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Water Quality in Bandeng Fish Pounds in Lamdingin Village Banda Aceh

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Abstract

The people in Lamdingin village rely on aquaculture activities as their livelihood. The commodities cultivated in the pond are milkfish, tilapia, and shrimp. Water quality conditions have a significant role in the success of fish farming. Water as a living habitat for cultivated fish must be in optimal conditions in terms of quantity and quality. Therefore, water quality is the important factor in fish farming. This study aims to determine water quality based on parameters of brightness, temperature, salinity, and pH in milkfish ponds in Lamdingin village. Sampling and measurement were carried out at 09.00 in the morning for one week. Brightness was measured using a Secci disk, the temperature was measured using a digital thermometer, salinity was measured using digital salinity, and pH was measured using a pH meter. The results showed that the brightness, temperature, salinity and pH were 27.42 cm, 28.5 ^{0}C, 30.25 ppt and 7.42, recpectively. These results meet the Indonesian National Standard (SNI).

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INTRODUCTION

Pond waters are one of the lands that can improve the economic sector. Most of the people in Lamdingin village rely on aquaculture activities as their livelihood. The commodities cultivated in the pond are milkfish, tilapia, and shrimp. The aquaculture business of milkfish, tilapia, and shrimp in Lamdingin village is still ongoing, which is carried out by some communities using monoculture and polyculture systems. However, farmers face various obstacles and problems caused by, among others, the high price of production facilities, a tendency to decrease the quality of the coastal environment, the impact of polluting coastal waters, and the low application of aquaculture technology.

Fish farming is one of the efforts to overcome the decline in the production of fish caught. The prospect of fish farming is up-and-coming and is expected to solve the community's economic downturn. Water quality conditions have a significant role in the success of fish farming. Water serves as a living medium for fish, both internal and external. As an external medium, water acts as a living habitat for fish (Wahyuni Panca, 2020).

Water as a living habitat for cultivated fish must be in optimal conditions in terms of quantity and quality. Meanwhile, monitoring and management of water quality are indispensable in fish farming. The target of monitoring and managing water quality is to ensure that water quality consistently meets the requirements for the survival and growth of aquacultured fish (Sahrijanna 2014).

The main factor in the success of fish farming activities is selecting the correct location. Light availability, temperature, salinity, currents, and nutrient availability are environmental factors (Wu 2012).

The physical, chemical and biological characteristics of waters become one of the determinants of the success of fish farming. Ecological parameters that determine the right location for fish farming are physical environmental conditions which include depth, brightness, current speed, Suspended Solids Load (SSL) or Total Suspended Solid (TSS), and chemical environment, which provides salinity, pH, dissolved oxygen, nitrate and phosphate, as well as biological aspects which have an abundance of phytoplankton and chlorophyll-a (Akib et al.,2015).

The sustainability of aquaculture depends on the quality of the aquatic environment. Different underwater environmental conditions can affect both physical, chemical, and biological ecological quality. In pond cultivation, water quality is a critical factor in success because it is an absolute requirement to maintain cultured organisms. Therefore, in this work we investigated the water quality in milkfish ponds in Lamdingin village.

METHOD

This research was conducted in a milkfish pond in Lamdingin Village, Kuta Alam District, Banda Aceh City. Water samples were taken every day for a week, and water samples were analyzed directly in the field. The water quality parameters observed included: brightness, temperature, salinity, and pH. The temperature data were collected using a digital thermometer, intelligence using a Secchi Disk, salinity using digital salinity, and pH using a pH meter/litmus. The data obtained from the measurement of pond water quality parameters were treated and analyzed descriptively by comparing the water quality parameters of the research results with the parameters of the Indonesian National Standard (SNI), as shown in Table 1.

Table 1. Parameter Value of Milkfish Cultivation Water Quality SNI 01.6148.1999

No	Criteria	References SNI 01.6148.1999
1.	Temperature (^{0}C)	28-32 ^{0}C
2.	Brightness (cm)	20-30 cm
3.	Salinity (ppt)	5-35 ppt
4.	Ph	7.0-8.5
5.	DO (mg/L)	3 mg/L
6.	Nitrat (mg/L)	0.1-2.0 mg/L
7.	Phospat (mg/L)	0.0-1.0 mg/L

RESULTS AND DISCUSSION

Water is a place for milkfish to live, which affects their growth and survival. Therefore pond water must meet the requirements for both volume and quality. As for the results obtained when conducting experiments for a week at 09.00 – 10.00 WIB in the milkfish ponds of Lamdingin village, the data obtained are shown in Table 2.

Table 2. Water quality parameters in milkfish ponds in the village of Lamdingin

Parameters	Day						
	I	II	III	IV	V	V1	VII
Brightness (cm)	23	25	34	30	29	29	27
Temperature (^{0}C)	31.9	31.4	23.8	26.9	28.2	28.8	29.02
Salinity (ppt)	26.5	26.8	33.3	32	31.6	31.78	29.8
pH	7.6	7.8	7.1	7.3	7.3	7.4	7.5

Table 3. Comparison water quality parameters in milkfish ponds in Lamdingin village for a week and SNI

Parameter	Average measurement results	SNI 01.6148.1999	Description
Brightness (cm)	28.14	20-30	Suitable
Temperature (^{0}C)	28.5	28-32	Suitable
Salinity (ppt)	30.25	5-35	Suitable
Ph	7.42	7.0-8.5	Suitable

The brightness values obtained during the study are shown in Table 3. The average value of the measurement results is 28.14 cm which was measured using Secchi disks. From Table 3, it is shown that the brightness value of milkfish ponds in Lamdingin village is in SNI range . The brightness for fishing activities is 20-30 cm. The value of good water brightness for fisheries is at least 20 cm (Regency 2010).

The measurement results obtained the average temperature value is 28.5^{0}C. Milkfish ponds in Lamdingin village, the temperature is according to SNI, namely 28^{0}C-32^{0}C. Fish can live at temperature of 30ºC-35^{0}C, Rimmer (2013). The temperature for milkfish growth is 27^{0}C –31^{0}C Suryanti (2016). Fish can still live generally at a temperature of 27^{0}C -35^{0}C, Wu (2012). High temperature will damage the growth of phytoplankton which will inhibit the process of photosynthesis. Increased water temperature will cause Dissolved Oxygen (DO) to decrease. Temperatures that are too low will affect the operation of metabolism and photosynthesis. Salinity will also be affected if the water temperature continues to increase for a long time. High temperature will result in the increase of evaporation. As a consequence, salinity will increase (Nasrul 2018).

The salinity values obtained during the study are shown in Table 3. The average salinity value was 30.25 ppt in milkfish ponds, wich is in the range of SNI. Sahrijanna and Sahabuddin (2014) stated that a good salinity for milkfish growth in ponds are in the range of 15-35 ppt.

The pH obtained during the study in Table 3 was 7.42. The pH value for milkfish growth is between 7.0 - 8.5 SNI. Rachmansyah (2011) differences in pH values in waters are caused by the difference in measurement time. Changes in pH concentration in waters have a daily cycle. This cycle is a function of carbon dioxide. Waters contain free carbon dioxide and carbonate ions, so the pH tends to be acidic, and the pH will increase again if CO2 and HCO3 begin to decrease.

CONCLUSION

The research results showed that the brightness, temperature, salinity and pH of the milkfish pond were is 27.42 cm, 28.5 ^{0}C, 30.25 ppt, and 7.42 respectively. Therefore, the data shows that pond water quality meets the SNI standard.

REFERENCES

Akib, Abdul et al. 2015. "KELAYAKAN KUALITAS AIR UNTUK KAWASAN BUDIDAYA Eucheuma Cottoni BERDASARKAN ASPEK FISIKA , KIMIA DAN BIOLOGI DI KABUPATEN KEPULAUAN SELAYAR (Water Quality Fitness for Cultivation of Eucheuma Cottoni Based on Physics , Chemitstry and Biology Aspects In Dis." 1(1).

Nasrul, Nasrul. 2018. "Evaluasi Kesesuaian Lahan Tambak Ikan Bandeng Di Desa Salemba Kecamatan Ujung Loe Kabupaten

Bulukumba." *Jurnal Environmental Science* 1(1): 5–6.

Panca Wahyuni. 2020. "STUDI KUALITAS AIR UNTUK BUDIDAYA IKAN BANDENG (Chanos Chanos Forsskal) Di TAMBAK KELURAHAN SAMATARING KECAMATAN SINJAI TIMUR." *Jurnal Agrominansia* 5(1): 2020.

Rachmansyah. 2011. "Hubungan Antara Kualitas Air Dan Plankton Di Tambak Kabupaten Tanjung Jabung Barat Provinsi Jambi." *Prosiding Forum Inovasi Teknologi Akuakultur 2011*: 961–68.

Regency, Kendal. 2010. "Daya Dukung Lingkungan Perairan Tambak Desa Mororejo Kabupaten Kendal." *Daya Dukung Lingkungan Perairan Tambak Desa Mororejo Kabupaten Kendal* 4(1): 50–55.

Rimmer, Michael A. 2013. "Perubahan Kualitas Air Pada Budidaya Ikan Nila (Oreochromis Niloticus) Di Tambak Kabupaten Pangkep Provinsi Sulawesi Selatan." *Prosiding Forum Inovasi Teknologi Akuakultur* 1(1): 1065–75.

Sahrijanna, Andi. 2014. "Kajian Kualitas Air Pada Budidaya Udang Vaname (Litopenaeus Vannamei) Dengan Sistem Pergiliran Pakan Di Tambak Intensif." *Prosiding Forum Inovasi Teknologi Akuakultur 2014*: 329–36. https://bppbapmaros.kkp.go.id/wp-content/uploads/2016/07/FITA-008.pdf.

Suryanti. 2016. "Analisis Produktivitas Primer Tambak Ikan Bandeng (Chanos Chanos, FORSSKAL) Dengan Data Citra Satelit Ikonos Di Kabupaten Pati, Jawa Tengah." *Diponegoro Journal of Maquares : Management of Aquatic Resources* 5(1): 83–90. http://ejournal-s1.undip.ac.id/index.php/maquares.

Wu, Lie. 2012. "Keanekaragaman Plankton Di Perairan Tambak Ikan Bandeng Di Tapak Tugurejo, Semarang." *Shengming Kexue* 1(1).