

Efficacy of Thai Herbal Extract Oral Care Products in Promoting Antimicrobial Health Among Healthy Volunteers

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INTRODUCTION

The prevalence of dental caries in permanent dentition is estimated to impact approximately 2.4 billion individuals in the adult population, whereas primary dentition caries affect approximately 532 million children.^[1] The etiology of dental caries is also intricately linked to the involvement of microorganisms.^[2] Halitosis, also known as the unpleasant odor emanating from the oral cavity, is a malady that is influenced by a multitude of factors, and its etiology can be either oral or non-oral in nature.^[3,4] This research was conducted to assess the antimicrobial effectiveness against oral pathogens of oral care products that contain UM extract, which encompassed lozenges, mouth spray, and mouthwash.

MATERIALS AND METHODS

Healthy participants including 20- to 35-year-old men (n = 5) and women (n = 5) were recruited from Thai Traditional Medicine Clinic, Suan Sunandha Rajabhat

ABSTRACT **Background:** Reducing the levels of oral microbials, including *Streptococcus mutans*, *Candida albicans*, and *Lactobacilli* sp., would provide the prevention of dental caries and oral illness. **Aims:** To assess the antimicrobial effectiveness against oral pathogens of oral care products that contain *urginea maritima* extract (UM) extract, including lozenges, mouth spray, and mouthwash. **Methods:** The skin irritation test was conducted on each product compared with controls in healthy participants (n = 10) by the 24-hour closed obstruction patch test. The elimination of oral pathogens in participants (n = 30) before and after product usage (as per the instruction) was assessed using a modified dip slide test. **Result:** The physical appearance and stability of oral care products were almost preferable. When added to oral care products for oral health maintenance, the cariogenic bacteria *S. mutans*, *Candida* species, and *Lactobacilli* species have been found to exhibit antimicrobial activity.

KEYWORDS: Antimicrobial, dental caries, oral care product, oral microbials, *Streptococcus mutans*

University, Samut Songkhram, Thailand, from January to March 2022. The inclusion criteria were normal skin appearance without any skin infection, lesion, and pruritis especially in the back area. The skin irritation test was performed by the 24-hour closed obstruction patch test. Evaluation of skin irritation from each product containing herbal extract was conducted in triplicated experiments along with raw materials (reagent base) and 0.9% normal saline as controls. Each sample (0.3 ml) was separately applied on gauze (2 × 2 cm²) that was patched on the back skin surface, and the gap of tested or controlled gauze was 3 cm/border. The tablet was adjusted with the help of 0.9% normal saline (W/V) to 10%. as shown in Figure 1a and b.

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Table 1 : Physical appearance and tablet characteristics of herbal lozenges

Physical Appearance	Result	Table picture
Color	Pinkish-White	
Odor	Spearmint Like	
Foaming	Few/Fine foaming	
Visual Inspection	Tablet Forming/Roughly surface without broken or Fragile	
Table evaluation	Result	Reference range
Weight Variation	<10%	<10%
Tablet Thickness	4.1-4.8mm	3.0-3.5 mm
Tablet Hardness	1.9-2.2 Kilopond	>4.0-8.0 Kilopond
Tablet Friability	0.5-2.0%	<1.0%
Disintegration Time	25.24-26.04 min	<30 min
Loss on Drying	10.6-11.5%	<10%

Table 2: Physical appearance & stability of herbal mouth spray & mouthwash

Product	Physical appearance	Result
Mouth Spray	Color	Pale Yellow
	Odor	Fresh Scent Odor
	Transparency	Clear
	Texture	Slightly Viscous/Cooling
Mouthwash	Color	Pale Yellow
	Odor	Fresh Scent odor
	Transparency	Clear
	Texture	Watery/cooling
	Stability test	Result
Mouth spray	Room Temperature	No layer separation/precipitated
	Freeze & Thaw cycle	No layer separation/precipitated
Mouthwash	Room Temperature	No layer separation/precipitated
	Freeze & Thaw cycle	No layer separation/precipitated

RESULTS

Lozenge was prone to broken or unstable due to lower thickness and hardness, and higher friability and loss on drying as shown in Table 1.

Upon observation, there was a homogeneous solution without any presence of layers or precipitation, as depicted in Table 2.

DISCUSSION

Investigations conducted *in vivo* and *in situ* are imperative to establish definitive substantiation regarding the efficacy and clinical applications of these compounds in the prevention of dental caries.^[5] When the count exceeds this normal range, it is generally regarded as the threshold for caries in clinical investigations.^[6] In this particular investigation, the oral microbials in the participants were below the normal range, which can be attributed to the real-life circumstances that did not involve any alterations to their usual oral hygiene practices or teeth cleaning routines. Consequently, each product application was conducted after breakfast, and this factor may

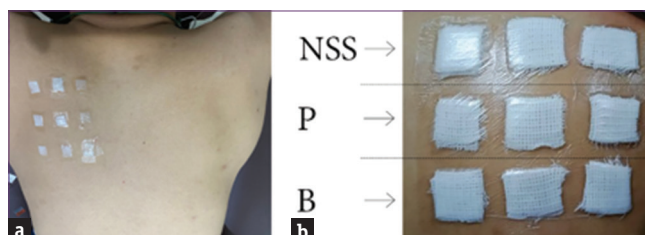


Figure 1: Skin irritation test applied back skin surface as show in (a) and (b) Example of negative results for oral care product (P) in the middle row compared to controls, 0.9% normal saline solution (NSS) and reagent base (B)

have also played a role in reducing the microbial challenge.^[7]

CONCLUSION

After careful consideration, we have arrived at the conclusion that oral care products that include UM herbal extract are of sufficient quality in terms of their physical appearance and stability without causing any irritation or allergic reactions. Use of all oral care products in oral health practices has been found to have antimicrobial effectiveness against the cariogenic *S. mutans*, *Candida* sp., and *Lactobacilli* sp.

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Conflicts of interest

There are no conflicts of interest.

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