BIOFILMADS: UTILIZATION OF *Pseudomonas putida* BACTERIA AS A BIOFILM AND HUMAN HAIR AS BIOADSORBEN WASTE TO SEWAGE TREATMENT SYSTEM OF OIL CONTAMINATION

Fajar Heri Nurcahyo¹ & Nurul Syamsiyah²
¹Pendidikan Kimia, ²Pendidikan Biologi
Fakultas Keguruan dan Ilmu Pendidikan
Sebelas Maret University

ABSTRAK

Indonesia is the largest archipelago in the world with at least 17,204 islands and the island has a land area of 1,910,931.32 km². Indonesia also has a sea area that is very spacious, with the Exclusive Economic Zone (EEZ) 2,981,211.00 km², 284,210.90 km² of territorial sea, and 279,322.00 km². This data shows that Indonesia has a sea area that is wider than the land. Indonesia is also internationally recognized as a maritime state defined in the UNCLOS (United Nations Convention on the Law Of the Sea) in 1982. With coverage is very extensive marine areas, of course, many ports are located in Indonesia. The harbor is a place where ships lean and as one of the entry of goods from within the country and abroad. Port has a function that is vital for trade and maritime transport activities. The ships coming into the harbor tends to increase each year who come from within the country and abroad. With the increasing number of such vessels, the volume of wastewater containing oil (oily waste) is also likely to increase. Oil waste pollution, if not treated immediately will damage the environment harbor waters. Source pollution comes from natural seeps of oil 47%, consumption activities (land-based run-off, non-tanker operational releases and spills) 33%, 8% tanker spills, other (atmospheric deposition and aircraft jettisoned fuel) 5%, transportation (cargo washings, coastal facility and pipeline spills) 4% and extraction (platforms and produced water) 3%. It can lead to pollution of the waters of the harbor that could significantly damage the marine ecosystem in the surrounding waters.

This study used an experimental method. Tools and materials used in this study is the waste of human hair, stockings, a former mineral water bottles and used oil to taste (± 1 liter) and *Pseudomonas putida*. This product we named 'Biofilmads'. Biofilmads made like a buoy, but added *pseudomonas* bacteria to degrade the waste oil. To cultivate *Pseudomonas* inoculation. Before inoculation, they were grown individually in a Luria-Bertani (LB) medium for 16 h on a rotary incubator at 30 °C and 150 rpm. A 100 μL aliquot of the overnight bacterial culture was washed with a phosphate buffer solution (PBS) three times to remove the residual LB media before being resuspended in OSPW for the batch studies.

The experimental results showed that (1) human hair can be used as adsorbent oil contamination, (2) oil absorption mechanisms by which physical Biofilmads by absorbing molecules into the cuticle oil contained in the hair shaft and biology by way of *Pseudomonas putida* degrade the compounds will katabolic capabilities, and (3) the use made Biofilmads shaped buoys lined up with each other that has two functions, namely as an adsorbent and degrade the waste oil.

Keywords: Adsorbents, Biofilmads, Degradation, Human hair, Pseudomonas putida