ANALISIS ADHESI *EXTRA POLYMERIC SUBSTANCES* (EPS) DIATOM PADA SERAT ALAM

Oleh :

Yudithia Damyanti

11/313677/BI/08661

INTISARI

Biofouling dikenal sebagai suatu masalah, utamanya bagi industri perkapalan. Namun dalam dunia biomimetik, *biofouling* menjadi hal yang positif bagi perkembangan teknologi adhesif seperti *biocomposite* atau *green composite*. *Extra polymeric substances (*EPS) disimulasi dinamika molekulernya bersama *natural fibres* untuk mengetahui kemampuan adhesi EPS diatom terhadap substrat. Diatom merupakan salah satu organisme yang turut melakukan *biofouling.* 3 molekul substrat yaitu selulosa, hemiselulosa, dan lignin serta 4 molekul *extra polymeric substances* (EPS) yaitu α *D-galacturonic acid ,* ß *D-mannuronic acid,* α *L-glucoronic acid*, dan ß *1,3-Glucan Chrysolaminarin* dibentuk dan disimulasi dengan *Ascalaph Designer* untuk mendapatkan *intermolecular energy*. Hasil menunjukkan bahwa EPS menempel pada semua molekul substrat, namun adhesi terkuat terjadi pada substrat hemiselulosa. Sementara molekul dengan nilai *intermolecular energy* terbesar adalah ß *D-mannuronic acid.* Reaksi adhesi molekul EPS akan bertambah kuat seiring dengan bertambahnya monomer pada molekul. Dari semua hasil yang didapatkan, maka dapat diketahui bahwa diatom mampu menempel pada *natural fibres.*

Kata kunci : *biofouling*, diatom, *natural fibres*, EPS

ADHESION ANALYSIS OF EXTRA POLYMERIC SUBSTANCES (EPS) OF DIATOM ONTO NATURAL FIBRES

By:

Yudithia Damayanti

11/313677/BI/08661

ABSTRACT

Biofouling is a well-known problem in the shipping industry. However, biofouling has become a positive interest for biomimetics in the advancement of adhesive technology, such as bicomposite or green composite. The aim of this reasearch was to analyze the adhesiveness of extra polymeric substance (EPS) to substrate by doing molecular dynamics simulation of diatom's EPS onto natural fibres. Diatom was chosen because it was one of aquatic biofouling organisms that lived by attaching themselves to rock, ship hull, and many places. 3 substrate molecules, which were cellulose, hemicellulose, and lignin were build and simulated alongside 4 EPS molecules which were α D-galacturonic acid , ß D-mannuronic acid, α L-glucoronic acid, ß 1,3-Glucan Chrysolaminarin with Ascalaph Designer. The result showed that EPS attached strongly to all substrate molecules, but the strongest attachement was happened in hemicelullose. EPS molecule with the biggest intermolecullar energy was ß D-mannuronic acid. As the monomer became longer, EPS's adhesive reaction also became stronger. These results indicate that diatom could attach themselves to natural fibres.

Keyword : biofouling, diatom, natural fibres, EPS