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ORIGINAL ARTICLE

The Fecal Coliform to Fecal Streptococci Ratio of Traditional Ice Cream in Tabriz (East-azerbaijan), Iran.

[1]Javadi. Afshin, [2]Safarmashaei.Saeid

[1]*Department of food hygiene, Tabriz Branch, Islamic Azad University, Tabriz, Iran.*
[2]*Young Researchers Club, Tabriz Branch, Islamic Azad University, Tabriz, Iran.*

Javadi. Afshin, Safarmashaei.Saeid; The fecal coliform to fecal streptococci ratio of traditional ice cream in Tabriz (East-Azerbaijan), Iran.

ABSTRACT

Most of present traditional ice cream from hygienic quality has non-conforming with extant standards. Pasteurization of primary ice cream mixture with sufficient thermal processing by increase in hygienic quality level causes control of primary infection. Origins of infection for traditional ice cream consist of: use of infected primary materials (milk or cream) or non-pasteurization of them. Study infection ratio of coliforms to Enterococcus is one of diagnostic method for fecal infection, therefore this study was performed in order to determine the infection ratio of fecal coliform and Enterococcus in traditional ice cream and also determine the ratio of fecal coliforms to Enterococcus for characterization of infection origins. In this study 30 ice cream samples from different regions of Tabriz were collected and after provided, enumeration of fecal coliforms and Enterococcus according to standards of Iran respectively 356, 2946, 2198 was done. In this study mean of coliform infection and Enterococcus infection respectively 6.676 and 307.10 were observed. According to result of this study and by attention to mean ratio of fecal coliform to Enterococcus in cow, therefore cow as origin of ice cream infection in Tabriz was distinguished, this probably is for direct and indirect contact with milks.

Key words: Traditional, Ice-cream, Coliforms, Enterococcus, Ratio.

Introduction

Ice cream is a frozen dessert usually made from dairy products, such as milk and cream, and often combined with fruits or other ingredients and flavors. Most varieties contain sugar, although some are made with other sweeteners. In some cases, artificial flavorings and colorings are used in addition to (or in replacement of) the natural ingredients. This mixture is stirred slowly while cooling to prevent large ice crystals from forming; the result is a smoothly textured ice cream. Use of ice cream in Iran in century of 19 from Europe entered to Iran and has been fashionable. The rate of consumption for ice cream in advanced countries in 2002 about 25 liter have been being which in Iran 1.7liter/year have

been reported [1, 2, 3, 4]. Friedhoff et al. (2005) have described the use of simple microbiological criteria, including aerobic mesophilic colony counts, Enterobacteriaceae counts, and in some instances, enumeration of yeast, performed on samples taken during processing in small businesses to verify good manufacturing practices [5]. This verification through monitoring was found to be an attractive alternative to the examination of end products and also coliform bacteria are one of most importance indicator organisms that are most commonly used to ensure food safety include coliform bacteria, fecal coliform bacteria, E. coli, total Enterococcus spp., and aerobic plate count (APC) [6,7,8]. Many psychrophiles and psychrotolerant microorganisms like Listeria monocytogens, Staphylococcus aureus, Bacillus

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Corresponding Author

Javadi A., Department of food hygiene, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
E-mail: javadi@iaut.ac.ir
Tel: 00989141165059

species, Salmonella species, Shigella species, Streptococus spp., Pseudomonas spp., Campylobacter spp., Brucella spp. and coliform bacteria are generally present in ice cream [9,10]. Streptococcus (group-D) consist of str.fecalis and Str.facium and coliforms have very importance in food science, because in most time infection to this agents in foods has been reported, therefore in recent years this bacterial as best index of fecal infection has been distinguished. Distinguish of coliform ratio to enterococcus is one of common methods for determine of fecal infection. For height ratio of enterococcus in animals feces and height ratio of coliforms in human feces this ratio in determine of fecal infection origin in foods have very importance, therefore the aim of this study is to determine of fecal coliforms infection and enterococcus in ice cream and also determine ratio of fecal coliforms to enterococcus for distinguish the origin of fecal infection.

Material and method

In present study for determine the ratio of ice cream infection to fecal coliforms and Enterococcus 30 samples from different regions of Tabriz were collected and after provided, enumeration of fecal coliforms and enterococcus according to standards of Iran No: 356, 2946, and 2198 was done. Also from spss (version12) program for determine of central index and dispersion index were used. 10 grams of samples representative sample were removed aseptically from each and homogenized samples in 90 ml of 1.5%peptone water, using a stomacher. From KF streptococcus agar (Merck) incubated at 37 °C for 72h and Lauryl sulfate tryptose broth (Merck) incubated at 37 °C for 24-48h and Lactose bile brilliant green broth incubated at 45 °C for 24-48h in this study were used[11,12,13].

Results:

According to results of this study 28.57% of samples infected to fecal coliforms and 14.28% of samples infected to Enterococcus were observed. Also mean of coliforms infection and Enterococcus infection in present study was 6.676 and 307.10 respectively. Table 1 shows mean, standard deviation and standard error mean for enumeration of fecal coliforms and Enterococcus in ice cream samples. The mean ratio of coliforms to Enterococci in samples 0.021738 was calculated. By attention to findings of Pitt in 1998, ratio of fecal coliforms to fecal Enterococcus in infectious with human origin is equal with 4.33, in cat 0.29, dog 0.02, mouse 0.0003, and cow 0.02 and in duck is 0.16 and in present study this Ratio 0.021738 were determinates, so that cow as origin for these infections were

distinguished[14].

Conclusion:

In recent years provision of food with low infection rate have very importance for determine the origin of fecal infection. In spite of the fact that animal faces is as one importance origin for food infection, therefore study on this subject is very importance and attractive for determine the origin infection in food and in ice cream. In one study by Wilson and et al. were determinates which for distinguish of human and animals fecal infection must use from collection of diagnostic method, but use of this collection need to very time and expense. Studies have been shown if there ratio of fecal coliforms more than total of enumerated coliform can say infection with human faces has been done [15].

Also in one study by Wouafo and et al. in Kameron (1996) on 300 ice cream samples, 71.3% (214 samples) of total samples infected to fecal bacterial were observed [16]. In one study by Bialasiewicz and Rzadzinska in lahestan (1997) on 195 samples, 12.3% of this samples infected to fecal coliforms were observed [17].In two study in Ankara (1981) and Kastarica (2000) respectively 25% and 82.5% of these studies infected fecal coliforms were reported [18,19]. In some study in Libya, India and Dakar respectively coliforms in this countries 6%, 19% and 10.6% were reported [20, 21, 22], whereas in some countries not isolation of this bacteria's were reported [23].

According to results of present study and by attention to others studies can say the infection ratio of ice cream to this microbial agents in Tabriz area is low, that is confirm with one study by Jushi et al. on Microbial Quality of Ice Cream Sold in Kathmandu [24]. In one study on Microbiological Quality of Ice Cream after HACCP Implementation, the staphylococcus aureus after HACCP introduction were not isolated but Escherichia coli were reduced, which this subject shows the importance of HACCP in ice cream production for reduce of this agents [25]. The results obtained from experimental ice cream clearly indicate that the pastry shops' (open/artisanal) ice cream samples are more contaminated by coliforms, Enterococcus and other aerobic bacteria than the others'. The results are generally similar by other authors' [26, 27]. Several other researchers have observed the presence of other pathogenic organisms in ice cream. Incidence of pathogenic bacteria such as Listeria monocytogenes and Staphylococcus aureus were found in the higher numbers together with other species of bacteria. Two Yersinia enterocolitica strains were isolated from non-industrial ice cream, which this agent cases a dangerous disease in human and have very important in human health [29]. The results suggest negligence

such as poor sanitation during the preparation/or storage of ice cream. These included the observed dirty premises, used utensils and the use of bare hands in preparing the products. Even the raw milk could be a possible source of contamination. Analysis of raw milk samples in different checkpoints of milk chain system showed that the samples were heavily contaminated by both coli forms and general bacterial load [29].

Microbial infected of Tabriz traditional ice cream causes by use of nonstandard and infected water and milk. Most infection ratio with these agents can be for non-hand washing and not using of glove in this ice cream shaping. In fact fecal infection is one of most difficulties in production of ice cream and this bacteria's as abundant organism in diary and also are, as one of importance agents of diarrhea in child's and newborns [28]. Nonexistence of proper system for feces and urine excretion, use of non-safe water and non-enough thermal processing for primary materials of ice cream have very importance rule in microbial load and transmission of pathogenic organism in ice cream [15].

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