

**ANTIOXIDANT ACTIVITY OF *Alpinia galangal* EXTRACTS AND ITS
POTENTIAL AS TOOTHPASTE'S ADDITIVE**

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ABSTRACT

ANTIOXIDANT ACTIVITY OF *Alpinia galangal* EXTRACTS AND ITS POTENTIAL AS TOOTHPASTE'S ADDITIVE

This article explains how *Alpinia galangal* has been cultivated as a medicinal herb for its antibacterial, anti-ulcer, and antioxidant activities, as well as a source of food for its high nutritional value to human health. *Alpinia galangal* is known as “Lengkuas” locally in Malaysia. There are several chemicals used as preventative agents and aids to remove the plaque in toothpaste and mouth rinse. However, the high concentration of certain chemicals can cause negative side effects to teeth in long term usage. So, the objectives of this research are to know if there are bioactive compound in *Alpinia galangal* extract that acts as bioactive agents and is the extract suitable to add as additive in toothpaste to lessen the usage of chemical additive in the toothpaste. The *Alpinia galangal* rhizome was washed thoroughly, and air dried for one week. The crude extract of *Alpinia galangal* was obtained through rotary evaporation. In this study, the chemical properties of *Alpinia galangal* were examined using phytochemical screening. The phytochemical screening indicates positive results in flavonoid, tannins, and saponin, indicating that such chemical components are present in *Alpinia galangal* extract. The antioxidant activity was then determined using the DPPH method. And after that, toothpaste containing *Alpinia galangal* extract was developed. The extract yield is 22% (v/w). Furthermore, an antioxidant test using 2,2-diphenyl picrylhydrazyl (DPPH) was conducted. When compared to ascorbic acid, *Alpinia galangal* has a high antioxidant activity. The disk diffusion method test reveals that toothpaste with a concentration of 3000 ppm has medium antibacterial activity against *Escherichia coli* (11.0 mm) and *Bacillus Licheniformis* (12.0 mm). The toothpaste was evaluated for spreadability or greasiness, as well as the presence of sharp and edge abrasive particles and pH. The toothpaste runs smoothly when pressed with finger and no sharp abrasive particle to be found. The toothpaste has a good greasiness that is neither too dilute nor too solidified. The median radius ring is 0.33 cm. The toothpaste has a pH of 6, making it safe to use. Bioactive compound is available in *Alpinia galangal* since the phytochemical screening of flavonoid, tannin, and saponin is positive.

TABLE OF CONTENTS

	Page
ABSTRACT	iv
ABSTRAK	v
ACKNOWLEDGEMENTS	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	3
1.3 Research questions	4
1.4 Significance of study	5
1.5 Objectives of study	6
1.6 Scope and limitation of study	6
1.6.1 Scope of the Study	6
1.6.2 Limitations of the Study	7
CHAPTER 2 LITERATURE REVIEW	
2.1 Genus <i>Alpinia</i>	8
2.2 <i>Alpinia galangal</i> taxonomy	9
2.3 <i>Alpinia galangal</i>	10
2.3.1 Pharmacological <i>Alpinia galangal</i>	11
2.4 Phytochemical screening	14
2.5 Biological activities	15
2.5.1 Antioxidant activity	15
2.5.2 Antibacterial activity	16
2.5.3 Anti-ulcer activity	17
2.5.4 Anti-tumor activity	17
2.5.5 Anti-SARS-CoV-activity	18
2.6 Ingredients in formulated toothpaste	18
2.7 Benefits of using <i>Alpinia galangal</i> in formulated toothpaste	20
2.8 Previous studies on <i>Alpinia galangal</i> extract on antimicrobial activities	21
CHAPTER 3 METHODOLOGY	
3.1 Materials and Chemicals	23
3.1.1 Raw materials	23
3.1.2 Chemicals	24

CHAPTER ONE

INTRODUCTION

1.1 Background of study

Herbal supplements are still the primary source of medication in underdeveloped countries. Natural products with medicinal properties have been used to prevent and treat a variety of dental problems for a long time. Organic ingredients derived from medicinal plants contain a large number of biologically active molecules that could help with the development of new pharmaceutical compounds. Herbal medicines' antibacterial, antiviral, and anti-inflammatory properties have made their way into dentistry. (Anusha, P. *et al.*, 2020; Özgü Ilkcan Karadağlıoğlu *et al.*, 2019).

The ginger plant *Alpinia galangal* is native to tropical Asia. The Southern Asian continent is the richest, with Malaysia, Indonesia, Brunei, Singapore, and the Philippines constituting a botanically distinct country (Partiban, S. and Muthulinggam, N. 2015). This plant is frequently used and blended as a medicinal herb to treat a variety of infections, including stomachaches, bacterial infections, and fungal infections (Faradiba, N. A. *et al.*, 2019; Partiban, S. and Muthulinggam, N. 2015). Besides that, this plant can also