chain may include manufacturers of domesticated animals food, initial producers, food producers, transporters, storekeepers, contractors and caterers along with dependant organizations such as producers of equipment, packaging, cleansers, additives, etc. Service providers are also a part of this category. Given the growing lifestyle, dietary changes in recent decades and also lack of education in this regard, nutrition immunity risks are considered to be one of the main problems of societies. World Health Organization believes that diseases caused by consumption of contaminated foods are one of the main problems of our era.

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The measurement of Gram negative salmonella bacilli is about 0/1 - 1/5 x 1 - 5 in micron. Anaerobic and aerobic bacteria are optional and grow in laboratory normal medium (in 15 - 45 c). However, the appropriate temperature for their growth is 37 c. Salmonella grows largely in liquid medium such as nutrient broth and water peptone causing monotonous turbidity. By the passages of the time, a delicate layer will be made in the surface of liquid medium. Salmonella possesses general features of enterobacteriaceae family when treated with biochemical tests. These kinds of bacteria usually ferment carbonyl hydrate by acid and gas production. When salmonella enters through nutrition, it can be pathogenic to human and/or animal. Salmonella is transmitted to humans from animals or animal products and may cause some diseases such as enteritis, systemic infection and enteric fever.
Palm tree is a plant of palmaceae family. Its scientific name is phoenix dactylifera L. that is a monocotyledons plant. There are 200 genus and 400 types of its kind. Palm tree is a two-legged and constant plant that reproduces fruit for 5 years before dying. The type differences include stem, leave, pistil of flower and fruit. The date is a single, stretched, pointed and cylindrical fruit with terminal stigma. Mazafati date is ripe fruit of palm tree. This kind of fruit is dark violet, fleshy, nectarous and delicious. Desirable kind of Mazafati date grows in Bam. Date is an important product with annual export rate of one million ton. Detection of date microbial contamination is necessary in order to maintain export market and provide opportunity to compete with products of other countries, this study was conducted in order to examine contamination rate of packaged Mazafati date by salmonella.

2 Materials and methods:

One hundred packages of 500 gr. Mazafati dates were randomly sampled from distributing centers in Tehran. Considering lack of similar studies in the past, Cachran test was used to provide the least number of samples required.

Pre-assumptions:
Confidence: 95%
96.1 = \( z \)
0.1 = \( d \) - error value
0.5 = \( p - q \)
\[ n = \frac{z^2pq}{d^2} \]

Cochran Formula:
The samples were transported to the Standard Research Institute located in Karaj city followed by conducting salmonella tests. 25 g of the homogenized sample was added to 225 ml of non selective pre-enrichment media buffered peptone water for initial suspension. The resulting suspension was incubated at 37 c for 16 to 20 hours. For enrichment stage, after incubation period, 0/1 ml of initial suspension was added to a tube containing Rappaport-Vassiliadis Magnesium chloride / Malachite Green soya peptone broth, while, 1 ml of the some suspension was added to a tube containing tetrathionateno vibioine broth medium. The resulting 2 cultures were incubated at 41.5 c for 24 hours. After incubation period, the RVC broth was cultured by a culture loop on the surface of large petri dish having the first selective solid medium (Phenol Red / Brilliant Green Agar). Xylose lysine Deaxycholate Agar was used for the second selective solid medium and was cultured on the surface using this method. The previous stages were repeated by two selective solid medium for the resulting culture of tetrathionateno vibioine broth after incubation period. The resulting petri dishes were reversely incubated at 31 c for 24 hours. After incubation period, the petri dishes were examined in terms of salmonella colonies. Salmonella colonies changed the pink color of medium into red after growing on the surface of Phenol Red/ Brilliant Green.
Agar medium and are seen in the XLD medium in the form of tiny black convex colonies with gray halation.

3 Results and Discussion

The contamination of Mazafati dates to salmonella was examined in this study. There was no contamination in 100 samples of the study which is indicative of date antibacterial characteristic. Likewise, several related studies have been conducted confirming antibacterial effects of data. The results of a study in Yasouj University of Medical sciences indicated that consumption of data as a nutrition is very effective in prevention of bacteria that causes tooth decay, i.e. it can stop the growth of the relevant bacteria. There are also reports about useful effects of date extract in preventing growth of some microorganisms such as streptococcus. There was a study about antiviral effect of palm kernel oil against lytic phage in Pseudomonas aeruginosa that indicated this extract can have significant inhibition against this phage. There are also other studies including Sadinkin et al. about effects of Phoenix dactylifera extract against 6 mutant strains of Streptococcus and the sensitivity of all strains towards it as well as Sallal and Hammed study about the effects of date with various contraction concentrations to prevent the growth of pyogenic streptococci. In the studies that were conducted on Anatoli and Eastoni extract of kernel and its prevention effect against the growth of 9 strains of staphylococcus aureus, we concluded that these extracts have relatively good inhibitory effect against the growth of 9 strains of staphylococcus aureus. Given the studies on antibacterial feature of date and the results of this study as well as not growing Salmonella in cultured samples, one can conclude that date has useful antibacterial effects that can be considered as a substitute for less effective or even ineffective current medication and it can be used in the treatment of infectious diseases. It is noteworthy that more research is required to obtain solid results.

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