Makara Journal of Health Research

Volume 21
Issue 3 *December*

Article 2

12-1-2017

The Specifications and Ingredients Found in Commercially Available Toothpastes

Kalyan C. Gundavarapu
Faculty of Dentistry, SEGi University, Damansara 47810, Selangor, Malaysia

Srinivas S. Ramachandra
Faculty of Dentistry, SEGi University, Damansara 47810, Selangor, Malaysia, periosrinivas@gmail.com

Daniel D. Dicksit
Faculty of Dentistry, SEGi University, Damansara 47810, Selangor, Malaysia

Vivek V. Gupta
Faculty of Dentistry, SEGi University, Damansara 47810, Selangor, Malaysia

Recommended Citation
Gundavarapu KC, Ramachandra SS, Dicksit DD, Gupta VV. The Specifications and Ingredients Found in Commercially Available Toothpastes. Makara J Health Res. 2017;21.

Makara J. Health Res., 2017, 21(3): 82-86
doi: 10.7454/msk.v21i3.7030

The Specifications and Ingredients Found in Commercially Available Toothpastes

Kalyan C Gundavarappa, Srinivas S Ramachandra*, Daniel D Dicksit, Vivek V Gupta

Faculty of Dentistry, SEGi University, Damansara 47810, Selangor, Malaysia

**E-mail: periosrinivas@gmail.com*

Abstract

Background: The aim of this study was to evaluate the specifications and ingredients of various commercially available toothpastes in Malaysia. **Methods**: Various toothpaste brand samples were collected from malls & pharmacies in Petaling Jaya, Malaysia. Each brand was studied and information regarding the presence or absence of fluoride, the fluoride content, whether the fluoride content was displayed on the packaging, the type of fluoride present, and the country of manufacture was noted. Using this information, a comprehensive list of commercially available toothpastes in the Malaysian market was prepared. **Results**: the 57 toothpastes collected, 12.3% (n = 7) did not state their fluoride contents, 15.8% (n = 9) were non-fluoridated, and 72% (n = 41) were fluoridated. From the 41 fluoridated toothpastes, 80% specified the type of fluoride present, with 60% containing sodium monofluorophosphate and 40% containing sodium fluoride. Of the 41 fluoridated toothpastes, only 38% specified the parts per million of fluoride. **Conclusions**: There is lack of standardisation regarding the labelling specifications amongst various toothpastes on the Malaysian market. This standard needs to be identified and should include information regarding the type of fluoride, concentration of fluoride, country of manufacture, and other necessary specifications printed on the toothpaste packaging.

Keywords: awareness, consumer, fluoride, labelling, Malaysia, toothpaste

Introduction

Most toothpastes are over the counter products, meaning they can be sold directly to a consumer without a prescription from a health care professional. However, many patients feel unsure of which toothpaste to buy and commonly ask their dentist's advice on which is the best brand to use. Toothpaste companies are constantly introducing new products and variations into the market and employ marketing strategies that may confuse the consumer due to the sheer number of choices available.[1] The Malaysian national guidelines state that information regarding the ingredients and presence or absence of fluoride needs to be clearly stated on the toothpaste packaging.[2] Information regarding ingredients and content is hugely important as it allows the consumer to make an informed purchase. There are many types of toothpastes available on the market and they may or may not contain fluoride, or they may have variations in the type of fluoride used or differing concentrations of fluoride, or they may be manufactured for specific indications, e.g. dentinal hypersensitivity.[3]

Lagerweij *et al.*, using information from the World Health Organisation's database, reported that caries prevalence decreased world over, after the implementation of fluoridated toothpaste.[4] In low income countries, where caries prevalence is higher due to more sugar consumption, the suggestions from Lagerweij *et al*. that state a reduction in caries experience can be achieved by the effective and affordable use of fluoridated toothpaste is particularly important.[4] The list of commercially available toothpastes is exhaustive and purchasing the correct toothpaste can be confusing for the consumer and difficult to advise on by the dentist. As such, an easy to understand guideline that states the specifications and details of all commercially available toothpastes in Malaysia would be beneficial to the greater population. The purpose of this study is to document the various specifications of commercially available toothpastes in Malaysia. Furthermore, this document may also serve the dental community as a guide to recommend specific toothpastes for particular conditions.

Methods

Following approval from the institutional review board of the SEGi University, different toothpastes from various shopping malls and pharmacies were collected. The presence or absence of fluoride, the fluoride content in the toothpaste, the display of fluoride content on the packaging of the toothpaste and toothpaste tube, and specific indications of the toothpaste (if any) were recorded. Additionally, the type of fluoride incorporated

in the toothpaste formulation and the place of manufacture was also identified. Toothpastes with specific indications like dentinal hypersensitivity, tooth whitening, toothpastes for pregnant women and smokers, and herbal toothpastes were also noted.

Results

A total of 57 toothpastes, from 24 brands, were collected from shopping markets and pharmacies. Amongst these 12.3% (n = 7) did not state their fluoride content, whereas 15.8% (n = 9) were non-fluoridated and 72% (n = 41) were fluoridated. Table 1 outlines the names of commercially available non-fluoridated toothpastes in Malaysia with their specific indications and details. From a total of 41 fluoridated toothpastes, 80% (n = 33) of toothpastes specified the type of fluoride used in the formulation, and the remaining 20% (n = 8) did not specify the type of fluoride used, but merely mentioned the presence of fluoride. Of the 33 toothpastes that specified the type of fluoride present in the formulation, around 60% (n = 20) had sodium monofluorophosphate and 40% (n = 13) contained sodium fluoride. Only 15 toothpastes stated the parts per million (ppm) of fluoride, with 27% (n = 4) having 1450 ppm of fluoride and 73% (n = 11) having 1000 ppm of fluoride. This study found no fluoridated toothpastes that had a fluoride content of less than 1000 ppm. Table 2 lists the names of commercially available fluoridated toothpastes with their specific indications and details.

Fluoride concentration is usually displayed as parts per million or in percentage by weight by weight (% w/w). of the total fluoridated toothpastes, 17.1% (7 brands) have the concentration displayed in both ppm and % w/w, however 31.7% (13 brands) have the concentration displayed in only % w/w and 22.0% (9 brands) have it displayed in only ppm. Not all toothpastes had printed the ingredient information on the box and tube, with 14.6% (6 brands) not printing the ingredients on the outside box, only on the tube itself. Conversely, 9.8% (4 brands) had printed the ingredients on the tube but did not include the information on the box. Around 12% (n = 7) were used specifically for dentinal hypersensitivity. (Table 3 provides a list of toothpastes available for dentinal hypersensitivity with their active ingredients.) Among the samples collected, 24.6% were manufactured locally in Malaysia, whilst the majority were imported from Thailand (22.8%; n = 13), China (16%; n = 9), India (11%; n = 6), and the United Kingdom (5.3%; n = 3). Around 21% did not specify the country of manufacture.

Discussion

those containing fluoride in the range of 550 ppm or lesser, 1000-1300 ppm, and 1350-1500 ppm. It is hoped that the present study may be useful to a busy dentist or dental hygienist, who may suggest a specific toothpaste for a particular condition or one that addresses a patient's concerns.[5] Toothpastes containing 1350–1500 ppm of fluoride, used twice daily, are the most effective way to prevent dental caries in adults.[5] Children under 3 years old should brush twice daily, with a smear of toothpaste containing no less than 1000 ppm fluoride. Children between 3 and 6 years old should brush at least twice daily, with a pea-sized amount of toothpaste containing more than 1000 ppm fluoride.[5]

Table 1. Non-Fluoridated Toothpastes with Their Specific Indications and Details

Names of The Non-Fluoridated Toothpastes	Place of Manufacture	Specific Indications/Details
Najwa Toothpaste	Malaysia	Herbal in nature
Pureen Toothpaste	Malaysia	Maternity toothpaste Does not contain fluoride, sodium lauryl sulphate, or saccharin
Halagel Herbal Toothpaste	Malaysia	Does not contain gelatin or bone ash from animal sources.
Litna Vegetarian Toothpaste	Malaysia	Free of fluoride and sugar Contains banyan and *Acacia arabica*
Dentobac Gel	Malaysia	Contains gooseberry, liquorice, clove, and neem
K.P. Namboodiri's Aloe Vera Herbal Toothpaste	India	Contains aloe vera, miswak, and natural mint
K.P. Namboodiri's Natural Salt Toothpaste	India	Natural salt (rock salt), clove, ginger, nutmeg, tea tree oil, and cardamom
K.P.Namboodiri's Herbal Toothpaste	India	Herbal products
Instituto Dentiste' Plus White	Malaysia	Contains vitamin C and xylitol

Benzian *et al*., studied 119 samples of toothpastes for the total and free fluoride concentrations from 4 countries.[6] Only one sample was found to have a discrepancy in the fluoride content declared on the packaging and the actual fluoride content in the toothpaste. Benzian *et al*., highlighted the weak regulations that struggle to control labelling and consumer information, as well as a possible influx of counterfeit low-quality toothpastes.[6] Similarly, the present study also showed discrepancies in the labelling and consumer information on toothpaste tubes and packaging. Some fluoridated toothpastes provided the exact amount of ppm of fluoride present in the formulation, whereas others merely made mention of the presence of fluoride in them. An absence of clear guidelines for packaging and labelling of toothpastes provides an increased chance for counterfeit toothpastes.

Table 2. Fluoridated Toothpastes with Their Specific Indications and Details

Names of The Fluoridated Toothpastes	Specific Indications/Details	Place of Manufacture
Safi Toothpaste, with Siwak, Orange and Sea Cucumber	Sodium monofluorophosphate; However, the ppm of fluoride present is not given.	Malaysia
Darlie	Type of fluoride and ppm of fluoride not mentioned	Malaysia
Double action		China
Enamel Protect		Hong Kong
Enamel Protect (Mild Mint)		Singapore
Multi Care Toothpaste		Taiwan
All Shiny White Lime Mint		Thailand
Sensitive Fresh		
Sensitive Whitening		
Fresh N Brite		
All Shiny White Charcoal Clean		
Colgate	Type of fluoride, ppm of fluoride or w/w	Malaysia
Maximum cavity protection	Sodium monofluorophosphate; 1450 ppm	
Sensitive Pro. Relief (Whitening)		
Sensitive Pro Relief (Fluoride)		
Sensitive Pro Relief (Multi-Protection)		
Sensitive Pro Relief (Enamel Repair)		
Triple Action	Sodium fluoride; 0.24% w/w	
Advanced White (Activity)	Sodium fluoride; 1000 ppm	
Optic White		
Sensitive (Whitening)	Sodium monofluorophosphate; 1000 ppm	
Sensitive (Gum Protection)	0.76% w/w	
Sensitive (Fresh Mint)		
Clinpro™ 5000	Contains fluoride (5000 ppm), calcium, and phosphate	Malaysia
	Is a regulated medication and not available as an over the counter product.	USA
GC tooth Mousse (Recaldent™)	Caesin phosphopeptide amorphous calcium phosphate (CPP-ACP)	Malaysia Singapore

Table 3. Desensitizing Toothpastes with Their Active Agents

Names of The Fluoridated Toothpastes	Place of Manufacture	Specific Indications/Details
Darlie Sensitive Fresh/Whitening	Malaysia China Hong Kong Singapore Taiwan Thailand	Potassium nitrate
Sensodyne Repair and Protect	Malaysia	Uses NovaMin technology. Contains calcium Sodium Phosphosilicate, which leads to formation of hydroxyapatite-like crystals.
Sensodyne Rapid Relief	Malaysia	Strontium acetate
Sensodyne Complete Protection	Malaysia	NovaMin Technology Active Ingredient is Calcium Sodium Phosphosilicate (NovaMin®)
Colgate Sensitive Toothpaste	Malaysia	Combination of potassium citrate, sodium monofluorophosphate
Colgate Sensitive Multi Protection	Malaysia	Combination of potassium citrate, sodium monofluorophosphate plus zinc citrate
Colgate Sensitive Pro-Relief™ Repair and Prevent	Malaysia	Pro-Argin™ technology Active ingredient is Arginine 8%

An investigation by the United States Food and Drug Administration led to the collection of 60,000 tubes of toothpaste from retail outlets and product distributors.[7] Microbiological testing of these counterfeit toothpastes showed the presence of Gram negative rods, including Pseudomonas, Serratia, and Klebsiella.[7] Some of the toothpastes used in the present study were imported from other countries, with the rest manufactured within Malaysia. Unfortunately, due to Malaysia's shared borders there is the possibility that counterfeit toothpastes may enter the market.

Among the 39 fluoridated toothpastes available in the Malaysian market, 62% of them did not mention the concentration of fluoride either on the outer packaging or on the toothpaste tube. This can make it difficult for consumers to make the correct choice for their needs, as high fluoride containing toothpastes (1450 ppm) should only be used in patients with an increased risk of caries.

Toothpastes containing an optimum fluoride concentration of 1000 ppm should be suggested for patients with a moderate risk of caries and for the general population. A guide on the use of fluoride in Malaysia, published by the Malaysian Dental Council, stipulates that dentifrice containers and packaging should clearly display the fluoride concentration, along with its specific indications.[2] Absence of clear labelling of the ppm of fluoride content in 62% of the fluoridated toothpastes studied should be a concern for policy makers. Additionally, very few types of toothpaste had a clear and large print that stated the presence or absence of fluoride, with the majority of the packaging opting for small print. This may present difficulties for patients and clinicians when choosing toothpastes for those with different caries risk.

Some toothpaste brands labelled the presence of fluoride in w/w, rather than the more common unit of ppm. Dentists may be more comfortable to quantify the presence of fluoride when it is expressed in ppm, as universities commonly utilise this unit of measurement in their curriculums. Even though there is significant information available on the Internet regarding the interpretation and conversion of fluoride concentrations of fluoride products, it is unlikely that the general consumer would be educated on this and this further highlights the need for clear guidelines regarding the labelling on toothpaste packaging.[8] Research has also shown that a particular peptide in milk, casein phosphopeptide amorphous calcium phosphate (CPP-ACP), is responsible for reducing demineralisation and increasing remineralisation.[9,10] CPP-ACP is marketed under the RECALDENT™ brand around the world.[9,10] Newer toothpastes with evidence based research are also available for the treatment of dentinal hypersensitivity.[11] These toothpastes are available for use by both the general public and for professional use and some toothpastes purportedly claim to relieve dentinal hypersensitivity instantly.[11]

Some of the herbal based, non-fluoridated toothpastes are shown to have antimicrobial properties and can be used as an alternative to synthetic toothpastes.[12] Due to the reported side effects of mucosal ulcerations and

circumoral dermatitis with synthetic toothpastes, herbal toothpastes are becoming popular among certain sections of people.[13] Herbal toothpastes contain ingredients including clove, ginger, nutmeg, tea tree oil, cardamom, vitamin C, aloe vera, miswak, natural mint, gooseberry, neem, banyan, and acacia Arabica.[13] Additionally, these toothpastes usually claim to be free of fluoride, which they often use as a marketing tool.[13] As a general rule, use of fluoridated toothpastes is indicated as they are proven to reduce caries risk, unless there is a specific justifiable reason to avoid the use of fluoridated toothpastes.[14] The Authors endeavoured to include a comprehensive list of available toothpastes on the Malaysian market; however they acknowledge they may have missed some versions or brands of toothpastes. The Authors also would like to highlight that they are in no way endorsing any of the products studied.

Conclusions

Due to the sheer number of available toothpastes on the Malaysian market, it is not surprising that both clinicians and patients may find it difficult to choose an appropriate toothpaste for their needs. This study sought to provide a comprehensive list of fluoridated and non-fluoridated toothpastes, as well as toothpastes for specific clinical conditions based on the companies scientific claims. It is hoped that in clinical practice, this document may be used by dental professionals to choose an appropriate toothpaste for their patient's particular condition, based on both scientific evidence and the patient's preference.

Conflict of Interest Statement

None of the Authors have any conflict of interest with any toothpaste manufacturing companies.

References

1. Jardim JJ, Alves LS, Maltz M. The history and global market of oral home-care products. *Braz Oral Res*. 2009;23 Suppl 1:17-22.
2. Malaysian Dental Council: Use of Fluorides in Malaysia. 2009 [cited 27 November 2016]. Available from http://mdc.moh.gov.my/uploads/fluorides.pdf.
3. Rugg-Gunn A, Bánóczy J. Fluoride toothpastes and fluoride mouthrinses for home use. *Acta Med Acad*. 2013;42:168-78.
4. Lagerweij MD, van Loveren C. Declining caries trends: Are we satisfied? *Curr Oral Health Rep*. 2015;2:212-7.
5. Delivering better oral health: an evidence-based toolkit for prevention [Internet]. [cited 27 November 2016]. Available from: https://www.gov.uk/government/publications/delivering-better-oral-health-an-evidence-based-toolkit-for-preventionon.
6. Benzian H, Holmgren C, Buijs M, van Loveren C, van der Weijden F, van Palenstein, *et al*. Total and free available fluoride in toothpastes in Brunei, Cambodia, Laos, the Netherlands and Suriname. *Int Dent J*. 2012;62:213-21.
7. Brzezinski JL, Craft DL. Characterization of micro-organisms isolated from counterfeit toothpaste. *J Forensic Sci*. 2012;57:1365-7.
8. Fluoride conversions. [Internet] [cited 27 November 2016]. Available from: http://www.colgateprofessional.com.au/Professional/v1/en/au/localeassets/docs/student_Fluoride_Conversions.pdf.
9. Sudjalim TR, Woods MG, Manton DJ, Reynolds EC. Prevention of demineralization around orthodontic brackets in vitro. *Am J Orthod Dentofacial Orthop*. 2007;131:705.e1-9.
10. Huq NL, Myroforidis H, Cross KJ, Stanton DP, Veith PD, Ward BR, *et al*. The Interactions of CPP-ACP with Saliva. *Int J Mol Sci*. 2016;17.
11. Addy M, West NX. The role of toothpaste in the aetiology and treatment of dentine hypersensitivity. *Monogr Oral Sci*. 2013;23:75-87.
12. Anushree B, Fawaz MA, Narahari R, Shahela T, Syed A. comparison of antimicrobial efficacy of triclosan-containing, herbal and homeopathy toothpastes-an invitro study. *J Clin Diagn Res*. 2015;9:DC05-8.
13. Khairnar MR, Dodamani AS, Karibasappa GN, Naik RG, Deshmukh MA. Efficacy of herbal toothpastes on salivary pH and salivary glucose - A preliminary study. *J Ayurveda Integr Med*. 2017;8:3-6.
14. Cury JA, Tenuta LM. Evidence-based recommendation on toothpaste use. *Braz Oral Res*. 2014;28:1-7.