Influence of pseudomonas aeruginosa presence in the biodegradability study of solvent-based and water-based dispersant in oil spill handling

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Abstrak

Oil-Spill Dispersant (OSD) reduces interfacial tensions of oil and water turning oil spill into droplets that makes crude oil easier to be degraded by hydrocarbonoclastic bacteria such as Pseudomonas aeruginosa. The purpose of this study is to assess the effect of dispersant utilization (solvent-based and water-based) related its performance efficiency in the presence of Pseudomonas aeruginosa. The research was carrried out in laboratory, varying Dispersant-Oil Ratio (DOR) into 3 levels (1:8, 1:20, 1:25) and carbon source adaptation into 3 levels (0%, 1%, 2%). The total number of samples prepared was 84, consist of 21 samples without Pseudomonas aeruginosa addition and 63 samples with Pseudomonas aeruginosa addition. Total petroleum hydrocarbon (TPH) is measured using gravimetric method to determine the biodegradation of crude oil. Also measured are pH of samples with Pseudomonas aeruginosa addition and COD (Chemical Oxygen Demand) value of samples with dispersants. Data were evaluated using ANOVA. The result shows Pseudomonas aeruginosa has the ability to degrades crude oil despite the presence of dispersant, whereas the use of water-based dispersant showed better biodegradation ability than solvent-based OSD usage. Dispersant effectiveness of solvent-based and water-based is 33% and biodegradation by Pseudomonas aeruginosa achieved 25% in 72 hours.