



**DETECTION OF INTERCELLULAR ADHESION GENES:
THE VIRULENCE GENES IN BIOFILM FORMATION OF
*Staphylococcus epidermidis***

By

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DECLARATION

I declare that this thesis entitled “Detection of Intercellular Adhesion Genes: The Virulence Genes in Biofilm Formation of *Staphylococcus epidermidis*” is the result of my own research except as cited in the references. This thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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ABSTRACT

DETECTION OF INTERCELLULAR ADHESION GENES: THE VIRULENCE GENES IN BIOFILM FORMATION OF *Staphylococcus epidermidis*

Staphylococcus epidermidis (*S. epidermidis*) is a natural constituent of the human skin and mucosal surfaces. Nowadays, *S. epidermidis* are recognized as opportunistic human pathogens and are widespread in the environment. Generally, the success of *S. epidermidis* as a pathogen has to be attributed to its ability to adhere to surfaces and to remain there under the cover of a protection extracellular material in relative silence. The intercellular adhesion (*ica*) operon genes are the virulence genes of *S. epidermidis* that consist of *icaA*, *icaB*, *icaC* and *icaD* respectively. This study only focusing on two *ica* genes (*icaA*, *icaD*). Biofilm formation of *S. epidermidis* is mediated by the expression of the *ica* genes operon. Thus, this research aim to detect the intercellular adhesion (*ica*) genes in biofilm formation of *S. epidermidis*. In this study, twenty-one samples of *S. epidermidis* were sub-cultured from previous study samples. Several identification test were performed to identify and confirm *S. epidermidis* spp. from the samples. Detection of targeting *icaA* and *icaD* genes were performed by using real-time polymerase chain reaction (qPCR). Based on the result obtained, from twenty-one samples tested only five (23.8%) expressed the *icaA* genes. The remaining 16 (76.2 %) samples showed no genes were observed. The result for *icaD* genes was non-specific from twenty-one samples that performed qPCR. Among *ica* genes, *icaA* and *icaD* have been reported to play a significant role in biofilm formation in *S. epidermidis*. It is significant to note that both genes were demonstrated in biofilm producing strains of *S. epidermidis* although there were no *icaD* genes observed in this study. Further research is needed to discover more specific virulence properties of *ica* operon genes and gain awareness about biofilm formation that occurred not only on medical devices but also in human body.

Keywords: *Staphylococcus epidermidis*, biofilm, *ica* genes, virulence genes, real-time PCR