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SHORT COMMUNICATION

BACTERIOLOGICAL ASSESSMENT OF RASGULLA SYRUP SOLD AT DIFFERENT SHOPS OF SILCHAR, ASSAM, INDIA.

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Rasgulla, health effects, bacteria, contamination

Abstract

Sweet prepared from milk is an integral part of the culinary habits of people all over India. However, their rich nutrient content also provides an excellent environment for microbial growth. Ingestion of contaminated sweets are responsible for many foodborne diseases. In the present study, 28 rasgulla syrup samples were collected from different sweet shops of Silchar, Assam, India and their bacteriological assessment were performed. Total microbial load ranges from 1.52×10^4 to 9.38×10^4 cfu/ml and the isolates were identified as *Escherichia coli*, *Staphylococcus* spp. and *Bacillus* spp, comprising 68% of total isolates. Few strains of *Klebsiella* spp., *Pseudomonas* spp., *Salmonella* spp. and *Shigella* spp. were also observed, which often causes serious health effects. The findings of the present study revealed that the rasgulla syrup sold at different street shops of Silchar city constitute a diverse environmental bacteria. However, maintaining aseptic conditions during procurement, processing and distribution may reduce the bacterial contamination and increase the quality of rasgulla.

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Introduction:-

Indigenous dairy product is playing a major role in our society, and among them Rasgulla is regarded as the king of Indian milk sweets (Ahmad and David, 2017). People of all age groups usually use milk and dairy products as a dietary and high-grade food. It contains the major elements like proteins, fat, sugar, minerals, vitamins etc. which are required for growth and maintenance of the body (Jain *et al.*, 2014). However, at suitable conditions, milk products provide an excellent condition for the growth of the microorganism. Unhygienic practices also lead to early spoilage (Oliver *et al.*, 2005), leading to food poisoning and food borne diseases (Ozha, 2016).

Rasgulla is a syrup based sweet dish made from milk product called 'Channa' (Indian cheese) and cooked in syrup made of sugar. Manufacturing of sweets and sweet syrup is based on traditional methods without maintaining the quality of the raw material used. As a result, these products are extremely vulnerable to contamination with pathogenic organisms as well as toxic metabolites of microbes. The presence of Enteropathogenic bacteria causes food poisoning, resulting in severe diarrhoea and vomiting. So, to improve the microbiological quality and protect public health against milk-borne infections, precautions against contamination must be taken at different critical control points (Roy *et al.*, 1998). The knowledge about the microbial contaminants of sweet syrup is of great significance for the development of hygienic and healthy practices. Thus, the present study evaluated the bacteriological quality of sweet syrups sold at various sweet shops of Silchar, India.

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Methodology:-

Rasgulla syrup samples were randomly collected from 28 different sweet shops of Silchar city, Assam, India. Handling by the workers and hygienic conditions of the shops were also noted. The samples were collected in a sterile plastic sampling bags kept in a cold box and then immediately brought to the laboratory for further studies. Serial dilutions of the syrup were prepared using sterile saline water. Samples were spread on agar plates and were incubated at 37°C for 24 hours. The total bacterial count was determined by counting the colonies in microprocessor colony counter. Individual distinct colonies were sub-cultured and were identified on the basis of colony morphology (shape, structure, colour, pattern, size), Gram's staining and biochemical tests (Indole production, Methyl red, Voges-Proskauer, citrate utilization and starch hydrolysis) (Cappuccino *et al.*, 2008; Dubey *et al.*, 2014).

Results and Discussion:-

The unhygienic condition of food handlers and lack of proper storage plays a vital role in sweet and dairy product contamination. Maximum bacterial load was observed due to improper handling and processing of food items, which directly contributes to microbial contamination (Sharma and Mazumder, 2014). In the present study, bacterial load in the syrup samples ranges from 1.52×10^4 cfu/ml to 9.38×10^4 cfu/ml. Among all the isolated bacteria, *Escherichia coli*, *Staphylococcus* spp. and *Bacillus* spp. comprises 68% of the total microbial load. Chatli *et al.*, (2014) isolated bacteria from rasgulla and panner, having viable microbial count 2.8×10^4 cfu/ml and 6.7×10^4 cfu/ml respectively. Vaishnavi *et al.*, (2001) reported a viable microbial load of 3×10^2 to 9.7×10^{10} cfu/ml in sweet and milk products. The unhygienic environment in preparation, processing, packaging and storage are often so poor that the foodstuffs on reaching the customers have an enormous microbial load, which may comprise of different strains of pathogens that cause the serious health hazards. Few strains of *Klebsiella* spp. (7%), *Pseudomonas* spp. (4.6%), *Salmonella* spp. (13%) and *Shigella* spp. (7.4%) were recovered from the syrup samples, inferring the cause of alimentary intoxications by consumers. *Staphylococcus* spp. contamination was coming presumably from the hands of the rasgulla syrup handlers. *Escherichia coli* frequently occur in indigenous sweet milk products such as Rasgulla and Rasmalai (Kumar *et al.*, 2011). The majority of *E. coli* rods do not constitute a serious health hazard, but some serotypes can cause food poisoning. Similar result were reported by other researchers who found *E. coli* in milk samples (Zeihnom *et al.* 2014; Ozha, 2016), *Salmonella* spp. in rasgulla and paneer (Akhtar *et al.*, 2014; Vaishnavi *et al.*, 2001), *Klebsiella* spp. in burfi, rasgulla, paneer and ice-cream (Bhatnagar *et al.*, 2007; Tambekar, 2010). The qualitative analysis of the syrup samples revealed the presence of wide range of pathogenic bacteria, indicating serious health hazard and foodborne illness.

Conclusion:-

This study concludes that unhygienic processing, poor quality of raw materials and unsafe water for washing the utensils could be the main factors responsible for the microbial deterioration of the rasgulla syrup products. Therefore, efforts should be made on educating the food handlers, improving the environmental conditions under which the trade is carried out and maintaining hygienic condition while food preparation and package, may reduce the risks of contamination.

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