

**CHARACTERIZATION OF BIOFLOCCULANT-PRODUCING BACTERIA ISOLATED
FROM BIOFLOCS OF SHRIMP POND**

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**Thesis submitted in Fulfillment of the Requirement for the Degree of Masters of Science in
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This one is for you, *Abah* and *Ummi*
For all the supports, kindness and countless prayers, may Allah grants both of you the highest
place in Jannah.

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Characterization of bioflocculant-producing bacteria isolated from bioflocs was prompted to explore marine bacteria that enhanced bioflocculation process in aquaculture wastewater treatment. Certain bacteria were believed to secrete extracellular polymeric substances (EPS) which response to the physiological stress encountered in the natural environment that can act as bioflocculants. The objectives of this study were identification of bioflocculant-producing bacteria isolated from bioflocs, evaluation on their flocculating activity and characterization of protein composition in extracellular polymeric substances (EPS) produced by identified bioflocculant-producing bacteria. In this study, standard methods on phenotypic and genotypic identification of bacteria including biochemical test and molecular approaches were employed. Six species known as *Halomonas venusta*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus pumilus*, *Nitratireductor aquimarinus* and *Pseudoalteromonas* sp. were successfully identified as bioflocculant-producing bacteria. Their flocculating activities were examined using Jar Test. The highest flocculating activity was exhibited by *Bacillus cereus* with 93% while

Halomonas venusta showed the lowest record with 59% of flocculating activity. Extracted EPS that acted as bioflocculants were obtained from culture supernatant by using cold ethanol precipitation method. Protein content determination using Bradford assay indicated all six species of bioflocculant-producing bacteria showed different protein concentration that ranged between 1.377 µg/mL to 1.455 µg/mL. On Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis (SDS-PAGE) gel, several protein bands with different molecular weight that ranged between 12 kDa to 100 kDa were observed. The results of this study revealed six marine bacteria identified were important in bioflocs formation. These bacteria have great potential to initiate bioflocculation in aquaculture wastewater treatment process.