Connection Of Heavy Metals (Pb, Hg, Cd) In Raw Water In Gasami Fisheries (Osphronemus Gouramy) At Pandaan Pasuruan Freshwater Management Unit

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Abstract

The raw water is the main water used as a medium carp hatchery process performed by the unit Pengelolah freshwater aquaculture (UPBAT) Pandaan conducted, in this case the raw water is derived from well water and river water. In order to make the program successful that CPIB Central Government digalahkan, this water must be considered and examined since water is the main medium in the vaccination process, and also water is also very susceptible to pollution. But the facts on the ground show that there are still many farmers who are still underestimated and do not pay attention to the heavy metal content in the raw water in the vaccination process of carp. Based on this study, it is necessary to determine the content of heavy metals lead (Pb), mercury (Hg), cadmium (Cd) in raw water for carp fish farming (Osphronemus gouramy). Data recovery method uses appropriate samples. Water samples were taken from 2 different points and analyzed using the AAS method (Atomic Absorption Spectrophotometry). The results of the measurement of heavy metals Pb, Hg and Cd, showing the difference between river water and well water. The content of heavy metals from river water and well water is Pb or 0.0031 mg / l - 0.0033 mg / l and 0.0001 mg / l; 0.0011 mg / L -0.0012 mg / L and 0.00071 mg / L-0.00072 mg / L; Cd 0.0052 mg / l -0.0054 mg / l and 0.0012 mg / l -0.0013 mg / l. And the water source still does not exceed government quality standards.

Keyword: Water Quality, Heavy Metal, Pb, Hg, Cd, Gurami

Introduction

The raw water is the main water used as a medium carp hatchery process performed by the unit Pengelolah freshwater aquaculture (UPBAT) Pandaan conducted, in this case the raw water is derived from well water and river water. In order to determine the level of water quality, conditions indicative of contaminated conditions or good conditions of a water source within a certain time are made by comparing the established water quality standards. According to Government Decree No. 20 of 1990, water that can be used for aquaculture is included in Class C water. To defeat the government's program, this water must be considered and investigated, since water is the main medium of the breeder's process and is very susceptible to pollution. But the facts on the ground show that there are still many farmers who are still underestimated and do not pay attention to the heavy metal content in the raw water in the vaccination process of carp. However, the influence of heavy metal content in the breeding water can have a negative impact on the sustainability and quality of Gouramy seeds (Osphronemus gouramy).

Heavy metals dissolved in certain concentrations in waters change their function as a poison source for aquatic organisms. Although the toxicity caused by a heavy metal to all aquatic organisms is not the same, destroying a group can cause a break in the life chain. At the advanced level, this condition can certainly destroy an aquatic ecosystem order (Palar, 2004). Lead has a negative effect on humans because it can damage the function of organs such as the kidneys, the nervous

system and the reproductive system. In addition, it can cause anemia and intoxication in pregnant women, in breastfed children and in breast milk (Sunardi, 2004).

Based on this study, this research must be performed to determine the levels of heavy metals lead (PB), mercury (Hg), cadmium (Cd) in raw water for Gourmy hatchery (Osphronemus gouramy) in the Pandaan Fresh Water Cultivation Management Unit (UPBAT). This is because the source of the water used in the hatchery process immediately drains away from household waste, agricultural waste and industrial waste.

Materials And Methods

This study was conducted in February 2013 and the study site was in the Pasaan Freshwater Cultivation Unit (UPBAT), especially in fish farming (Osphronemus gouramy). Data recovery method uses appropriate samples. Water samples were taken from two different sources, namely river water and well water (groundwater). River water is used to care for and marry the mother while water is used to care for carp larvae.

The sampling technique for testing heavy metal samples was performed based on SNI 6989.57-2008 in Hidayah (2012) by taking 2 liters of water using sample points at each sampling site. Water samples for the analysis of heavy metal residues are stored in polyethylene (PE) bottles and preserved with nitric acid (HNO3) until the pH reaches ± 1.5. Then, the sample is introduced into the cool box to keep the temperature stable, so that the quality of the sample is not affected. The analysis of heavy metals (Pb, Hg and Cd) was carried out at the Muhammadiyah University of Malang Chemistry Laboratory using the AAS (Atomic Absorption Spectrophotometry) method. According to Darmono (1995), the principle of this method is based on the evaporation of the sample solution, then the metal contained therein is converted into free atoms.

Results And Discussion

Based on the results of heavy metal content measurements performed at the Muhammadiyah Malang University Chemical Laboratory, the following results were obtained:

Table 1 Results of content measurement (Pb, Hg, Cd) on river water samples:

Parameter - Unit	Hasil (dry based)		Method
	1	2	
Lead (Pb) – mg/l	0,0031	0,0033	Vogel - Spectrophotometer
Merkury – mg/l	0,0011	0,0012	Vogel - Spectrophotometer
Cadmium – mg/l	0,0052	0,0054	Vogel - Spectrophotometer

(Source: Chemistry Laboratory, Muhammadiyah Malang University)

Table 4.2 Results of the content measurement (Pb, Hg, Cd) in well water samples:

Parameter - Unit	Hasil (dry based)		Method
	1	2	
Lead (Pb) – mg/l	0,0001	0,0001	Vogel - Spectrophotometer
Merkury – mg/l	0,00072	0,00071	Vogel - Spectrophotometer
Cadmium – mg/l	0,0013	0,0012	Vogel - Spectrophotometer

(Source: Chemistry Laboratory, Muhammadiyah Malang University)

The results of the measurement of the heavy metal content of Pb, Hg and Cd show the difference between river and well water. In the river water, the Pb metal content undergoes an increase in the second repetition, ie, from the value of 0.0031 mg / L in the first iteration to 0.0033

mg / L in the second iteration. While in the Pb heavy metal well water the results of the test were determined, which was set at the first repetition and second repetition to 0.0001 mg / l. For the results of measuring the mercury (Hg) content in well water, the yield was 0.00072 mg / L in the first iteration, then it became 0.00071 mg / L in the second iteration. While in river water the value of Merkury (Hg) is higher than that of well water, this is 0.0011 mg / L in the first repetition to 0.0012 mg / L in the second repetition. Which causes the level of cadmium (Cd) in the river water to rise by 0.0052 mg / l at the first repetition and at the second repetition from 0.0054 mg / l. In the well water, the content of cadmium (Cd) is then less than the value of the river water, which is 0.0013 mg / l at the first repetition and 0.0012 mg / l at the second repetition.

The difference in the results of well water and river water can be caused by material or runoff obtained from the water source. Well water has low yields because well water is groundwater that is still pure and is not affected by pollution or runoff from agricultural, household or factory waste. While river water has a high yield compared to well water, river water flows directly from agricultural waste, households and even factories. Because the river that penetrated the UPBAT Pandaan had already passed through several factory buildings, and the last was the paddy field just outside the UPBAT Pandaan site.

Water pollution from rivers can come from a variety of pollutants, including industrial waste, household waste, agricultural waste and others. The wastes in question may be in the form of substances, energy and / or other components that are released or disposed of due to both industrial and non-industrial activity. According to Effendi (2003), water pollution is caused by the presence of pollutants in the form of gases, solutes and particles, while the world 's most dominant sources of water pollution are human waste, industrial waste and chemicals and agricultural waste (pesticides and fertilizers) Pollutants include industrial organic substances, acids, heavy metals, ammonia, nitrates, as well as phosphates and pesticide residues from agriculture. This is the difference between the two values in the test results of the two samples.

The content of cadmium (Cd) is the content that has the highest value compared to the heavy metal content of lead (Pb) and mercury (Hg). In addition to its natural presence in these waters, it can also come from Cd-containing industrial waste, household waste and agricultural waste (pesticides and fertilizers). In river water samples, the Cd content tends to be greater than that of well water. This may be the case because river water is a street or a container of domestic waste, outflow of agricultural waste and factory waste upstream.

In general, however, the distribution of the metal content of Pb, Hg, and Cd shows a value which, according to PP, still does not exceed the value of the threshold set by the government. RI No 82 of 2001 on the Control of Water Pollution and Water Quality Management, namely 0.03 mg / L for standard Pb quality standards and 0.01 mg / L for cadmium (Cd) in freshwater aquaculture water. According to Darmono (2001), the standard quality standard for mercury (Hg) in river water is 0.001 mg / l. The heavy metal content in each water still does not exceed the established quality standards. Therefore, the raw water used in UPBAT Pandaan for the Gourmy hatchery process is still suitable for the cultivation process.

Conclusions

The results of laboratory tests were obtained, the value of heavy metal content in river water was greater than that of water. Heavy metal content of river water and well water are Pb 0.0031 mg / L - 0.0033 mg / L or 0.0001 mg / L; 0.0011 mg

/ L -0.0012 mg / L and 0.00071 mg / L-0.00072 mg / L; Cd 0.0052 mg / l -0.0054 mg / l and 0.0012 mg / l -0.0013 mg / l. And the water source still does not exceed government quality standards.

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