UNIVERSITI TEKNOLOGI MARA

ANTIMICROBIAL ACTIVITY OF ETHANOLIC EXTRACTION OF *Zingiber zerumbet* RHIZOME AGAINST SKIN MICROORGANISMS

By

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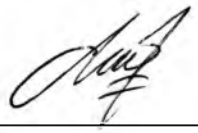
DECLARATION

I hereby declare that this thesis is my original work and has not been submitted previously or currently for any other degree at UiTM or any other institutions.



(Dzarana Binti Mat Safri)

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ABSTRACT

ANTIMICROBIAL ACTIVITY OF ETHANOLIC EXTRACTION OF *Zingiber zerumbet* RHIZOME AGAINST SKIN MICROORGANISMS

Zingiber zerumbet is a perennial plant that can be found in many tropical countries. Its main part is rhizome which widely used as traditional medicine for long time. The rhizome is able to cure inflammation, sore throat, diabetes, swelling chest pain, bronchitis and many more. Moreover, it is also reported to have antimicrobial activity. There are lots of antimicrobial soaps available in markets nowadays which contain an active ingredient or antimicrobial agent, triclosan. Triclosan has been reported to affect the health of user and environment especially for the long term usage. In order to make sure that antimicrobial soaps are healthy to use, triclosan need to be changed with natural products. Hence, this study was done to determine the antimicrobial activity of *Zingiber zerumbet* rhizome against skin microorganisms as well as to detect its bioactive compounds. The *Zingiber zerumbet* rhizome was extracted with ethanol then performed antibacterial susceptibility testing (AST) against tested microorganisms using disc diffusion method. Then, Minimum Inhibitory Concentration (MIC) was done using broth microdilution method with microtiter plate. Shower gel was prepared from *Zingiber zerumbet* rhizome extract to test against the tested microorganisms using disc diffusion method. The preliminary phytochemical screening was done using different types of reagent for different bioactive compounds. The result for AST show that most sensitive with the largest diameter of inhibition zone, 11 mm. It was followed by *Candida albicans* (10.33 mm), *Proteus mirabilis* (8 mm) and then *Staphylococcus aureus* (7.67 mm). Both *Pseudomonas aeruginosa* and *Acinetobacter baumannii* showed no inhibition zone. The MIC showed that *Proteus mirabilis* had the lowest MIC value (15.63 mg/ml). *Staphylococcus aureus* had 31.25 mg/ml meanwhile both *Staphylococcus epidermidis* and *Candida albicans* had the same value, 62.5 mg/ml. When tested with *Zingiber zerumbet* shower gel, none of the tested microorganisms were sensitive except for *Staphylococcus epidermidis* (11.67 mm). The preliminary phytochemical screening revealed that *Zingiber zerumbet* rhizome contains alkaloids, flavonoids, proteins and amino acids and triterpenoids. This finding showed that *Zingiber zerumbet* rhizome extract had antimicrobial activity against skin microorganisms and had a potential to use as natural product in antimicrobial soaps replacing the triclosan.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Zingiber zerumbet is a plant species of Zingiberaceae family which known as bitter ginger or shampoo ginger. Apart from being known by only these names, *Zingiber zerumbet* also has several names depend on the country or state it found such as 'Lempoyang' in Malaysia and Indonesia, 'Bon adha' in Bangladesh, 'Awapuhi' in Hawaii, 'Haeo dam' or 'Hiao dam in Northen Thailand, 'Zurunbah' in Arab, 'Hong qiu jiang' in China and it is known as 'Ghatian' and 'Yaiimu' in India (Hossain *et al.*, 2012). The *Zingiber zerumbet* is a plant that has high medicinal values which make scientists from many countries to have interest to explore this plant (Yob et al., 2011). Instead of being added in cooking for better taste of dish, *Zingiber zerumbet* also is stated to have many uses that will give benefits to the users. The rhizome is reported to have the ability to cure for swelling, appetite loss, lumbago, diabetes, sore throat and inflammation. In addition, it also can cure rheumatic pains, chest pain, and bronchitis (Hossain *et al.*, 2012). There is a source reviewed about the uses of *Zingiber zerumbet* rhizome as well, whereby they said that it can treat fever, toothache, indigestion, constipation, diarrhea, severe sprains and also to reduce the pain, antispasmodic, antirheumatic and diuretics agents. Other than that, if a child is suffering with worm infestation, the boiled rhizome of the *Zingiber zerumbet* can cure it. The fresh rhizome also is used as antiflatulent agent especially in Thailand. Besides the rhizome that was used as traditional medicine, the leaves also useful to cure cuts and bruised skin. The leaves are burnt and the ash from the burning is mix with ashes of *Schizostachyun glaucifolium,* nut sap of *Aleurites moluccana* and tuber sap of *Zingiber zerumbet* (Yob *et al.*, 2011). There are several studies stated that *Zingiber zerumbet* has the ability as antimicrobial agent which can inhibit the growth of microorganisms.