

ABSTRAK

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ANOTASI SERTA ANALISIS GEN-GEN TERKAIT ADHESI PADA *Lactiplantibacillus plantarum* SU-KC1A DAN ANALISIS KEMAMPUAN ADHESINYA PADA MUKUS BABI

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(xiii + 45 halaman; 3 gambar; 5 tabel; 3 lampiran)

Kemampuan bakteri probiotik bertahan hidup dalam kondisi saluran pencernaan yang dinamis sangat bergantung pada kemampuannya berkoloni, yang mana tergantung pada kemampuan adhesi bakteri ke dinding saluran pencernaan. Untuk melakukan adhesi, bakteri dapat mengekspresikan molekul yang berfungsi membantu pelekatnya ke dinding usus, antara lain MucBP, FnBP, dan CnBP. Penelitian ini dibagi menjadi dua komponen: 1) menganalisis kemampuan adhesi *Lactiplantibacillus plantarum* SU-KC1a pada mukus babi menggunakan metode *adherence assay*, dan 2) menganalisis gen-gen dari genom SU-KC1a yang berperan dalam adhesi. Metode yang digunakan adalah *adherence assay* menggunakan *microplates* yang telah diimobilisasi masing-masing dengan BSA dan mukus babi untuk mengetahui persentase adhesi SU-KC1a. Selanjutnya, dilakukan perakitan, pemolesan, dan anotasi data WGS SU-KC1a serta analisis perbandingannya dengan *strain* SK151 untuk memperoleh informasi mengenai keberadaan gen yang dapat mengekspresikan protein terkait adhesi. Hasil *adherence assay* menunjukkan bahwa persentase adhesi SU-KC1a pada mukus babi setelah inkubasi 1, 2, dan 3 jam, masing-masing sebanyak 81,19%, 85,14, dan 88,12%. Sedangkan pelekatan SU-KC1a pada BSA setelah inkubasi 1, 2, dan 3 jam masing-masing sebanyak 68,60, 70,24%, dan 67,93%. Hasil tersebut menunjukkan bahwa terjadi peningkatan persentase adhesi pada mukus yang proporsional dengan waktu inkubasi adhesi. Hasil analisis anotasi genom SU-KC1a menunjukkan bahwa terdapat sejumlah CDS yang mengkodekan protein untuk permukaan sel: *hydrolase* (5 CDS), protein yang berperan dalam proses daur ulang produk peptidoglikan *turnover* (1 CDS), *fibronectin/fibrinogen binding protein* (4 CDS), dan *surface protein* yang belum diketahui fungsinya (13 CDS). Analisis lebih lanjut perbandingan genom SU-KC1a dan SK151 menunjukkan adanya 3 CDS yang memiliki kemiripan bervariasi dengan gen-gen MucBP *domain-containing protein* pada SK151.

Kata kunci : *Lactiplantibacillus plantarum*, *adherence assay*, mukus babi, MucBP

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ABSTRACT

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ANNOTATION AND ANALYSIS OF ADHESION-RELATED GENES IN *Lactiplantibacillus plantarum* SU-KC1A AND ANALYSIS OF ITS ADHESION TO PORCINE MUCUS

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The survivability of probiotic bacteria in dynamic condition of digestive tract is highly dependent on their ability to colonize, which depends on its adhesion to digestive tract wall. To perform adhesion, bacteria can express molecules to help them adhere to the intestinal wall, including MucBP, FnBP, and CnBP. This study was divided into two parts: 1) analyzing the adhesion of *Lactiplantibacillus plantarum* SU-KC1a to intestinal porcine mucus using the adherence assay method, and 2) analyzing the genes from the SU-KC1a genome that play a role in adhesion. The method used is adherence assay using microplates that have been immobilized with BSA and porcine mucus, respectively, to determine the percentage of SU-KC1a adhesion. Furthermore, the WGS data of SU-KC1a was assembled, polished, annotated, and then analyzed in comparison with the strain SK151 to obtain information about the presence of genes that can express adhesion-related proteins. The adherence assay results showed that the percentage of SU-KC1a adhesion to porcine mucus after incubation for 1, 2, and 3 hours was 81,19%, 85,14, and 88,12%, respectively. Meanwhile, the adhesion of SU-KC1a to BSA after incubation for 1, 2, and 3 hours was 68,60, 70,24%, and 67,93%, respectively. These results indicate that there is an increase in the percentage of adhesion to mucus which is proportional to the incubation time of adhesion. The results of the annotation analysis of the SU-KC1a genome showed that there are several CDS that encode proteins for the cell surface, such as: hydrolase (5 CDS), protein that plays a role in the recycling process of peptidoglycan turnover product (1 CDS), fibronectin/fibrinogen binding protein (4 CDS), and surface proteins with unknown function (13 CDS). Further comparison analysis of the SU-KC1a and SK151 genomes revealed the presence of 3 CDS with varying similarities to the MucBP domain-containing protein genes in SK151.

Keywords : *Lactiplantibacillus plantarum*, adherence assay, porcine mucus, MucBP

Reference : 2000-2021