

UNIVERSITI PUTRA MALAYSIA

ISOLATION AND CHARACTERIZATION OF STREPTOCOCCUS SPP. FROM DENTAL PLAQUE SAMPLES

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PENGESAHAN

Dengan ini adalah disahkan bahawa projek yang bertajuk "Isolation and Characterization of *Streptococcus* spp. from Dental Plaque Samples" telah disiapkan serta dikemukakan kepada Jabatan Mikrobiologi oleh Zatul Najihah binti Wagiman (164213) sebagai syarat untuk kursus BMY 4999 projek.

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ABSTRACT

Dental caries is a prevalent oral disease worldwide. It affects a vast majority of adults, including those in developed countries although many prevention measures are available. It is of great importance to update the dental caries status of adults and to investigate the utilization of dental services and dental caries experience from publics. It is also important to know the exact bacteria species that involves in the dental plaque formation especially the bacteria that form biofilm. In conjunction with that, this study was conducted to isolate the bacteria from oral cavity and to characterize and identify them. Dental plaque samples were collected from 15 female subjects aged between 20 – 25 years old. Early assumption can be made based on colony morphology, Gram staining and biochemical tests that the bacteria isolated were *Streptococcus* spp. Only two isolates were successfully identified as *Streptococcus salivarius* based on 16s rDNA sequencing.

ABSTRAK

Karies gigi adalah sejenis penyakit mulut lazim yang dihidapi seluruh dunia. Ia memberi kesan kepada sejumlah besar orang dewasa termasuklah mereka yang berada di negara yang berkembang pesat walaupun pelbagai langkah pencegahan tersedia ada. Adalah menjadi suatu kepentingan utama untuk sentiasa mengetahui dari semasa ke semasa tentang keadaan karies gigi dalam kalangan dewasa dan untuk mengkaji penggunaan perkhidmatan pergigian dan pengalaman pergigian daripada orang ramai. Ia adalah penting untuk mengetahui spesies bakteria sebenar yang terlibat dalam pembentukan plak gigi terutamanya bakteria yang memainkan peranan dalam pembentukan biofilem. Sehubungan dengan itu, kajian ini dijalankan untuk mengasingkan bakteria daripada rongga mulut dan untuk mengklasifisikan serta mengenalpasti bakteria tersebut. Sampel plak gigi telah dikumpulkan daripada 15 orang wanita sebagai subjek yang berumur antara 20 – 25 tahun. Andaian awal telah dapat dibuat berdasarkan kepada morfologi koloni, gram pewarnaan dan ujian biokimia bahawa bakteria yang terdapat di dalam rongga mulut daripada kajian ini adalah sejenis *Streptococcus* sp. Tetapi terdapat hanya dua pencilan yang berjaya dikenalpasti sebagai Streptococcus salivarius berdasarkan kepada keputusan penjujukn yang diperolehi.

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CHAPTER 1

INTRODUCTION

The human oral microbiome is complex in nature. It is composed of bacteria and fungi. There are 700 species of bacteria found in the oral cavity, a large number of which are still uncultivable and needs to be identified (Avila et al., 2009). The properties of mouth as a microbial habitat are dynamic and will change during the life of an individual (Marsh & Marvin, 2009). The bacteria may be isolated from the oral cavity are *streptococci*, *lactobacilli* and *veillonella*. In this group of bacteria, the mutans group of streptococci is known as the major causative agent of dental caries, and the mitis group of streptococci is one of the most prevalent bacterial groups in infective endocarditis. One of the early colonizers of the tooth surface is *Streptococcus mutans* (*S. mutans*), which is the bacterium responsible for initiation of dental plaque bacterial biofilms (Kim & Lee, 2015).

Based on the report conducted by National Health Insurance Scheme (NHIS) in 2010, definition of oral health is health of the mouth and teeth. About three quarter of adults aged 18 to 64 years are classified as having very good oral health, 17% had fair oral health and 7% had poor oral health. Education level is strongly associated with oral hygiene awareness. Tertiary educated individuals have a better oral health status compared to the others of the same age (Xu et al., 2014). Statistics showed that, 42% of adult who did not have regular dental visit were from lower education level. This is due to the cost and 33% of them thought that it was not necessary (Barbara et al., 2008). The lack of awareness leads to dental caries problems caused by accumulation of dental plaques (Schuller et al., 2003).

Dental plaque is a biofilm that causes dental caries, gingivitis and periodontitis (Savage et al., 2009). The largest accumulations of bacteria are found as biofilms on the tooth surface (Zaura et al., 2009). The presence of these microbes on all accessible surfaces of the mouth is natural, and is essential for the normal development of the physiology of the oral cavity (Marsh et al., 2010). Dental diseases can be controlled by meticulous mechanical oral hygiene (Marsh, 2010).

There are so many ways could be practiced to prevent dental diseases. The most common general approach will be brushing teeth at least twice a day with a fluoride containing toothpaste, preferably after having meal and before going to bed. Flossing or using mouthwash is another alternative practices to clean the mouth. Reducing daily sugar in food intake would be a very good practice too. Diet do affects the integrity of teeth. Salivary amylase will hydrolyze sugars and other fermentable carbohydrate and the product is the substrate for the metabolism of oral microorganisms.

Specific preventive or treatment approach will be more effective if it is targeted for the related dental causing bacteria. Thus, in the present study, the objective is to isolate and identify bacteria from the dental plaque samples.

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