

PRELIMINARY STUDY: WATER QUALITY PARAMETER ANALYZES OF SALT EVAPORATION PONDS IN KECAMATAN GALIS KABUPATEN PAMEKASAN, EAST JAVA

Onie Wiwid Jayanthi^{a,*}, Ary Giri Dwi Kartika^a, Widia Yuliati Ningsih^a, Zulia Susanti^a, Ghetra Sanda Sascheva^a

^aMarine Science Departement, Faculty of Agricultural, University of Trunojoyo-Madura
Jl. Raya Telang PO BOX 2 Kamal-Bangkalan, East Java

* Corresponding author: onie.jayanti@trunojoyo.ac.id

Abstract

Water quality is an important parameter that affects the productivity and quality of salt produced in the traditional salt ponds. Environmental factors of water quality in salt ponds include bouzem plots, brine plots, peminihan ponds, and crystallization tables are important to be analyzed so that the quality of community salt can be improved, but some research is very limited about this so this research needs to be carried out. The method that used in this research is exploratory descriptive method by measuring water quality in bouzem plots, brine plots, evaporation ponds and crystallization tables. The result of water quality in bouzem plots (temperature=32°C; pH=8,5; DO = 5,2 mg/L; salinity=2,5⁰Be), evaporations ponds (temperature=34°C ; pH=8,5 – 8,6 ; DO=5,4 – 6,2 mg/L; salinity=34⁰Be), brine plots (temperature=39°C ; pH=7,4 – 7,5 ; DO=2,8 – 3,3 mg/L; salinity=20⁰Be), and crystallization tables (temperature=38°C ; pH=5,7 – 6,4 ; DO=1,2 – 1,3 mg/L; salinity=29⁰Be)

Keywords: Water quality, Salt Evaporation Ponds, Pamekasan

INTRODUCTION

Indonesia has great marine resource potential, one of which is salt resource. National salt land area is around 27,898 hectares (Kementerian Kelautan dan Perikanan) ^[1]. One of the centers for salt production is Pamekasan, where salt production in 2014 reached 3.57% of the national salt production^[2].

Salt pond technology consists of multilevel crystallization technology and total crystallization technology. Water quality parameters in salt ponds that affect productivity and quality of salt include temperature, pH, DO, and salinity. Temperature will affect the rate of evaporation of sea water accelerate the rate of crystallization. The level of salt concentration in each salt pond plot determines the type of salt crystal compound formed^[3]. Each salt plot on the farm must have an appropriate salt content value so that the NaCl compound to be produced.

This study aims to determine the parameters of water quality in salt ponds so

that it will help the knowledge of ideal pond locations based on water quality parameters.

MATERIAL AND METHOD

This research was conducted on one salt pond with total crystallization technology in Galis, Pamekasan, East Java, which was carried out on August 7, 2019.

The method used in this study is exploratory descriptive method by measuring water quality in salt ponds with sampling points consisting of points on bouzem plots, evaporation ponds, brine plots and salt crystallization tables ^[4].

Measurement of water quality parameters using in situ methods including parameters of temperature, pH, DO, and salinity by using a measurement tool according to the observed parameters. The measurement results are analyzed with the suitability of each parameter with the ideal salt pond plot.

RESULT AND DISCUSSION

Salt pond technology in Pamekasan uses a total crystallization method by utilizing the area of ponds for several plots including bouzem plots, evaporation ponds, brine plots and crystallization tables. The source of salt pond water is obtained from direct sea water which is accommodated in a pool of bouzem. After entering the pool of bouzem, sea water is put into an evaporation ponds to increase the salt content by evaporation proces in the pond. From the evaporation ponds then seawater is collected into an brine plots (according to the desired salt content) and then put into a crystallization table until it finally becomes salt. Salt evaporation pond construction that utilizes large land area with irregular plots which consist of ponds, if brine has been obtained is flowed to the crystallization table, is one form of salt evaporation ponds with complex table construction^[5]. Each salt evaporation pond plot has different water quality parameter values.

Table 1. Salt Evaporation Ponds Water Quality Parameters

Located	Tempt (°C)	Salinity (°Be)	DO (mg/l)	pH
Bouzem Plots	32	2,5	5,2	8,5
Evaporation Ponds	34	4,3	5,4-6,2	8,5-8,6
Brine Plots	39	20	2,8-3,3	7,4-7,5
Crystallization tables	38	29	1,2-1,3	5,7-6,4

The temperature in the bouzem plot is lower than the evaporation ponds, brine plots, and crystallization table which is 32°C this is because the bouzem plot has a higher depth than the pond pond, old water table, and crystallization table. Temperature affects the rate of evaporation of sea water so that the salinity can increase^[6].

Salinity level affect the results of the quality of the crystallization salts produced in salt evaporation ponds. If the concentration of salt is 3-6 °Be, the salt crystals that settle are mud, sand, Fe₂O₃ or CaCO₃, the salt content of 17-27 °Be which settles sulfate calcimate (NaCl), 27–35 °Be salt crystals that form Magnesium Salt, and the concentrations of salt 28–35 °Be which precipitate sulfate calcite (NaCl), 27–35 °Be salt crystals that form Magnesium Salt, and the concentration of salt 28–35 °Be which settles Sodium Bromide. In this salt evaporation ponds, brine

plots are flowed to the crystallization table with a salt content of 20 °Be so that the quality of the salt produced more NaCl content obtained minimizes the presence of salt impurities^[7]. In the salt evaporation ponds for each salt plot, the salinity has increased until the crystallization table shows that the evaporation rate of each plot has increased so that the salinity produced increases.

Dissolved oxygen (DO) levels decreased from bouzem plots, evaporation ponds, brine plots, and crystallization tables showed a change in salt concentration (increase in salt content) affecting dissolved oxygen in pond plots. The content of dissolved oxygen is useful for living organisms in salt evaporation ponds. Some organisms that can live on salt ponds are halophilic and halotolerant organisms^[8]. Some living organisms include fungi, microalgae *Dunaliella salina*, *Artemia salina*, several types of halophilic bacteria that have the potential to increase the process of evaporation of sea water so that the crystallization process becomes faster^[9].

In the salt evaporation ponds plot shows the pH value of sea water will decrease the increasing value of the level of salt that has crystallized into salt^[10]. The pH value of sea water with a salinity of 2,5 °Be is 8,5 (alkaly) while the brine that will be channeled to the crystallization table with a salinity of 20 °Be has a pH of 7,4 – 7,5 is a neutral pH (salt pH)^[11].

CONCLUSION

Galis, Pamekasan salt evaporation ponds, with ponds including bouzem plots, evaporation ponds, brine plots and crystallization tables have water quality parameters, salinity, DO and pH ideal for the salt production process. Future studies are expected to not only analyze water quality samples in situ and also organic material, BOD, COD, TOM from salt evaporation ponds so that the water quality parameters analyzed are more complex.

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COMMON ABBREVIATIONS

Frequently used acceptable abbreviations are given below.

degree Celsius, °C
degree Baume, °Be
milligram, mg
liter, l