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MICROBIOLOGICAL ASSESSMENT OF HANDMADE SWEETS OF MILK MARKETED IN THE MUNICIPALITY OF LASTRO, PARAÍBA, BRAZIL

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ABSTRACT

The milk sweet is an important food produced and marketed, mainly in Brazil and Argentina, with high content of nutrients, resulting from the cooking of the mixture of milk and sugar, added flavoring or not, until their concentration and caramelisation. Failures during its processing or storage increases the risk of contamination to the consumer. In addition, microbiological analyzes are essential to meet the hygiene conditions in which food is prepared, the risks to the health of the consumer and the shelf life of desired. Therefore, the objective of this work was to evaluate the microbiological conditions of sweets of milk marketed of artisan way in the city of Lastro, Paraíba, where they were analyzed for the parameters of Coliforms at 35ºC (NMP/mL), 45ºC (NMP/mL), Salmonella sp. (presence/absence), Staphylococcus spp. (UFC/mL) and total count of mesophilic aerobic bacterium (CTM) (UFC/mL). The legislation does not establish standards for mesophilic aerobic bacterium,however, the presence of this microorganism in samples of sweet milk is reported by several authors. As the coliform bacterium, Salmonella and Staphylococcus, the results showed that the sweets of milk were in accordance with the standards recommended by the Brazilian legislation.

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INTRODUCTION

The milk sweet is a product resulting from the cooking of milk with sugar can be added other food substances permitted, even partial concentration appropriate to the caramelisation, which acquires color, consistency and flavor characteristic due to non-enzymatic browning reactions (FERREIRA *et al*., 1989; HOUGH, *et al*., 1991 ANVISA, 1978).

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It is an important food produced and marketed, mainly in Brazil and Argentina, and presents high nutritional value because they contain proteins and minerals, in addition to the energy content. It is also a perishable food that milk and great sensorial acceptance (DEMIATE *et al*., 2001). Considered as an ingredient which can be widely used for the preparation of foods such as sweets, cakes, biscuits, ice cream, the milk sweet is also consumed directly in food as a dessert or accompanied by bread, toast or cheese (MILAGRES *et al*., 2010). The sweet milk production in Brazil is done by many companies, since the jams (bracelets) until the industrial, with distribution across

the country. However, the food obtained by handmade processes have a great opportunity to submit contaminated, by the use of raw materials from renewable non-secure, Kitchenware poorly sanitized or contaminated, drawing in conditions unfit and storage and marketing at room temperature inadequate, these factors contribute to an increased risk of foodborne diseases (DUARTE *et al*., 2005). However, the foodborne diseases are an important public health problem, since it is estimated that millions of people around the world are affected by Foodborne Diseases (DTAs), since these are currently responsible for most of the outbreaks of diarrhea in almost all countries (SCARCELI; PIATTI, 2002; CVE/CCD-SES, 2004). Despite the sweet milk may not be a product favorable to the growth of microorganisms, due to its high concentration of carbohydrates and, consequently, low water activity, the possibility to transmit pathogenic bacterium is not excluded, because the contamination may be linked to conditions of raw materials or to bad habits of handlers (NOLLA; CANTOS, 2005). The presence of microorganisms, such as *Salmonella, Staphylococcus* and coliforms in milk sweet has been a reason of concern on the part of the bodies responsible for inspection of food and public health, which have established tolerance limits for the occurrence of these microorganisms in the product. Sanitary-hygienic care in processing and handling of sweet milk are among the main preventive measures to prevent their contamination (TIMM *et al*., 2007). Therefore, the Anvisa establishes, by Resolution RDC No. 12 of 02 January 2001, which has the technical regulation on Food Microbiological Standards, that the sweet milk must be analyzed for the presence of Salmonella sp., coliforms at 45°C (faecal coliforms) and coagulase positive (Staphylococcus aureus) (ANVISA, 2001). Since the handling of milk candy bracelets may be inadequate and exposure to the environment increases the risk of contamination of the product offered to the consumer. Its microbiological assessment is of great importance, and with this, the objective of this study was to analyze microbiological samples of sweet milk marketed by craftsmen in the town of Lastro, Paraíba, Brazil.

MATERIALS AND METHODS

The experiment was carried out from the collection of handmade sweets of milk produced and marketed in the municipality of ballast-PB, where he was made a search informative about the marketing of this type of product in the municipality and from addition, were identified as the points of sales with greater marketing, being selected five of them. Five samples were collected from each point of marketing, totaling 25 samples, which were taken to the Laboratory of Food Microbiology (LMA) da Universidade Federal de Campina Grande (UFCG), for the conduct of the microbiological analyzes. The samples were analyzed for the parameters of Coliforms at 35ºC (NMP/mL), 45ºC (NMP/mL), *Salmonella* sp. (presence/absence), *Staphylococcus* spp. (UFC/ mL) and total count of mesophilic aerobic bacterium (CTM) (UFC/mL). All analyzes were performed based on the methodology adopted by Silva *et al* (2010). For better comparison of data, the results were expressed from the averages obtained by five samples of each point of marketing.

RESULTS AND DISCUSSIONS

Second Timm *et al*. (2007), the possibility of pathogenic bacterium in sweet milk cannot be excluded, although this product present low water activity due to the high concentration of carbohydrates. Alais (1985), says that the sweet milk provides beyond the development of filamentous fungi and yeasts osmofílicas, the growth of Staphylococcus spp. Resistant to high osmotic pressure of the medium, these being, potential producers of enterotoxins which cause food poisoning. Table 1, Figure 1 and Figure 2 presents the averages of the results obtained for five samples of each point of marketing.

Table 1. Results of the average values obtained for each commercialization point in relation to Salmonella sp., Coliformes at 35ºC and 45ºC

Locations	Coliforms to 35ºC	Coliforms to 45ºC	Salmonella sp.
DL1	0,91	0 NMP/g	Absent
DL2	0,36	0 NMP/g	Absent
DL3	0,36	0 NMP/g	Absent
DL4	0,73	0 NMP/g	Absent
DL5	0,36	0 NMP/g	Absent

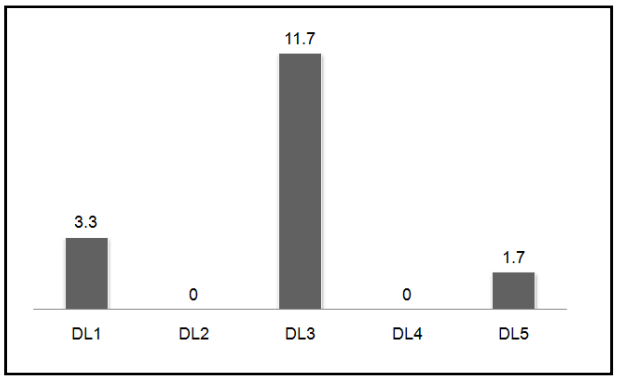

Figure 1. Results of the mean values obtained for each commercialization point in relation to Staphylococcus spp (UFC/g)

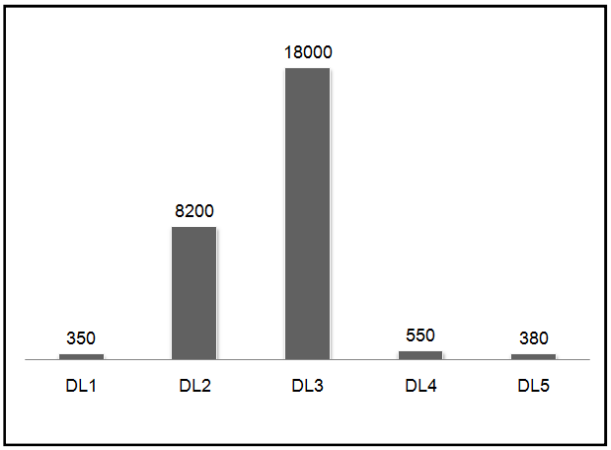

Figure 2. Results of the mean values obtained for each commercialization point in relation to Total counting of mesophilic aerobic bacteria (UFC/g)

The results found for Coliforms at 35º to each point of marketing, ranged from 0.36 to 0.91 NMP/g NMP/g. There is no default recommended by legislation for this group of microorganisms for Sweet Milk, however, the presence of coliforms, from the point of view of health, functions as an important indicator, able to demonstrate a greater probability of that food has entered into contact with fecal material of origin, indicating, with greater precision, the possible presence

of enteric pathogens (SILVA *et al*., 2001; NOVAK; ALMEIDA, 2002). However, the positive results for the analysis of Coliforms at 45º, demonstrate the harmlessness of this type of micro-organism in the sweet of milk were analyzed. Similar results were found by Silva *et al*., (2011) examined the microbiological quality of the curd and milk sweet produced in Tocantins - MG where 18 samples were within the standards established by the legislation for total and thermotolerant coliforms. Bacterium of the genus Salmonella are one of the main causes of diseases carried by food (D'AOUST, *et al*., 2001). The Brazilian legislation determines the Technical Regulation on Food Microbiological Standards, the National Agency of Sanitary Surveillance, that the sweet milk must present absence of Salmonella in 25 g (BRAZIL, 2001).

The analysis of *Staphylococcus* spp. Indicates poor conditions during the production of food, mainly arising from the lack of good manufacturing practices by handlers, which is due to the majority of contamination, because this is a microorganism present in a natural way on microbiata skin, which may contaminate utensils and raw materials used (Lamaita *et al*., 2003). The results found for analysis of Salmonella *spp*. Were within the standards recommended by the RDC No. 12 of 02 January 2001, as well as for *Staphylococcus* spp., where the count for this microorganism presented results below the ceilings established by the Brazilian legislation. Similar results were found by Martins *et al*. (2015), when analyzed microbiologically the milk sweet during 150 days of storage in ambient conditions, where presented values below $1.0x10^2$, consequently, below which the legislation recommends. Destri *et al*. (2009), in a study about sweets of milk sold in fairs free of Pelotas-RS, we found a positive aspect for microbiological analyzes performed (Coliforms at 45º, Salmonella sp. and *Possibilityof* spp.) since none of the five samples analyzed showed contamination. In spite of the legislation does not establish standards for mesophilic aerobic bacterium, several authors have reported the presence of such microorganisms in samples of fresh milk. All samples obtained presence of mesophilic aerobic bacterium, ranging from $3.5x10^2$ UFC/g to 1.8x104 UFC/g, despite not having a limit established for this type of organism, it can be worrying foods that are contaminated by them. Second Landgraf (2008), even though there is no pathogens, and a large number of micro-organisms of this type indicates that the food was not manufactured properly and that favorable condition for pathogens multiply were identified, since all foodborne pathogenic bacterium are mesophilic.

Conclusions

To diagnose possible risk factors for diseases carried by food and that may contribute to the importance of hygienic and sanitary control, with the present study it was possible to conclude that the sweet milk samples showed good hygienic-sanitary conditions of the product, which is in accordance with the standards recommended by the Brazilian legislation.

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