NOTE

APPLICATION OF CHITOSAN FROM *Peneaus monodon* AS COAGULANT OF Pb(II) IN WASTE WATER FROM TOLANGOHULA SUGAR FACTORY KABUPATEN GORONTALO

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ABSTRACT

The aim of this research is to remove Pb(II) from waste water of Tolangohula sugar factory, Gorontalo. In this study, coagulation technique was developed using chitosan as coagulant. Chitosan was obtained from Peneaus monodon shell. The effect of coagulant mass was studied by varying the mass of chitosan: 0, 2.5, 5, 7.5 and 10 g. In addition, effect of pH was also examined by varying the pH of solution: 2, 6, 7, 8, 9 and 10. The results showed that the utilization of 10 g chitosan gave the optimal Pb(II) removal of 72.36% or 22.28 x 10^{-6} mg/g. Additionally, Pb(II) removal was optimum (83%) or 25.44 x 10^{-6} mg/g at pH 9. It could be concluded that chitosan coagulant had the ability to adsorb the Pb(II) in the waste water from Tolangohula sugar factory Kabupaten Gorontalo.

Keywords: *Chitosan; Peneaus Monodon; Coagulation; Plumbum*

ABSTRAK

Penelitian ini bertujuan untuk menghilangkan Pb(II) dalam air limbah pabrik gula Tolangohula Kabupaten Gorontalo. Dalam studi ini, teknik koagulasi dilakukan dengan menggunakan kitosan sebagai koagulan. Kitosan diperoleh dari Peneaus monodon. Pengaruh massa koagulan dilakukan dengan memvariasikan massa kitosan 0, 2,5, 5, 7,5 dan 10 g. Selain itu, pengaruh pH juga diteliti dengan memvariasikan pH larutan: 2, 6, 7, 8, 9 dan 10. Hasil penelitian menunjukkan bahwa penggunaan 10 g kitosan memberikan efisiensi penurunan Pb(II) yang optimal sebesar 72,36% atau 22,28 x 10^{-6} mg/g. Selain itu, penurunan Pb(II) yang optimal berada pada pH 9, sebesar 83% atau 25,44 x 10^{-6} mg/g. Dapat disimpulkan bahwa koagulan kitosan memiliki kemampuan untuk mengadsorpsi Pb(II) dalam air limbah pabrik gula Tolangohula Kabupaten Gorontalo.

Kata Kunci: *Kitosan; Peneaus Monodon; Koagulasi; Timbal*

INTRODUCTION

Gorontalo industrial development may give either positive or negative impacts to community and environment. One of negative impacts is environmental contamination. This is mainly due to industrial waste discharged from factories which contains dangerous and poisonous materials [1].

One of the most dangerous pollutants is lead, which exists as cation of Pb(II). Lead in the organic form of black tin has toxicity level of 1-100 ppm, a little bit higher than copper (Cu) and mercury (Hg) [2-3]. Development of techniques and innovations in treatment of Pb(II)-contained-waste has gained much attention with the main aim to minimize its concentration in the environment. The techniques include chemical precipitation, evaporation, cementation electrolysis, reverse osmosis, ion exchange [4], activated carbon adsorption [5] and coagulation [6]. Among the other methods, coagulation is known as the most effective method in minimizing heavy metal concentration in waste water [7-8].

Now, coagulation technique is directed to become biocoagulation as environmental (biodegradability) and economical aspects should be considered. Biocoagulation may become promising and potential technique in the Pb(II) waste water treatment due to the availability of various coagulations, for instance chitosan as by product from fisheries industry [9]. Chitosan has been employed as coagulant and adsorbent [10]. Chitin and chitosan are nontoxic and biodegradable [11-12].

Chitosan is a material produced via deacetylation of chitin using strong base. Chitin and chitosan are largely found at crustaceans, like shrimp and crab [6]. Chitosan is a polymer that can be obtained from the shells of seafood such as prawns, crabs, and lobsters. Chitosan has free amino groups, which can attract

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