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Original Article

Potency Pineapple Skin *(Ananas comosus)* As Bioadsorbents Reducing Iron (Fe) Levels in Well Water Dig

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ABSTRACT

Pollution water is one of the problems which affect human quality of life. Quality water very important for well-being man. According to Organization Health World (WHO), around 829,000 death caused by quality water Which bad every the year . One of the parameters that must meet the standard candy is iron (Fe) Which No more from 1 mg/L. Rate Fe Which more from1 mg/L will cause health problems. Study This aims to know the rate of reduction in levels of iron (Fe) in dug well water by utilizing waste skin pineapple as bioadsorbent. Type Study This is *true experiment with posttest-only control* research design *group.* There are 7 groups with each treatment design done 4 time repetition. Analysis data Which used that is *one-way anova.*Dug well water was treated by contacting it with various doses adsorbent (1.5 g, 2.0 g and 2.5 g) and time variations (30 minutes and 60 minutes) each in 100 mL water well dig. Results study show flat-the average decrease in iron (Fe) levels in dug well water K (control) 0.5247 mg/L, A (1.5g in 30 minutes) the average reduction is 0.0839 mg/L, B (1.5 g in 60 minutes) average the decline 0.8 5 mg/L, C (2,0 g in 30 minute) average the decrease was 0.10 mg/L, D (2.0 g in 60 min) the average decrease 0.11 mg/L, E (2.5 g in 30 minutes) the average reduction is 0.0 4 mg/L, andF (2,5 grams in 60 minute) average the decline 0.12 mg /L. Conclusion study This optimal treatment in lowering Fe ie dose 2.5 g with a contact time of 30 minutes .

INTRODUCTION

Quality water very important for well-being human . According to Organization Health World (WHO), around 829,000 death caused by quality water Which bad every the year . Overcome clean water problem is need for the countries of the world, and wrong One source income main for Lots country tropical is pineapple, in several countries pineapple Also contribute to pollution waters . Various adsorbent has succeed made from leaf pineapple For remove pollutant (organic And inorganic) For processing water (Fouda-Mbanga & Tywabi-Ngeva, 2022) . Iron will remain in human tissues for a long time, and can cause retinitis, choroiditis and conjunctivitis. after contact. High concentrations of iron in water change the color, taste, and smell of stains on clothes, and corrosion of water pipes (Abbaspour et al., 2014) . On various period contact and dose adsorbent , capacity adsorbent For absorbing Fe(III) ions was investigated . Capacity adsorption increase along with time contact and dose adsorbent . The result show potency use waste pineapple skin for treat wastewater and remove Fe (III) ions as efficient adsorbent . (Puty Mairawati, Bambang Suhardi, 2019). In batch system , has tested effectiveness skin deep pineapple stem adsorption mixture substance Methylene Blue, Brilliant Green and Congo Red colors . factors in matter This is mass adsorbent . (Fegousse et al., 2019).

Based on results analysis diffractogram X- rays , carbon pineapple leaf showing pattern diffraction with a number peak very clear sharp with corner diffraction 2 between 25 to 65 degrees , with degrees 32% crystallinity , and activated carbon pineapple leaf showing enhancement amount degrees crystallinity at an angle diffraction 2 between

20 and 65 degrees , with degrees crystallinity Good carbon active pineapple leaf and biosorbent pineapple leaves have structure material amorphous , according results characterization XRD study (Herlinawati et al., 2022) . Rubbish from pineapple can used For cleaning waste water with remove Pb2+ metal ions from solution watery . (Ayob et al., 2020) . Use filtrate pineapple skin can For reduce chromium (Cr) (Dina et al., 2022) . For lower rate phosphate in laundry waste , pineapple leaves can utilized as adsorbent (Putri et al., 2018).

Product side from waste agriculture and industry , eg husk rice and fly ash , have used For remove metal heavy from waste water . For success disappearance metal heavy with range concentration 20–60 mg/l, adsorbent costs low can used . (Hegazi, 2013). Activated 10% HCl ability powder deep pineapple leaf absorb copper (Cu2+), iron (Fe3+), and zinc (Zn2+) respectively were 95.98%, 79.16% and 88.71%. (Simanjuntak & Gultom, 2020). The point of zero charge (PZC) value of pineapple skin is 5.0, indicating that more pH value big of PZC is required For produce adsorbent with surface loaded negative and facilitating adsorption copper (Valerio Cárdenas et al., 2021) . Study This aim For For know level decline rate Substance Iron (Fe) in waterwell dig with use waste pineapple skin as bioadsorbent.

METHODS

Preparation Study

Material study that is Pineapple skin waste obtained from the Fruit Market Jakabaring Palembang . Rubbish The collected pineapple skins were cleaned with distilled water several times to remove dust and dirt. Last sample of pineapple waste dried in an oven at 100 ºC for 24 hours to remove surface moisture. Then the samples were milled and filtered through a 125 micron (125 µm) sieve and then stored in a plastic container for further use. (Ayob et al., 2020). Activity This carried out in the laboratory Pharmacy Poltekkes Palembang Ministry of Health , temperature room 23-25 °C with humidity room 50%.

Implementation Study

Manufacturing process bioadsorbent that is with method Pineapple skin that has been cleaned, then driedwith oven on temperature 250oC – _ during 3 O'clock. So charcoal destroyed with blenders and sifted up become granule. Activation bioadsorbent in a manner chemistry that is with carbon method _ Which has sifted added solutionH3PO4 _ _ _ 10%. Then stirred during 1 O'clock And soaked during 24 O'clock. Slurries Which formed Then filtered For separate granular with filtrate. Results filter Then heated in the oven at 110 ˚ C for 1 hour Then charcoal Which got washed with aquades until pH 6 And heated with ovens temperature 150 ^{O}C during 3 hours. Sampling of well water containing Fe was carried out with use technique *simple random sampling.* Taking The water samples were taken from dug wells in the Kelurahan Sukodadi, Palembang City. Testing process done with method bioadsorbent entered to in glass beaker which already contains 100 ml of dug well water samples , then stirred using *a magnetic stirrer* with a stirring speed of 200 rpmd ith time contact Which needed bioadsorbent For reduce levels of iron (Fe) is 30 minutes and 60 minutes and speed stirring For process adsorption is on 90 rpm. Water well dig Which has homogenized with adsorbent skinpineapple then allowed to stand for 30 minutes to precipitate the residue. Then the filtrate was filtered using filter paperseparate the filtrate and residue, then measured using AAS tool and repetition is done 4 times

Data analysis

Type Study This is *true experiment with posttest-only control* research design *group.* There are 7 groups with each treatment design done 4 time repetition. Analysis data Which used that is *one-way anova.*Dug well water was treated by contacting it with various doses adsorbent (1.5 g, 2.0 g and 2.5 g) and time variations (30 minutes and 60 minutes) each in 100 mL water well dig.

RESULTS

Results of Reducing Fe Levels in dug well water after contact with 1.5 grams of bioadsorbent for 30 minutes and 60 minutes that is decrease in Fe concentration highest on repetition First 30 minutes time that is of 0.0 4 and decreased concentration lowest Fe there is on repetition First 60 minutes time that is as big 3,12 (Table .1).

Table 1. Decreasing levels of iron (Fe) in dIg well water dose of 1.5 g with variations time 30 minutes

Repetition	Control (mg/L)	Time	
		30 minute s(mg/L)	60 minute s(mg/L)
I	0.21	0.00	0.05
II	0.40 _	0.10	0.12
III	0.21	0.0 5	0.0 5
IV	1,2 6	0.01 _	0.24

Results of Reducing Fe Levels in dug well water after contact with 2.0 grams bioadsorbent with a time of 30 minutes and

60 minutes , concentration decrease in Fe highest on that is of 0.23 during 30 minutes time whereas 60 minutes time highest Fe reduction as big 0.1 5 (Table 2).

Table . 2 Decreasing levels of iron (Fe) in dug well water dose of 2.0 grams with variations time 30 minutes and 60 min

Repetition	Control (mg/L)	Time	
		30 minutes (mg/L)	60 minutes (mg/L)
I	0.21	0.13	0.1 5
II	0.40 _	0.23	0.1 5
III	0.21	0.02	0.1 4
IV	1,26	0.01	0.02 _

Results of Reducing Fe Levels in dug well water after contact with 2.5 grams bioadsorbent with a time of 30 minutes and 60 minutes , concentration decrease in Fe highest of 0.23 during 30 minutes time whereas 60 minutes time highest Fe reduction as big 0.1 5 (table 3).

Repetition	Control (mg/L)	Time	
		30 minutes (mg/L)	60 minutes (mg/L)
I	0.2 1	0.0 4	3,1 2
II	0.40 _	0.1 4	0.0 6
III	0.21	0.11	0.01 _
IV	1,2 6	0.0 5	0.1 2

Table . 3. Decreasing levels of iron (Fe) in dug well water dose of 2.0 grams with variations time 30 minutes and 60 min

DISCUSSION

Based on laboratory tests on the control, the highest results were obtained 1.25 mg/L Iron (Fe) on water. Decline average rate Fe after addition of pineapple peel bioadsorbent at a dose of 1.5 grams for 30 minute is 0.0839 mg/L, dose 1.5 grams during 60 minute is 0.8249 mg/L, dose 2.0 grams during 30 minute with average decline as big0.098 mg/L, a dose of 2.0 grams for 60 minutes with an average decrease of 0.1108 mg/L, a dose of 2.5 grams for 30 minutes with an average a decrease of 0.0352 mg/L and a dose of 2.5 grams for 60 minutes with an average reduction of 0.1166 mg/L. Thus the dose bioadsorbent skin pineapple Which most optimal is dose 2,5 grams withtime contact for 30 minutes. Difference decline rate Iron (Fe) is known with do Statistical test using one way ANOVA was first tested normality And use *Shapiro-Wilk* For know is datadecline rate Fe the normal or No. Results test normality decreased levels of Iron (Fe) obtained a ρ *value of* 0.05 then the data normally distributed, so that it can be continued with the one statistical test way anova.

The results of the statistical test with one way ANOVA found that the *test of homogeneity variances* got ρ *value* 0.052 > 0.05 Which means that the data is homogeneous or the variance is the same, thus the conditions for done test *one-way anova.* Based on results test statistics *one-wayanova* , obtained ρ *value* 0.000 <0.050 which means there is a difference significant between addition bioadsorbent skin pineapple in lowerrate Iron (Fe) in water dug well. After done test *one-way anova* . and significant results are obtained, it is continued with the *Post Hoc Test* For know influence between addition bioadsorbent skin pineapplein reducing levels of Iron (Fe). Based on the *Post Hoc* test it was found that there is difference significant between sample water well dig with treatment of addition of Pineapple Peel Bioadsorbent with samples without addition bioadsorbent skin pineapple (control), so that can it was concluded that there was an effect of reducing Iron (Fe) in dug well water with addition of pineapple peel bioadsorbent.

The most optimal dose to reduce Fe in dug well water obtained at a dose of 2.5 grams, which is the highest dose tested by researchers. This is in line with the research conducted by Ghapar, et al (2020) which shows that the use of skin pineapple as bioadsorbent activated with *Zinc Chloride* ($ZnCl_2$) can reduce Fe levels up to 55.26% in wastewater. Study Ghapar, at al (2020) showed doses of 1, 2, 3 and 4 grams and contact time of 120 minutes can reduce the turbidity in the wasteWhich contain Fe as much 27.28% until 55.26%.

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