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POTENTIAL OF PINEAPPLE (*Ananas comosus*) FILTRATES IN REDUCING THE HEAVY METAL LEAD (PB) IN TOMAN FISH (*Channa micropeltes*)

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Abstract

The waters of the B River have lead levels which can have a negative impact on health. One type of fish that is often found in the B River is toman fish, where this condition can have a negative impact on the life of fish in the river. To reduce lead levels in toman fish can be done in various ways, one of which is using natural ingredients, including pineapple which contains many acidic compounds, one of which is citric acid. dentifying and analyzing differences in the effect of pineapple filtrate on reducing Pb levels in toman fish (Channa micropeltes) using atomic absorption spectrophotometry.The research method used to identify and the method used was experimental with the research design carried out namely experimental design. The sampling technique was purposive sampling, which was then carried out with a research design in the form of post test only and group design. Data analysis using One Way Anova. The treatment used in this research used pineapple filtrate concentrations of 50%, 75% and 100%. In this study, results were obtained where a concentration of 50% experienced a more significant decrease compared to filtrate concentrations of 75% and 100%. The data results show that pineapple filtrate has a significant effect on reducing lead levels in toman fish ($p<0.05$). From the three filtrate concentrations in this study, the results obtained were that at the 50% concentration there was a more significant reduction in lead levels compared to the other filtrate concentrations.

Keywords: Atomic Absorption Spectrophotometry, B River, Timbal.

Introduction

One of the tributaries of the river is a type of fish that lives in the B River, namely toman fish (*Channa micropelets*), where toman fish is a type of freshwater fish that is often consumed by people around the river. Toman fish has a high concentration of omega-3 compared to tilapia, catfish and others. Toman fish can be used as an indicator because these fish can live in polluted river water. According to SNI 7387: 2009, the maximum threshold value for Pb metal contamination in fish has been set at 0.3 mg/kg.

To reduce the Pb metal content in fish by using C6H8O7 citric acid from natural fruit acids which has the ability to chelate heavy metals with three carboxylic groups, it can bind Pb metal with a carboxylate group releasing protons to produce citrate ions, citrate ions react with metal ions to form bonds. Pb citrate complex (C12H10Pb3O14), because citric acid is an organic acid that dissolves in water and citric acid is able to form

complex compounds with metals so that it can free food ingredients from metal contamination (Ulfah et al., 2022). Examples of fruit that contain citric acid are tamarind, lime, lemon and pineapple.

Pineapples (Ananas Comosus (L) Merr) contain the chemical compound citric acid. Citric acid is one of the organic acids with the chemical name 2-hydroxy-1,2,3 propanetricarboxylic acid, it is non-toxic, functions as a sequestrant and has metal binding properties so it can reduce heavy metal levels. Pineapples have 90% water content and are rich in potassium, calcium, phosphorus, magnesium, iron, sodium, iodine, sulfur and chlorine. Apart from that, it is rich in acid, biotin, vitamin A, vitamin B12, vitamin C, vitamin E, dextrose, sucrose or sugar cane, as well as the enzyme bromelain, which is a protease enzyme that can hydrolyze proteins, proteases or peptides so that it can be used to tenderize meat (Puspasari,R.,2017)

Based on the results of Syazwani Ulfah's research in 2014 regarding Efforts to Reduce the Heavy Metal Lead in Mystus nigriceps in the Surabaya River Using Pineapple Peel Filtrate, it was explained that a concentration of 100% could reduce the metal the highest compared to concentrations of 75%, 50% and 25% with a reduction percentage of 76. 55%. It is proven that pineapple can reduce lead levels in contaminated fish, because pineapple has a percentage of 78% which can bind lead metal (Pb). The higher the concentration of acid used, the greater the amount of hydrogen that competes with metal ions so that the strength of metal bonds in proteins decreases and they are easily separated (Sabila & Kusuma P, 2019).

This research uses atomic absorption spectrophotometry which is one of the analytical methods used to analyze the concentration level of an element in a sample, this is based on the process by which atoms are at a basic energy level (ground state) in absorbing source radiation (Martini et al., 2020).

Based on the description above, it is necessary to conduct research on the amount of Pb content in River B and the citric acid content in pineapple which has the potential to reduce lead levels in fish, making researchers interested in examining the potential of pineapple filtrate in an effort to reduce the heavy metal lead (Pb). on toman fish using Atomic Absorption Spectrophotometry (SSA).

Materials and Methods

Ingredients: Toman fish taken from river B waters, pineapple fruit taken from community gardens on Jalan Marabahan, chemicals used are distilled water, nitric acid ($HNO3$), concentrated hydroxide acid ($H2O2$) and Pb (NO3).

The research method used is a true experimental method which is included in the quantitative research method which aims to determine the symptoms or effects that arise as a result of certain treatments or experiments (Imas Masturoh, 2018). In this research, experiments were carried out by giving special treatment to toman fish samples, namely by exposing toman fish samples to pineapple phytrate.The instrument in this research uses quantitative methods which are used to collect data and measure the value of the variables studied

(Sugiyono, 2019). In this study, the instrument used was Atomic Absorption Spectophotometry (SSA), this instrument was used to measure the decrease in lead metal levels in fish as the variable studied.

Results and Discussion

Table 1. Lead Level Values for Toman 1 Fish Before and After Giving Pineapple Fruit Filtrate

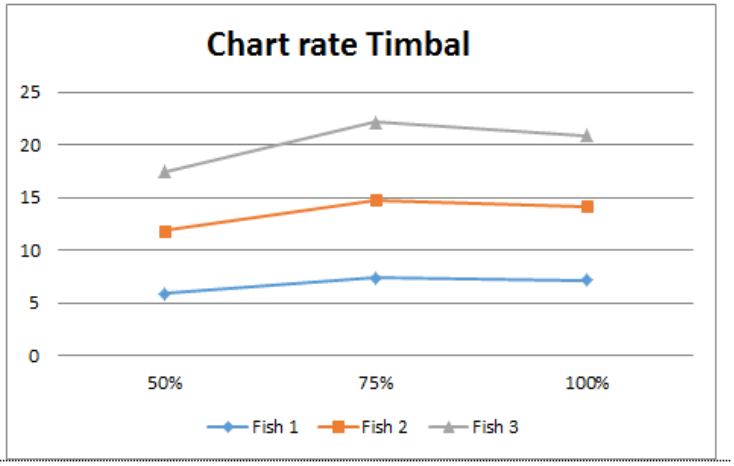
No.	Sampel	Absorbansi	Konsentrasi (x)(mg/L)	Kadar Timbal (mg/kg)
1.	0%	1,6361	8,626	8,412432166
2.	50%	1,1321	6,012	5,879077168
3.	75%	1,4213	7,525	7,35877106
4.	100%	1,4553	7,505	7,147683398

Table 2. Lead Level Values of Toman 2 Fish Before and After Giving Pineapple Fruit Filtrate

No.	Sampel	Absorbansi	Konsentrasi (x)(mg/L)	Kadar Timbal (mg/kg)
1.	0%	1,6239	8,169	7,596497835
2.	50%	1,1328	6,038	5,926147705
3.	75%	1,4266	7,567	7,413621922
4.	100%	1,4484	7,394	6,969899666

Table 3. Lead Level Values for Toman 3 Fish Before and After Giving Pineapple Fruit Filtrate

No.	Sampel	Absorbansi	Konsentrasi (x)(mg/L)	Kadar Timbal (mg/kg)
1.	0%	1,6212	8,042	7,373502925
2.	50%	1,1195	5,859	5,643865151
3.	75%	1,4261	7,517	7,363979349
4.	100%	1,4420	7,251	6,730986446



Graph 1. Reduction in Lead Levels and Percentage Reduction in Lead Levels

Pineapple filtrate was obtained from three fresh green pineapples with honey pineapple. From three pineapples, 300 mL was obtained. The results of this filtrate are divided into three concentrations (50%, 75% and 100%). 50% concentration of 50 ml pineapple fruit filtrate plus 50 ml distilled water, 75% concentration used 75 ml pineapple fruit filtrate plus 25 ml distilled water and 100% used 100 ml pineapple fruit filtrate without adding distilled water. (Sabila & Usuma P, 2019) Pineapple filtrate also differs not only in the variation of concentration but also in the physical appearance produced by the filtrate. The higher the concentration of pineapple filtrate, the darker the color of the filtrate, and vice versa. The lower the concentration, the fainter the color produced by the filtrate.

In this research, screening for the wavelength of Lead (Pb) was carried out by measuring a standard solution of 100 ppm of lead which was made and measured using an atomic absorption spectrophotometry instrument and the results obtained were that the wavelength of lead (Pb) was 283.3 nm, which means that lead (Pb) can be measured. This tool uses wavelengths that have been screened. This wavelength is used to measure the absorbance for the lead (Pb) standard curve and measure the absorbance of the test sample. The results of this research are appropriate because the wavelength of lead is in the visible range of 283.3 nm -284 nm (Azizah & Humairoh, 2015).

Discussion of research using three pineapple filtrate concentrations showed a reduction in the heavy metal lead in samples of toman fish taken from ponds in the waters of the B River in the vicinity of the Banjarmasin city lumber factory.

Pineapple filtrate has the potential to reduce lead levels in toman fish, this can be said to be due to the citric acid content in pineapple filtrate. The percentage reduction in lead levels found in fish: 1 concentration of 50% has a result of 5.879077168%, concentration of 75% has a result of 7.35877106%, and concentration of 100% has a result of 7.147683398%. In fish 2, 50% had a yield of 5.926147705%, 75% concentration had a yield of 7.413621922% and 100% concentration had a yield of 6.969899666%. In fish 3, the 50% concentration had a yield of 5.643865151%, the 75% concentration had a yield of 7.363979349% and the 100% concentration had a yield of 6.730986446%. Based on the results above, it can be seen that the higher the concentration of pineapple filtrate, the greater the decrease in lead levels in toman fish. However, in my research at 50% concentration there was a decrease, while at 75% concentration there was an increase. This was caused by the researcher being less careful when weighing the samples. This caused the weight of the sample at 75% concentration to increase. While in the ANOVA test the result was <0.001, which means There is a significant difference between the different pineapple fruit filtrates on reducing lead levels, so the hypothesis is accepted.

Conclusion

Conclusion: From the three filtrate concentrations in this study, the results showed that at a concentration of 50% there was a more significant reduction in lead levels compared to other filtrate concentrations.

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