

**ANTIBACTERIAL ACTIVITY OF BETEL QUID INGREDIENTS
AGAINST GRAM-NEGATIVE BACTERIA
ASSOCIATED WITH HALITOSIS**

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ABSTRACT

ANTIBACTERIAL ACTIVITY OF BETEL QUID INGREDIENTS AGAINST GRAM-NEGATIVE BACTERIA ASSOCIATED WITH HALITOSIS

Modernisation has caused Malaysians to start neglecting cultures and traditions including the consumption of betel quid. Betel quid consists of betel leaf, areca nut, and slaked lime. The population of Malaysian who consumed betel quid in their daily life is decreasing over time. Due to halitosis which is an offensive odour originates from the oral cavity, the youngsters nowadays preferred to eat chewing gum and candy as mouth fresheners as substitute to betel quid. However, these kinds of mouth fresheners contain synthetics supplements and high contain of sugars, which could be harmful for their health especially in their oral cavity. Halitosis is caused by metabolism of the bacteria known as bacterial putrefaction. Typically, bacterial putrefaction is caused by gram negative bacteria. Both *Klebsiella pneumoniae* and *Enterobacter cloacae* are the most predominant type of bacteria in the oral cavity. Thus, the aim of this study is to determine the potential of betel quid ingredients as an antibacterial against gram negative bacteria associated with halitosis which are *Klebsiella pneumoniae* and *Enterobacter cloacae*. Ingredients of betel quid usually are consumed together, therefore, the most effective and efficient antibacterial activity among the betel quid ingredient is unknown. The second aim of this study is to identify the betel quid ingredient that is the most effective and efficient as antibacterial. Disk diffusion assay, MIC and MBC was conducted. The disk diffusion assay showed betel leaf is the highest potential as antibacterial compared to areca nut and slaked lime. Betel leaf also showed the lowest MIC which is 125 µg/ml when against *Klebsiella pneumoniae* and 62.5 µg/ml when against *Enterobacter cloacae*. The extract also is bactericidal at the same concentration when tested in MBC. Therefore, betel leaf is the most effective and efficient antibacterial against halitosis causing gram-negative bacteria.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Malaysia is a country which rich of cultures and their own traditions which comes from variety of ethnics and races. Therefore, it is common for Malaysian to share and practice those cultures and traditions, such as eating betel quid. Eating betel quid had been practiced since the ancestor's generation until this threshold era. Betel quid consist of betel leaf (*Piper betle* Linn.), areca nut (*Areca catechu* Linn.) and slaked lime (calcium hydroxide). The old folks believe that eating betel quid could bring many benefits to individuals as it has nutritious properties. One of the most beneficial parts of betel quid is its positive effect in oral health such that, being an anti-inflammatory and antimicrobial utility in the oral cavity (Pradhan *et al.*, 2013).