



Effect of Mass and Adsorption Time of Methylene Blue Dyes Using Green Shell Chitosan as Adsorbent

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ABSTRACT

In this research, methylene blue was reduced using waste from green kerrang shells. Optimum results for variations in mass and time with masses of 0.1, 0.2, 0.3 grams and 0.1 mg/L methylene blue occurred at a mass of 0.3 grams with 60 minutes. Result of adsorption capacity. Optimum adsorption capacity for Methylene Blue with adsorbent from green mussel shell chitosan with a contact time of 10-60 minutes with variations in optimum adsorption time with a time of 10-60 minutes and a mass of 0.3 grams with an adsorption capacity of 3 mg/ g, From the results of this research, the mass of chitosan has an effect on decreasing the adsorption concentration, which is greater as the contact time increases. In this study, the largest adsorption capacity occurred at a mass of 0.3 grams. In this study, the maximum adsorption removal percentage in the mass variation was at 60 minutes, which means that at 10-50 minutes, the adsorption removal percentage was still gradually increasing with the highest result at 60 minutes with 98.9%.



1. Introduction

One of areas in Java The East is a lot own potential fishery is Gresik district which has amount production fish 115,621.55 tons in 2024. Village Randuboto located in the District Siddhartha Gresik Regency. Village This located in the area Coast North Gresik area which borders direct with Madura Strait. Majority the people who live in the area the depend on Coast as the mover economy start from arrest or production, trade fisheries, as well as processing fish And results sea others. Results catch shell only taken the meat just. Shell shell Not yet utilized inhabitant in a way maximum so that accumulation waste shell shells on the edge Beach Utilization waste skin shell Actually Not yet maximum in processing (Puspitorini, 2022)

Shell green (Mahasri et al., 2014) is Wrong One source Power Indonesia's abundant fisheries obtained through fishing in nature And is Wrong One successful shellfish cultivated. One of the alternative effort utilization waste shell shell green to have mark And Power use waste shell shell green (Mahendra et al., 2023) become valuable product economical tall processing become chitin And chitosan as adsorbent metal weight. Compiler main from shell shell green is chitin. One of the compound derivative from lots of chitin developed Because its wide application is chitosan (Firyanto, 2019)

2. Methodology

Tool And Material

Material main used in study This is adsorbent from Shell Shell Green is taken from village Randuboto, Gresik Regency and methylene blue 5000 ppm (Rofa Laboratory Center). Material analysis And the helper used For study Sodium Hydroxide Dense 90% (Marck) and Aquadess (SEFNI KURNIA, 2020)

Procedure Study

Preparation Adsorbent Chitosan From Shells Shell Green Shell shell green cleaned up using clean water to remove dirt that sticks , dried at a temperature of 150 ° C (Zahra, 2021). Shells shell green that has smooth, then sieved with size 100 Mesh . Mineral Removal (Demineralization) Powder shell shrimp added solution HCl 1.5 M with ratio 1:15 (w/v) at temperature 40-50 ° C for 4 hours while done stirring with speed 100 rpm then done filtration so that obtained in form supersenatan. The solid obtained washed with distilled water For remove The remaining HCl.

Deproteinization of Powder shell shell green obtained from results demineralization added solution NaOH 3.5% with 1:10 ratio (w/v) Mixture the heated on temperature 40-50 ° C for 4 hours while done stirring with speed of 50 rpm (Anas et al., 2017). Filtrate last obtained tested with PP indicator, if No happen change color red brick so remaining OH- ions contained Already is lost solids obtained dried in an oven at 80 ° C for 24 hours then cooled down in desiccator (Anas et al., 2017). Deacetylation Results obtained from the deproteination process to be continued by deacetylation process For remove group acetyl on chitin with add NaOH 60% with ratio of 1:20 (w/v) (Mashuni et al., 2021). The mixture stirred And heated on temperature 40-50 ° C for 4 hours with speed stirring at 50 rpm. The solids obtained neutralized with distilled water until the pH is neutral . Solids Then dried in the oven on temperature 80 ° C for 24 (Sinaga et al., 2024).

Absorbance Methylene blue solution in concentrations of 1, 2, 3, 4, 5 ppm, measured use UV-Vis spectrophotometer with long 600 nm (Lestari et al., 2021). At test This using 100 mL of solution *methylene blue* 1 mg/L variable mass 0.1, 0.2, 0.3 gram chitosan shell shell green activated into the glass chemistry On test This using 100 mL of 1 mg/L methylene blue solution was added into 3 glasses chemistry 250 mL (Arini & Aminah, 2020), then inserted 0.1, 0.2, 0.3 grams of shell shell green activated with magnetic stirrer with variation time 10,20,30,40,50,60 Minutes trial (Hutapea et al., 2019). Then The filtrate is pipetted as much as 5 mL for analysis. with UV-Vis (Jurwita et al., 2020).

Analysis Adsorption Methylene And Chitosan

Determination rate elimination adsorption .

$$\%p = \frac{c_0 - c_a}{c_0} \times 100\% \dots \dots \dots (1)$$

Determination Capacity adsorption

$$Q = \frac{V (c_0 - c_a)}{m} \dots \dots \dots (2) .$$



3. Results and Discussion

Determination Influence Mass Variation of Methylene Blue

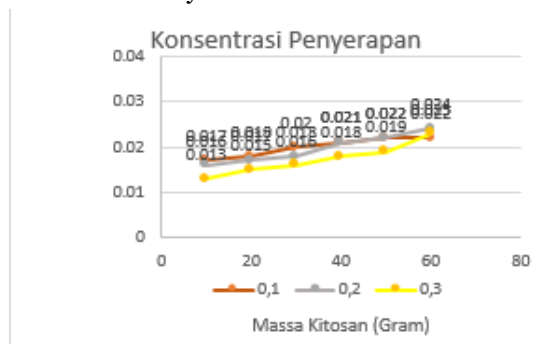


Figure 1 Chart Variable mass curve with Methylene Blue Adsorption

Figure 1 On study This ability absorption *Methylene Blue* increases along with increasing absorption time against the amount mass chitosan (Budiman et al., 2023) . The ability Power absorb chitosan shell shell green On test explain that the more Lots mass chitosan to *methylene blue* so concentration adsorption Also the more big (Jannah, 2020) . Optimum results on test This level most effective reduction there is on minute to 60 where with results decline adsorption namely 0.016; 0.018; and 0.019 mg/L. This is happen when methylene blue concentration increases simultaneously with existence methylene blue compound also the more big , so the more Lots adsorbed adsorbate on adsorbent (Mustakim, 2024) .

Determination Mass Influence Chitosan With Time To Capacity Adsorption *Methylene Blue* .

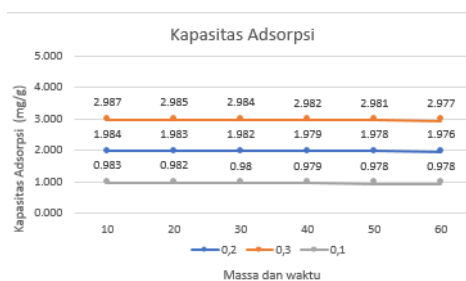


Table 2 Determination Mass Influence Chitosan With Time To Capacity Methylene Blue Adsorption

ADSORPTION CAPACITY			
TIME	0.1	0.2	0.3
0	0	0	0
10	0.983	1,984	2,987
20	0.982	1,983	2,985
30	0.98	1,982	2,984
40	0.979	1,979	2,982
50	0.978	1,978	2,981
60	0.978	1,976	2,977

Table 2 On study This show mass x axis And y- axis capacity adsorption capacity optimum adsorption on Methylene Blue with adsorbent from chitosan shell shell green with time contact 10-60 minutes with variation time adsorption highest with mass 0.3 grams capacity adsorption 3 mg/g (Robby, 2023) . Chitosan mass influential against Decrease Concentration adsorption the more big along increase time contact (Darmawan et al., 2019) .



This matter due to because of in the adsorption process mass chitosan can absorb surface adsorbent And possibility Methylene Blue particles are trapped into the pores adsorbent Still very big so that causes the absorption process more maximum (Mustakim, 2024).

The Influence of Mass and Time Adsorption With Percentage Elimination Adsorption

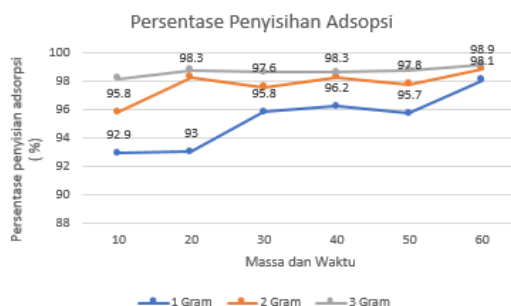


Figure 3 The Influence of Mass and Time Adsorption With Percentage Elimination Adsorption

ADSORPTION ALLOWANCE PRESENTATION			
TIME	0.1	0.2	0.3
0	0	0	0
10	98.3	99.20	99.56
20	98.2	99.15	99.50
30	98.0	99.10	99.46
40	97.9	98.95	99.40
50	97.8	98.90	99.36
60	97.8	98.80	99.23

On study This percentage elimination adsorption maximum on variation mass on minute to 10 Which It means on 10 minutes time percentage elimination adsorption high in comparison 20th minute – 60 minutes because surface adsorption Still tall after that percentage decrease along with saturated adsorbent Where results percent *removal* And elimination adsorption walk Good with show results the maximum with the decline concentration *methylene blue* (Niazkhani et al., 2020).

4. Conclusion

On study This show capacity optimum adsorption on Methylene Blue with adsorbent from chitosan shell shell green with time contact 10-60 minutes with variation time adsorption highest with mass 0.3 grams capacity Adsorption 3 mg/g, Mass of chitosan influential against Decrease Concentration adsorption the more big along increase time contact (Darmawan et al., 2019). This is due to because of in the adsorption process mass chitosan can absorb surface adsorbent And possibility Methylene Blue particles are trapped into the pores adsorbent Still very big so that causes the absorption process more maximum (Efiyanti et al., 2020).

On study This percentage elimination adsorption maximum on variation mass on minute to 10 which means on 10 minutes time percentage elimination adsorption high in comparison 20th minute – 60 minutes because surface adsorption Still tall after that percentage decrease along with saturated adsorbent (Harahap, 2018).

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