WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 12, 1244-1249. Research Article ISSN 2277– 7105

CHYAWANPRASH AND DENTAL CARIES? - AN EVALUATION OF ACIDOGENIC POTENTIAL OF COMMONLY CONSUMED AYURVEDIC FORMULATION IN INDIA.

Deepesh Prajapati[*](MDS), Rashmi Nayak[**](MDS), Tarunkumar T Awatramaney[***] (BDS), Dr. Ullal Anand Nayak[****](MDS), Dr. Nancy Shrivastava[*****](MDS), Dr. Vipin Bhaskar K.(MDS)[#]

[*]Assistant professor in the Department of Pedodontics and Preventive Dentistry at NIMS Dental College, Jaipur.

[**]Professor and Head of the Department of Pedodontics and Preventive Dentistry at Manipal College of Dental Science Manipal, Karnataka, India. Affiliated to Manipal University.

[***]Research & Product Analyst at Prevest Denpro India Ltd.

[****]Professor & Head in the Department of Pedodontics and Preventive Dentistry at NIMS Dental College, Jaipur.

[*****]Assistant Professor, Department of Periodontology, NIMS Dental College, Jaipur.

[#]Assistant Professor in the Department of Pedodontics and Preventive Dentistry at MAHE Institute of Dental Science, Kerala.

Article Received on
08 Oct 2015,

Revised on 29 Oct 2015,
Accepted on 18 Nov 2015

***Correspondence for Author**
Dr. Deepesh Prajapati
Assistant professor in the Department of Pedodontics and Preventive Dentistry at NIMS Dental College, Jaipur.

ABSTRACT

Context: diet remains an important aspect for causation of dental caries. There could be many food items might prove to have hidden acidogenic/cariogenic potential. **Aims**: A cross over study was conducted to determine the inherent pH and acidogenic potential of various commercially available preparations of chyawanprash in Indian market. **Settings and Design**: 10 volunteers were chosen and each volunteer was subjected to three test products after a week's wash out period. 10% sucrose solution was used as positive control. Base line plaque pH along with readings at 0,5,10,15,20,25,30 minutes after consumption of test food were recorded. **Methods and Material**: three commercially available chyawanprash brands were compared with 10% sucrose solution. **Statistical analysis used**: Changes in pH were assessed using ANOVA. **Results**: No statistical difference in pH

readings was observed among all 3 test products (P > 0.05). **Conclusions**: Chyawanprash can be considered as an acidogenic food item and diet can be modified accordingly for children with high caries risk consuming this preparation.

KEY WORDS: dental caries, chyawanprash, acidogenic food item, cariogenic food item.

KEYMESSAGE: chyawanprash certainly has acidogenic potential and is recommended to be used cautiously in children with high caries risk. Further research is encouraged to determine its cariogenic potential.

INTRODUCTION

There are many ancient house hold remedies prevalent all over the world and chyawanprash is one such "rasayna" based on principles of ayurveda. It is claimed that chyawanprash improves physique, vigour and vitality[1] and improves all the aspect of health when used regularly.[2] It contains ingredients possessing antioxidant, anticarcinogenic and antimutagenic activities.[3]

Recently chyawanprash has gained popularity all the over the world, it is considered as a herbal tonic for healthy individuals containing around 50 herbs.[1] It is very widely used on daily basis to improve the immunity of the body by the general population. The herbs used in the preparation and their function has been mentioned in table 1.[1]

The main constituents of chyawanprash which may have potentially harmful dental effects are "amla" and "honey". Some sugar free products are also available which contains sorbitol and sucralose as the sweeteners. Manufacturers recommend 10 gram or one teaspoon twice daily along with warm milk or honey.

When cariogenicity of food items is to be considered, two main factors that should be taken into account are the high fermentable carbohydrate content and inherent low pH of the food item. According to *Marathaki* et al, 1995, if any food item shows plaque pH changes similar to 10% sucrose solution it can be labeled as acidogenic.[4]

Keeping in mind, its usage in pediatric age group, a study was designed to know its acidogenic potential. This study was conducted with following aims, first one was to determine the inherent pH of test products and second one was to know the effect of consumption of chyawanprash on acidogenic potential of dental plaque, if any.

SUBJECTS AND METHODS

After taking approval from the Kasturba Medical College Ethical Committee, a cross over study was designed and 10 dental student volunteers (8 boys and 2 girls) with mean age 22 years were selected. The volunteers, who showed a drop in pH by one unit or below the critical level after rinsing with 10% of sucrose rinse for one minute, were included in the study. Similar inclusion criteria have been used by K. J. Toumba, 1999.[5]

Inherent pH of 3 test products were tested - regular Dabur chyawanprash, Dabur sugar free chyawanprash (Dabur India limited) and Sona Chandi chyawanprash (Hemma herbs Pvt ltd), using 20 grams of product in a sterile plastic beaker. Electrodes of the pH meter used (Eutech instruments) were directly dipped into the sample. Three different readings were made using three different samples of each test product and mean pH value was calculated.

Subjects were asked to abstain from brushing from 48 hours before sample collection. They were also asked not to consume any food or drink (except water) for 2 hours before the test. Each volunteer was seen at the same time of the day to avoid changes in the circadian rhythm. 10 grams of each test product was consumed and 15 ml of 10% sucrose solution, as positive control, was rinsed by the volunteers for one minute.

After taking consent and confirming that instructions have been followed, Plaque collection was done using smooth surface scaler from buccal surfaces of molars in predetermined sequence. To standardize 3 grams of plaque was collected for each time, once before exposure and then after exposure till 30 mins at every 5 mins interval. This plaque was mixed in 20 ml of freshly prepared distill water and pH was measured using pH/Ion 510 bench pH meter (Eutech instruments). The pH meter was calibrated with standard solution of pH 7 and then pH 4 before every plaque pH reading.

One week wash out period was allowed before cross over.

RESULTS

In phase I the pH of the study products was measured using pH/Ion 510 bench pH meter (Eutech instruments). The pH of test products ranged between 3.20 to 3.30 (table 2).

In phase II, the response of the dental plaque pH to the test agents was measured over a 30 minute period. Immediately after the exposure the pH dropped to a level below critical pH, greatest drop was seen in regular Dabur (with sugar) chyawanprash. The pH remained around

critical even after 30 mins. Mixed effect ANOVA was applied to statistically analyze the mean pH data (table 3) using SPSS software. On comparison within test groups no statistically significant difference was found (p = 0.997). Important point to be noted in this table is that immediate post exposure pH for all products was below the critical level and which remain around the critical level even after 30 mins post exposure.

Table 1 – common ingredients of chyawanprash and their uses

Common names	Uses
Adusa, vasaka	Cardiotonic, expectorant
Tejpatra	Helps n general debility, anorexia, indigestion
Dalchini	Anemia, anorexia
Elaichi	General tonic, anorexia, flatulence
Amala	Rejuvenative, rich source of vitamin C
Jivanti	Cooling, eye tonic
Pippali	General debility, dyspepsia
Clove	Antiseptic, aromatic, carminative, stimulant
Sugar	Sweetening agent
Silver foil	General debility, physical fitness
Ghee	Nutrient
Amrta	Immunomodulator
Patla	Genral debility, dyspepsia, blood disorders
Lal chandan	Skin, eye blood disorders, disinfectant of mucous membrane

Table 2 - inherent pH of test products

Product	Mean pH
Dabur	3.25
Sona chandi	3.30
Dabur - sugar free	3.20
10% sucrose solution	4.57

Table 3

	Pre exposure	0	5	10	15	20	25	30
Sugar Free	6.59	4.82	4.94	5.12	5.20	5.26	5.33	5.50
Sona Chandi	6.81	4.83	4.85	4.98	5.18	5.29	5.45	5.51
Dabur Sugar	6.75	4.76	4.75	5.04	5.10	5.17	5.27	5.37
Sucrose Rinse	8.03	5.09	4.89	5.21	5.48	5.93	6.35	7.27

Table 4

Product	Sweetener Content
Dabur	1.5gm/ 100gm of honey
Sona chandi	1.0gm/100gm of honey
Dabur - sugar free	Sorbitol &Sucralose
10% sucrose solution	10gm/100ml of sucrose

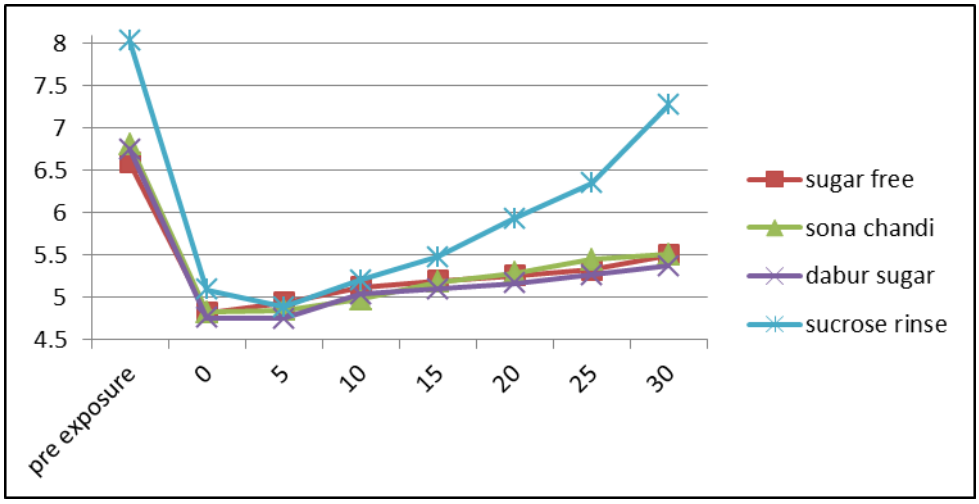

Figure 1 shows the mean plaque pH curves for the test and control group.

Figure 1 shows the mean plaque pH curves for the test and control group.

DISCUSSION

This study was conducted with the objective of knowing the acidogenecity of commonly consumed various chyawanprash test products. Adult volunteers were used as study subjects in this investigation. This is in accordance with the suggestions given by Imfled and Lutz who indicated that acidogenic profile of children and adults are similar and support to the extrapolation of results obtained in adult subjects for those in children[6], as there are potential problems on subject compliance which makes use of children in cariogenicity assessment studies problematic.[7,8]

There are many studies done in past to know the hidden cariogenicity of food items and they have found that commonly consumed items like pediatric syrups[9,10], cola drinks and orange juices[11] do have cariogenic potentials.

In this study all the study products had a highly acidic pH. This can be attributed to the presence of amla (Indian gooseberry) which is a very rich source of ascorbic acid with low pH. Second major component is honey which is a ready source of simple fermentable carbohydrates (fructose, glucose, maltose) explaining the drop in plaque pH. However, drop in pH for sugar free group could be attributed to presence of amla in it.

On sample collection, chyawanprash tags were found stuck to the molars smooth surfaces suggesting its retentiveness. This property of chyawanprash could have lead to it's reduce clearance from oral cavity and hence prolonged drop of plaque pH.

There is difference in honey content of the 3 test products, with Sona Chandi chyawanprash having least honey while sugar free variety having sucralose and sorbitol as artificial sweeteners(table no. 4). This might have lead to slightly higher plaque pH values in sona chandi group.

Honey itself has been proved to be antibacterial in high concentration for oral flora[12], while other herbs used in chyawanprash are known to be astringent and antioxidant.[1] Taking this into consideration, chyawanprash cannot be labelled as cariogenic.

The findings of the study have following clinical implications -

- To the best of our knowledge this was the first study evaluating effects of chyawanprash on dental plaque.
- Taking diet history has always been an integral part of any comprehensive dental treatment for children. Knowing the acidogenicity of chyawanprash, modifications of diet can be advised accordingly.
- Steps like avoiding it in dental erosive conditions like GERD or avoiding brushing just after consuming chyawanprash can help in prevention of erosion or abrasion of dental hard tissues.
- Though sugar free chyawanprash has no added honey yet its acidogenecity was not found to be very different from other tested chyawanprash products.

To know the cariogenic potential of chyawanprash, a randomized control design is warranted. A cross over design can also be formulated after knowing the duration of the possible long-term effects of chyawanprash on dental health and then deciding the wash out period, as suggested by Makinen in 2009.[13]

ACKNOWLEDGEMENT

Authors are thankful to Department of Dental Materials, Manipal College of Dental Sciences, and Department of Biostatistics, Manipal University, Manipal for extending valuable help and expertise during this study.

REFERENCES

1. Milind Parle & Nitin Bansal. Traditional medicinal formulation, Chyawanprash—A review. Indian Journal of Traditional Knowledge, October 2006; 5: 484-488.

2. Shah NC, Bharat Bhaishjya Ratnakar, Vol II, Ga'karadi kashay prakaran. Jain Publishers Private Ltd, New Delhi, 1999; 164.
3. Jeena KJ, Kuttan G, George J, Kuttan R. Antimutagenic and anticarcinogenic activity of Emblica officinalis Gaertn, J Clin Biochem Nut, 1997; 22: 171-6.
4. Marathaki E, Pollard MA, Curzon MEJ. The effect of sucrose in medicines on plaque pH. Int J Paediatr Dent, 1995; 5: 231-235.
5. K J Toumba and M S Duggal. Effect on plaque pH of fruit drinks with reduced carbohydrate content. British Dental Journal, 1999; 186: 626–629.
6. Imfeld T, Lutz F. Intraplaque acid formation assessed in vivo in children and young adults. Pediatr dent, 1980; 2: 87-93.
7. Edgar WM, Gedder DAM. Plaque acidity models for cariogenicity teting – some theorectial and practical observations. J Dent Res, 1986; 65: 1498-502.
8. Harper DS, Abelson DC, Jensen ME. Human plaque acidity models. J Dent Res., 1986; 65: 1503-10.
9. Sunitha S, Prashanth G M, Shanmukhappa, Chandu G N, Subba Reddy V V. An analysis of concentration of sucrose, endogenous pH, and alteration in the plaque pH on consumption of commonly used liquid pediatric medicines. J Indian Soc Pedod Prev Dent., 2009; 27: 44-8
10. Sharma A, Deshpande S. Effect of sucrose in different commonly used pediatric medicines upon plaque pH in human subjects. J Indian Soc Pedod Prev Dent., 2011; 29: 144-8.
11. Saeed S, Al-Tinawi M. Evaluation of acidity and total sugar content of children's popular beverages and their effect on plaque pH. J Indian Soc Pedod Prev Dent., 2010 Jul-Sep; 28(3): 189-92.
12. Steinberg D, Kaine G, Gedalia. Antibacterial effect of propolis and honey on oral bacteria. Am J Dent., 1996 Dec; 9(6): 236-9.
13. Mäkinen KK: An end to crossover designs for studies on the effect of sugar substitutes on caries? Caries Res., 2009; 43: 331–333.