



Comparisons of mutans streptococci levels in saliva, before and after consumption of probiotic curd among school children at Ahmedabad

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ABSTRACT

Aim: To compare mutans streptococci levels in saliva, before and after consumption of probiotic curd.

Materials & methods: Thirty caries free school children in the age group of 10-13 years of Ahmedabad city were selected and equally divided into two groups I and II which were given 200 ml probiotic curd and normal curd respectively for a period of 7 days. Saliva samples were assessed at baseline, 1 hour after consumption and after 7 days intervention period using Mitis Salivarius Bacitracin Agar. The number of colonies was counted and subjected to statistical analysis.

Results: The study revealed a reduction in salivary mutans streptococci counts in saliva both after 1 hour and 7 days in probiotic group. The difference in the reduction of mutans streptococci counts with probiotic curd and normal curd at 1 hour and also at 7 days was statistically significant ($p \leq 0.05$).

Conclusion: The use of probiotic products could be an alternative strategy of displacing pathogenic microorganisms by probiotic bacteria and can thus be exploited for the prevention of enamel demineralization.

KEYWORDS : Curd, Mutans streptococci, Probiotic.

INTRODUCTION

It was in the beginning of the 20th century when the Ukrainian born Nobel Prize laureate Elie Metchnikoff observed the positive beneficial effect of some bacteria on the human health and suggested that these beneficial bacteria can be used to replace harmful microbes in the body. Ever since then, different microorganisms have been used for their ability to prevent and cure diseases. In 1994, the WHO deemed probiotics to be the next-most important immune defense system when commonly prescribed antibiotics are rendered useless by antibiotic resistance. The term probiotic means 'for life', was first coined by Lilly and Stillwell. Probiotics are defined as "live microorganisms, which when administered in adequate amounts, confer a health benefit on the host". The most common probiotic strains belong to the genera *Lactobacillus* and *Bifidobacterium*. Bacterial strains that have been tested for probiotic action in the oral cavity include: *LACTOBACILLI SPECIES* [*L. acidophilus*, *L. rhamnosus* GG, *L. johnsonii*, *L. casei*, *L. rhamnosus*, *L. gasseri*, *L. reuter*, *L. paracasei*.], *BIFIDOBACTERIUM SPECIES* [*B. bifidum*, *B. longum*, *B. infantis*, *Bifidobacterium* DN-173 010.] and *OTHERS* [*S. salivarius*, *W. cibaria*].^[1]

The possible impact of probiotics on the oral health is less explored. Dairy foods such as cheese, yoghurt and milk are considered useful vehicles for probiotic bacteria, but an ideal administration vehicle has yet to be identified. Ideally, the delivery should be suitable for all ages and especially for very young children, since it has been suggested that exposure early in life may facilitate a permanent installation of health promoting strains. In this context, ice-cream and curd are interesting probiotic food, as they are popular and universally liked.^[2]

As a profession, we are slowly moving away from the purely surgical approach to treating dental caries. Science is providing us the tools to diagnose and treat the infection before it causes irreversible damage. Replacement therapy in the form of probiotics is an alternate and promising way to combat infections by using harmless bacteria to displace pathogenic microorganisms. Probiotics have been used successfully for treating gastrointestinal disorders in the medical field. The use of probiotics in dentistry has shown to reduce the cariogenic biofilm in various studies. The application of probiotic strategies may, provide the end of new cavities in treated populations.^[3] The various means of administra-

tion of probiotics for oral health purpose that have been studied are: Lozenges, Tablets, Cheese, Yoghurt, Mouth rinse, Capsule.^[1]

MATERIALS AND METHODS

The study was conducted to compare mutans streptococci levels in saliva, before and after consumption of probiotic curds. Study was conducted between January 2015 to March 2015 at G.M.E.R.S. Medical College, Sola, Ahmedabad. Thirty children were randomly selected from S.S DIVINE School_Ahmedabad for the study. The selected children were equally divided into two groups I, (probiotic curd group) and II (plain curd group) comprising of 15 children in each group who were given 200 gm probiotic curd and plain curd respectively for a period of 7 days. Curd was given once daily and subjects were instructed to refrain from other all curd consumption. The subjects were however, encouraged to maintain their normal oral hygiene habits. No tooth brushing was allowed for at least 1 hr after eating the curd.

Inclusion criteria

- Children in the age group of 12-14 years.
- All permanent teeth should be erupted (except 3rd molars).

Exclusion criteria

- Children who were severely ill.
- Medically compromised children.

Ethical clearance was obtained from ethical committee of G.M.E.R.S. Medical College, Sola, Ahmedabad and written informed consent obtained from all the participants.

Saliva collection was scheduled after the clinical examination. Children were made to sit comfortably on the chair and made to swallow the preexisting saliva, in order to clear the mouth of any residual saliva. After this, each student was asked to split the saliva in a sterile hard plastic container. The saliva samples of all the participants were identified by a code number during the period of sample collection and processing. The samples were precoded and not disclosed to the technician. In laboratory, samples were stored at room temperature (17-25° C) prior to the analysis. Saliva samples were assessed at baseline, 1 hour after consumption and after 7 days intervention period by using Mitis salivarius Bacitracin agar. The number of colonies was counted and subjected to unpaired t-test

statistical analysis. One loop (1/1000 ml of sample) was inoculated on the Mitis Salivarius Bacitracin Agar. The plates were incubated at 37°C anaerobically. After 72 hrs, colony characteristics were studied and the number of colony forming units of Streptococcus Mutans of saliva was determined using a colony counter.⁴

Statistical analyses

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 15 (SPSS Inc. Chicago, IL, USA) Windows software program. Descriptive statistics included computation of percentages. For all tests, confidence level and level of significance were set at 95% and 5% respectively. The mean and standard deviation for S.mutans count in samples were determined using unpaired Student t-test.

RESULTS

In this study, mean salivary mutans streptococci count at baseline for probiotic curd and plain curd group was 211.6 ± 24.5, and 215.8 ± 22.1 respectively. Mean salivary mutans streptococci count 1 hour after consumption of probiotic curd and plain curd was 185 ± 12.5, and 211.3 ± 21.6, respectively. When compared after 7 days, mean salivary mutans streptococci count after consumption of probiotic curd and plain curd was 150.6 ± 8.11, and 213.3 ± 25.6 respectively. When comparison of the mean salivary mutans streptococci after consumption of probiotic and plain curd after 1 hour and after 7 days was done the results were found to be statistically significant (p<0.05) [Table no. 1]

TABLE 1: COMPARISON OF MEAN SALIVARY MUTANS STREPTOCOCCI AFTER CONSUMPTION OF PROBIOTIC AND PLAIN CURD AT BASELINE, AFTER 1 HOUR AND AFTER 7 DAYS

Time interval	Curd	Mean	Standard deviation	p-value
Base line	Probiotic	211.6	24.5	0.62
	Plain	215.8	22.1	
1 hour	Probiotic	185.0	12.5	0.0002*
	Plain	211.3	21.6	
7 days	Probiotic	150.6	8.11	0.0001*
	Plain	213.3	25.6	

*P<0.05=statistically significant.

DISCUSSION

Bacteriotherapy is a novel and promising concept for combating infections and preventing dental caries. Studies on probiotics were performed to validate the survival and positive effects of probiotic bacteria Bifidobacterium lactis Bb-12 within the human body, including immune response and gastrointestinal health in young children, but research concerning probiotics and dental health are limited.⁽¹¹⁾

Since the late 1980s, a range of dairy products containing bifidobacteria have been marketed in a number of countries worldwide, and studies have been performed to validate the survival and positive effects of Bifidobacterium.⁽⁵⁾ The use of probiotic products could be an alternative strategy of displacing pathogenic microorganisms by probiotic bacteria and can thus be exploited for the prevention of enamel demineralization. Probiotic technology represents a breakthrough approach to maintain oral health by utilizing the natural beneficial bacteria commonly found in healthy mouth to provide natural defense against those bacteria thought to be harmful to teeth and gums. Probiotic may affect the oral ecology by specifically preventing the adherence of other bacteria and by modifying the protein composition of salivary pellicle.⁽¹²⁾ Studies carried out to validate the beneficial effect of probiotic curd on the oral ecology are few. Therefore, our study was done to estimate the effect of probiotic curd on salivary mutans streptococci. The product used for study was well accepted by the participants, which was expected since curd eating is a life-long tradition in India.

After comparing the mean salivary mutans streptococci after consumption of probiotic and normal curd at base line, after 1 hour and after 7 days, the results were found to be statistically significant after 1 hour (p<0.05) & after 7 days (p<0.05) period. This was in accordance with the study done by Anitha Chinnappa, et al.⁽²⁾ in which after 1hour and after 7 days statistically significant (p<0.05) results were found.

In our study, we found significant reduction in salivary mutans streptococci (p<0.05) after consumption of probiotic curd which was in accordance to the previous studies done by Anitha Chinnappa, et al.⁽²⁾ Esber Caglar et.al.⁽⁵⁾ Sule Kavaloglu et.al.⁽⁶⁾ and Yunwo Zhu et al.⁽⁷⁾ in which a statistically significant reduction of salivary mutans streptococci was recorded after probiotic yogurt consumption (p<0.05). Richa Singh et.al.⁽⁹⁾ also reported that probiotic ice-cream brought about a statistically significant reduction in mutans streptococci count (p<0.05). Similarly, G.Jindal et.al.⁽¹⁰⁾ concluded that statistically significant reduction (p<0.05) in salivary mutans streptococci counts was recorded after probiotic ingestion. Whereas, our results were in contrast to the previous study done by Li-Chuan Chuang et.al.⁽⁸⁾ in which no differences in the counts of mutans streptococci between probiotic and control groups were found.

The sample size taken was limited in the present study. In addition, mutans Streptococci in saliva can only be regarded as an intermediate endpoint for caries, it remains to be investigated whether or not this really is beneficial for the patients.

The findings of the present study revealed a significant reduction in the salivary mutans streptococci levels with probiotic curd after 1 hour and after 7 days period as compared to plain curd.

Probiotics used for the management of oral disease may reduce the cost of conventional therapy and prevention programs. The idea of replacing harmful microorganisms with non-harmful, inactivated, or genetically modified bacteria is attractive. Efforts should be made to increase the awareness of the general dental practitioners about this aspect of oral disease therapy and encourage the implementation of the concept of "food rather than medicine." Scientific research is needed to have a better understanding of probiotics in order to broaden their potential applications.

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