PENENTUAN PROFIL PROTEIN BIOFILM *Streptococcus mutans* UNTUK EKSPLORASI BIOMARKER RISIKO KARIES GIGI

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RINGKASAN

Penentuan Profil Protein Biofilm *Streptococcus mutans* Untuk Eksplorasi Biomarker Risiko Karies Gigi

Biofilm terdiri dari kumpulan mikroorganisme, yang melekat pada suatu permukaan dan diselimuti oleh perekat polisakarida yang diekskresikan oleh mikroorganisme tersebut. Biofilm berperan sebagai pelindung dan perangkap nutrisi yang diperlukan untuk pertumbuhan mikroorganisme, serta mencegah lepasnya mikroorganisme dari suatu permukaan yang terdapat di dalam sistem sirkulasi (Madigan, et al., 2006). Di dalam rongga mulut, saliva sebagai sistem sirkulasi. Salah satu pengaruh negatif biofilm pada kehidupan manusia yaitu munculnya kondisi patogen, sebagai contohnya adalah karies gigi yang disebabkan oleh biofilm yang dibentuk *Streptococcus mutans*. Salah satu upaya alternatif untuk menekan angka kejadian karies gigi, di antaranya dengan melakukan diagnosis risiko karies gigi sejak dini. Dengan demikian, individu yang terdeteksi memiliki risiko karies gigi dapat melakukan upaya pencegahan sejak tanggalnya gigi susu sesuai dengan tindakan perawatan yang telah disarankan oleh dokter gigi.
Tujuan dari penelitian ini adalah menentukan profil protein biofilm *Streptococcus mutans* dan menentukan protein biofilm yang berpeluang sebagai biomarker karies gigi. Sampel yang digunakan adalah *crude protein* hasil lisis dari biofilm *S. mutans*. Pertumbuhan Biofilm *S. mutans* dilakukan pada slide glass yang dicelupkan dalam media BHIB yang mengandung sukrosa 2%. Analisis profil protein biofilm *S. mutans* dilakukan menggunakan SDS-PAGE dengan konsentrasi akrilamid dan bis-acrilamid sebesar 12%, sedangkan penentuan protein antigenik biofilm S. mutans menggunakan Western blot dengan sampel saliva dari individu non karies yang memiliki sIgA tinggi. Hasil analisis profil biofilm *S. mutans* dengan SDS-PAGE 12% didapatkan 17 pita, dengan masing-masing pita memiliki berat molekul 190, 185, 175, 157, 105, 85, 66, 55, 52, 42, 40, 29, 25, 22, 20,18, dan 17 kDa. Sedangkan hasil analisis protein antigenik dengan Western blot didapatkan 4 pita, dengan masing-masing pita memilki berat molekul 105, 52, 40, dan 29 kDa. Dengan demikian dapat disimpulkan bahwa biofilm *S. mutans* memiliki profil protein dengan berat molekul 190, 185, 175, 157, 105, 85, 66, 55, 52, 42, 40, 29, 25, 22, 20,18, dan 17 kDa. Sedangkan biofilm *S.mutans* memiliki protein antigenik dengan berat molekul 105, 52, 40, dan 29 kDa.

SUMMARY

Determination of Protein Profile *Streptococcus mutans* Biofilm For Exploration of Dental Caries Risk Biomarker

Biofilms consist of colllection microorganismes, that are attached to a surface and covered by adhesive to polisacharide secreted by these microorganisme. Biofilms as protector and trap nutrients needed for growth of microorganisms, and prevent the escape of microorganisms from a surface contained in the circulatory system (Madigan et. all., 2006). In the oral cavity salivary as the circulatory system. One of the negative influence of biofilm of human life is the emergence of pathogens, for example is dental caries caused biofilm formed by *Streptococcus mutans*. One alternative effort to suppress the incidence of dental caries, among them with a diagnosis of early dental caries risk. Thus, individuals who were detected to have dental caries risk can take steps to prevent from loss of milk tooth according to the maintenance actions that have been recommended by dentist. The purpose of this study to determine the protein profile of *Streptococcus mutans* biofilm and determine the protein biofilm that chance as a biomarker of dental caries. Crude protein of lysis result from biofilm *S. mutans* as a sample. Biofilm growth of *S. mutans* performed on glass slide are dipped in BHIB medium containing 2% sucrose. Analysis protein profile of biofilm *S. mutans* performed using SDS-PAGE with the conccentration of acrylamid and bisacrylamid is 12%, while to determination of the antigenic protein biofilm *S. mutans* using Western blot with human saliva non caries who have the high sIgA. The result of protein profile analysis of biofilm *S. mutans* by 12% SDSPAGE earned 17 bands, molecular weight of each bands are 190, 185, 175, 157, 105, 85, 66, 55, 52, 42, 40, 29, 25, 22, 20,18, and 17 kDa. While the result of the analysis of antigenic protein by Western blot earned four bands, molecular weight of each are 105, 52, 40, and 29 kDa. The conclution of the research, the biofilm of *S. mutans* has protein profile with molecular weight 190, 185, 175, 157, 105, 85, 66, 55, 52, 42, 40, 29, 25, 22, 20,18, and 17 kDa. While the biofilm *S. mutans* have antigenic protein with molecular weight 105, 52, 40, and 29 kDa.

ABSTRACT

Biofilm consist of a collection of microorganisme witch attached to a surface and is covered by adhesive polysaccharides had excreted by these microorganisme. One of the negative influence of biofilm on human life is the emergence of dental caries. *Streptococcus mutans* is a virulent bacteria to biofilm formation causes dental caries. Dental caries can be several disease, including mediastinitis, sepsis, facial cellulitis, osteomyelitis, endocarditis, and pneumonia. Caries index in Indonesia around 2.2, caries index WHO's target is 1.0. Alternative effort to suppress dental caries with early diagnostic of dental caries risk using biomarker. Biofilm growth performed of *S. mutans* on glass slide to BHIBS media for 24 hours. Crude protein extract of biofilm had obtained by lysis using ultrasonication 7 x 30s, 40 Hz. Furthermore, analysis antigenic protein biofilm *S. mutans* using Western blot methode. In this study also have done the determination protein profiles of *S. mutans* biofilm using SDS-PAGE 12%. Protein profile of *S. mutans* biofilm consist of seventeen bands, with known size 190, 185, 175, 157, 105, 85, 66, 55, 52, 42, 40, 29, 25, 22, 20,18, and 17 kDa. Antigenic protein of *S. mutans* biofilm consist of four bands, with known size 105, 52, 40, and 29 kDa.

Keywords: biofilm, ultrasonication, Western blot, SDS-PAGE, *Streptococcus mutans.*