

STUDY OF ANTIBACTERIAL ABILITY OF *HYLOCEREUS POLYRHIZUS* FOR GRAM NEGATIVE BACTERIA

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ABSTRACT : Gram-negative bacteria are bacteria that have a cell wall layer <10 nm and have an outer lipid bilayer in the form of lipopolysaccharide (LPS). *Fusobacterium nucleatum*, *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis* are gram-negative bacteria, which are one of the main causes of periodontitis. Red dragon fruit skin contains several antibacterial compounds in the form of flavonoids and terpenoids. Previous research has been conducted on the antibacterial ability of red dragon fruit peel extract against several gram-negative bacteria, but the antibacterial ability of red dragon fruit peel extract against *F. nucleatum*, *A. actinomycetemcomitans* and *P. gingivalis* has not been tested. This study goal was to assessing the antibacterial ability of red dragon fruit srom extract against *F. nucleatum*, *A. actinomycetemcomitans* and *P. gingivalis* through Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) tests. MIC measurement of red dragon fruit extract against *P. gingivalis*, *A. actinomycetemcomitans* and *F. nucleatum* was carried out by serial dilution method on BHI media. Determination of MBC is done by taking a sample of bacteria from the liquid media, which is used for MIC measurements into the agar medium. The MIC and MBC values of *P. gingivalis*, *A. actinomycetemcomitans* and *F. nucleatum* were 6.25% and 12.5%. Red dragon fruit skin extract has the ability to inhibit the growth of *P. gingivalis*, *A. actinomycetemcomitans* and *F. nucleatum*.

Key words : *Hylocereus polyrhizus*, *P.gingivalis*, *A.actinomycetemcomitans*, *F.nucleatum*, antibacterial.

INTRODUCTION

Gram-negative bacteria are bacteria that have a relatively thin cell wall layer (<10 nm) and have an outer lipid bilayer in the form of lipopolysaccharide (LPS) (Mai-Prochnow, 2016; Sperandeo *et al*, 2016). *Fusobacterium nucleatum*, *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis* are gram-negative bacteria, which are one of the main causes of periodontitis. *F. nucleatum* is a heterogeneous species, *F. nucleatum* can be found in various tissues in the human body, but these bacteria are found mostly in the oral cavity (De Andrade *et al*, 2019). *A. actinomycetemcomitans* is divided into six serotypes (a-f), serotype b is most often found in aggressive periodontitis (Gholizadeh *et al*, 2017). These bacteria are usually found in between the gingiva and supragingiva (Minic and Pejicic, 2019). *P. gingivalis* is the most dominant bacteria found in periodontal disease, especially chronic periodontitis. *P. gingivalis* is commonly found

in the subgingival sulcus in the oral cavity (How *et al*, 2016). The bacteria colonize to be able to survive and multiply in the host's body. Bacterial colonization can occur due to bacterial virulence factors such as lipopolysaccharide (LPS), capsules, proteases and fimbria (Hajishengallis and Lamont, 2014).

Hylocereus is a type of cactus plant native to America, this fruit is known by several other names such as "pitahaya" or "pitaya". *H. polyrhizus* or red pitaya has red skin and flesh (Ortiz-Hernández and Carrillo-Salazar, 2012). This red dragon fruit skin contains high antibacterial compounds, based on the research of Kunnika and Pranee (2011), it is stated that every 100 grams of red dragon fruit skin extract contains 300-500 mg of antibacterial compounds. The known antibacterial content is flavonoids and terpenoids (Xie *et al*, 2014; Zacchino *et al*, 2017).

Previous research has been conducted on the antibacterial ability of red dragon fruit skin extract against gram-negative bacteria such as *Escherichia coli*, *Salmonella typhimurium*, *Campylobacter jejuni*,