

ABSTRACT

Priscila Nadya Yustika. 24020121140139. **Antibacterial Activity Test of Paint Coatings against Biofilm-Forming Bacteria in Marine Waters.** Under the guidance of Arina Tri Lunggani and Heddy Julistiono.

Biofouling is an accumulation of biota and their metabolic products that stick or adhere to the surface of a substrate submerged in water. Losses that can be caused by biofouling include damage to port installations, ships and bridges located in sea waters. Bacterial biofilms can be the initial phase in the formation of biofouling. One strategy for controlling biofouling is the use of antibacterial paint. This study aims to determine the antibacterial activity of the paint layer against bacteria that stick to the paint layer immersed in the sea. The methods used in this study include antibacterial tests, antibiofilm tests, and the effect of paint on the growth of planktonic bacteria. Antibacterial tests are carried out by direct contact tests between bacterial suspensions in synthetic sea mineral solutions and the surface of the paint layer. Biofilm tests are carried out in synthetic seawater media containing organic materials. Biofilm observations are carried out by releasing bacteria that stick to the paint and then counting using the Microtiter Plate Assay (MPA) method. The results show that each antibacterial composition of the paint layer against biofilm-forming bacteria has different inhibition of bacterial growth. The results of antibacterial tests against biofilm-forming bacteria with antibacterial activity of $100 \pm 0,00$ are Paint 6 (Generic antifouling paint with 0.3% micron-sized cerium oxide and seaNine) and Paint 13 (Antifouling paint without seaNine with 0.3% micron-sized cerium oxide), and inhibitory activity of $17,8 \pm 16,06$ is Paint 8, (Antifouling paint without seaNine without cerium oxide), indicating that all three paints can be coated with biofilm; respectively 464,800 (Paint 6), 1,571,200 (Paint 8), 1,176,800 (Paint 13) CFU/cm². The density of planktonic bacteria at OD₆₀₀ was 7.6365 for control, 5.2035 for paint 6, 7.3208 for paint 8, and 6.1709 for paint 13. Identification of bacteria is carried out based on the 16S rRNA gene. The results of bacterial identification showed a type close to *Corynebacterium stationis strain* ATCC 14403. From these data, it can be concluded that in seawater media without organic materials, paint has the potential to kill bacteria, but in media containing organic materials, bacteria can survive and form biofilms on the surface.

Keyword: Biofouling, Biofilm, Antifouling paint, Biofilm forming bacteria, Marine waters