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Study on the Testing Water Quality used Synthesized Zeolite for Aquarium Filter Media

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Abstract— Sugarcane bagasse ash samples were collected from Buriram sugar factory and then were synthesized for silica powder which was used as raw materials for the formation of zeolite. The sample of Narathiwat kaolinite was mixed together with silica powder by using hydrothermal method at 100 °C for 12 h with proportion of 3: 7 weight/weight. The cation exchange capacity of synthesized Na-P zeolite was 351 meq/100 g and it was then applied as fish-aquarium water treatment. Total zeolite amounts used were varied in different treatment conditions during 0.25-5 g in 20 ml of an aquarium water. The result showed that, the optimal amount of zeolite used for an aquarium water treatment was 0.25 g, which could provide the appropriate water conditions for viability of fish as same as it could generate the optimal water quality parameters including total dissolved solids (TDS), conductivity, dissolved oxygen (DO), salinity, turbidity, pH and total ammonia-nitrogen, respectively. For the comparative study, the aquarium water treatment sample without zeolite and using synthesized zeolite was investigated and it was found that, all tests using synthesized zeolite provided better performances in an aquarium water treatment than without zeolite, which revealed advantage results in all studied water quality parameter.

Keywords— Na-P Zeolite, Sugarcane bagasse ash, Narathiwat kaolinite, Water quality, Testing

1. INTRODUCTION

In closed aquatic environments such as fish breeding aquariums and ponds, nitrogenous compounds are main pollutants that are produced by uneaten feed and feces [1]. The polluted environment that results from this N can cause the sudden death of fish. Accordingly, circulating filtration systems that remove organic materials and nitrogenous compounds have been developed and applied to fish culture systems [2]. In a previous study, we found that the purification of an aquarium used to breed carp was accomplished using a simple circulating filtration system packed with alginate gel [3]. However, the removal efficiency of filtration systems that employ alginate gel beads has been found to decrease after two weeks due to the gradual decomposition of the matrix. Furthermore, it is important for such systems to be effective and compact for economic reasons and other fish aquarium water, such as total ammonia (NH_3), total dissolved solids (TDS), conductivity, dissolved oxygen (DO), sanity, pH and turbidity which main in influential parameters of fish water quality. Furthermore, it is well known that, Zeolites are the crystalline structure with an extending three-dimensional network of aluminum and silicon tetrahedral linked by sharing of oxygen atoms [4-5]. The zeolite dimensional framework contains repeating cavities and channels, wherein monovalent and divalent cations, water and/or small molecules may reside inside. The cationic exchange capacity of natural and synthetic zeolites is well-known, and thus this material has been used for solving different environmental problems, generally in the area of waste water depuration, removing such metals as Pb, Zn, Ni and others in borehole waters, acid mine waters or even process wastewaters.

In this present study, the aim of this research to further investigate the application of the Aquarium water quality to extend time to change fish water using synthesized zeolite from sugarcane bagasse ash and Narathiwat kaolinite. Specifically, the research aims to maintain time Aquarium water, reduce the parameters were conductivity, salinity and total ammonia respectively, and increase the dissolved oxygen. The results have indicated that development as zeolite filter from the utilization of sugarcane bagasse ash waste to economic value.

2. MATERIAL AND METHODS

2.1 Batch filter studies

Type of synthesis method of zeolite in this work was carried out by using batch experiment method. The amount of synthesized zeolite for 3 days of fish aquarium water treatment were varied at 0, 0.25, 0.5, 1.0, 2.0 and 5.0 gram /20 ml, respectively. Batch experiments were carried out in glass flasks (50 mL) using a magnetic shaker at room temperature and constant agitation of 300 rpm for 5 minutes. The suspensions were centrifuge at 1100 rpm for 10 minutes. At the end of each experiment, the supernatant were taken out from test tube and filtrated until the supernatant liquid is clear. All of sample were test all influence to water quality of living fish's water. Measurements of conductivity and temperature were carried out by using Senseline portable meter (F430T). Dissolved oxygen (DO) and pH values were measured by using SenseLine Plus DO meter (F405) and a Hanna pH meter, respectively. TDS was determined in accordance with Standard Method 2540C (APHA, 1998) [6]. Turbidity was measured using Standard Method 2130B (APHA, 1998). Salinity was determined in agreement with Standard Method 2130B (APHA, 1998). Analysis of total Ammonia value was conducted by using Phenate method

following Standard Method 4500-NH_3 F (APHA, 1998). All of the results were demonstrated in the averaged value from triplicate determinations.

2.2 Application for aquarium water of filter media

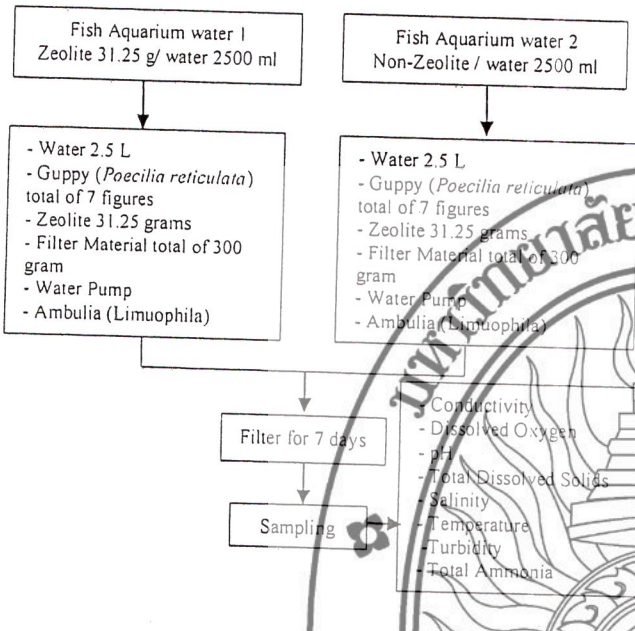
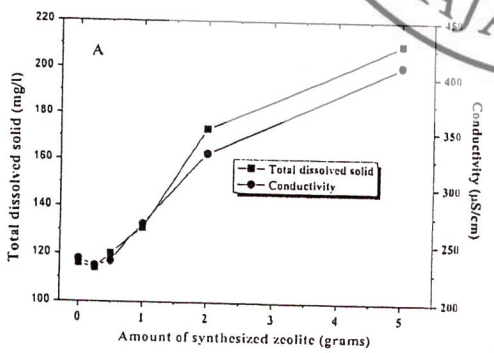


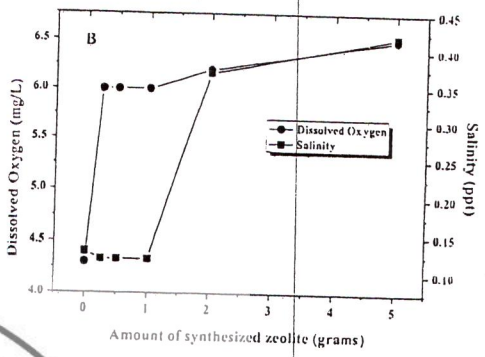
Figure 1 Diagram of synthesized zeolite filter

Figure 1 shows the diagram of research procedure demonstrating the comparisons for the setting conditions and measurement variables between zeolite aquarium water treatment (Fish Aquarium water 1) and treatment sample without zeolite (Fish Aquarium water 2).

3. RESULTS AND DISCUSSION

3.1 Effect of Na-P zeolite amount to filter quality in an aquarium water





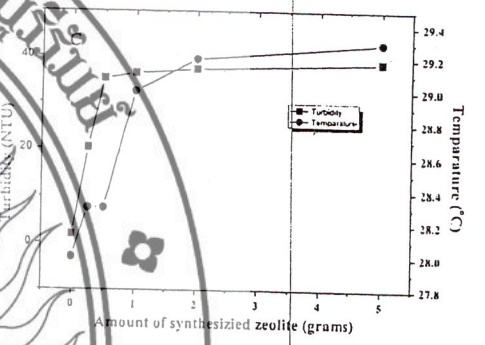


Figure 2 Quality water by various amount of zeolite treated in an aquarium water

The study was to evaluate the suitable use of zeolite in fish tank which were 0.25, 0.5, 1.0, 2.0, 5.0 g respectively, using in 20 ml of Aquarium fish water for 3 days. The result of the study led to an application of zeolite concentration as the fish tank filter media. Figure 2A demonstrated the amount of zeolite that effects to conductivity and total solids in fish tank water. First, it revealed that after adding 0.25g of zeolite in the water for 3 days, conductivity was 231 µS/cm. Second, Figure 2A indicated that after adding 0.25 g of zeolite in the Aquarium fish water for 3 days, total dissolved solids levels reached to 114.33 mg/l. additionally, and more addition of zeolite led to the increase of conductivity and total solids levels. The reason was that conductivity depend on concentration of types of ions, and water temperature [7]. Furthermore, conductivity was proportional to total dissolved solids. The experiment indicated that conductivity was in the range of 50 to 1500 µS/cm in accordance with the standard of water quality for aquatic life. Total dissolved solids consisted of fish excrete and excess fish food. Total dissolved solids were not up to 1300 mg/l in accordance with the standard of water quality for aquatic life. Figure 2B shows the amount of zeolite that had an effect on dissolved oxygen and salinity in fish tank water. First, it indicated that dissolved oxygen levels at 6.08 mg/l could be obtained after adding 0.25g of zeolite in the Aquarium fish water for 3 days. Moreover, the increase of zeolite had an effect on dissolved oxygen levels being stable until it reached to 1 g of zeolite concentration. Zeolite of 5 g made the highest level of dissolved oxygen due to the fact that less oxygen could be dissolved in clean water. The effectiveness of dissolve would decrease if the water has some contaminants,

in this experiment were suspension and salinity. Therefore, the experiment indicated that dissolved oxygen level should not be less than 3 mg/l in accordance with the standard of water quality for aquatic life. Second, Figure 2B demonstrated the result of salinity experiment. It revealed that the more zeolite concentration was added, the higher level of salinity was obtained. The lowest level of salinity was 0.12 ppt to be found after adding 0.25g of zeolite in the fish tank water for 3 days. In general, salinity in water obtained from sodium chloride. In this experiment, salinity in the fish tank water obtained from excess fish food. Therefore, the experiment revealed that salinity in the fish tank water should not be up to 7 ppt in accordance with the standard of water quality for aquatic life. Figure 2C showed the amount of zeolite having an effect on turbidity and water temperature in fish tank water. First, Figure 2C indicated the result of turbidity that the lowest level of turbidity was 20.16 NTU to be found after adding 0.25g of zeolite in the fish tank water for 3 days. However, the more zeolite concentration was added, the higher level of turbidity would get. The reason was that turbidity caused from suspension such as excess fish food, excretion, and zeolite. Zeolite could pass through the filters to block the transmission of light. Therefore, the experiment revealed that turbidity level should not be up to 100 NTU in accordance with the standard of water quality for aquatic life. Second, Figure 2C demonstrated the result of water temperature. It could be seen that after applying 0.25g of zeolite in the fish tank water for 3 days, the water temperature was about 28.33 °C. Therefore, there was no difference between water temperature both before and after adding zeolite. Water temperature took the highest degree at 29.5 °C when adding 3g of zeolite for 3 days. In addition, there were not much differences of the water temperature after adding different amount of zeolite. The reason was that water temperature depended on environmental condition. Therefore, the experiment indicated that water temperature in the range of 23 to 32 °C was suitable for aquatic life in accordance with the standard of water quality. Therefore, the result of the experiment indicated that all factors that effect on the water quality for aquatic life were acceptable in accordance with the standard of water quality [8].

Table 1 Total ammonia by various amount of synthesized zeolites

Amount of synthesized zeolite (g)	Total Ammonia (mg/L)
Pre-treat by Na-P zeolite	ND[a]
0.25	ND[a]
0.5	ND[a]
1	ND[a]
2	ND[a]
5	ND[a]

[a] Triplicate measurements, ND = NOT Detected

Table 1 showed the result of total ammonia. It could be seen that ammonia was not found in fish tank water with 0.25 to 5 g of zeolite and without filtration by zeolite in an aquarium water for 3 day, which is indicate that not detected value of ammonia. NH_4^+ (aquarium water) from and Na (synthesized zeolite) ions were exchange, resulting in the removal of NH_4^+ from aquarium fish water is as follow [9-10].

$$\text{Synthesized zeolite-Na}^+ + NH_4^+ \longrightarrow Na^+ + \text{Synthesized zeolite-}NH_4^-$$

Similar result was reported by Marayama et al. [11] removal of NH_4^+ and PO_4^{3-} in aqueous solution by synthesized zeolite from coal fly ash in the presence NH_4^+ is exchanged by Ca-P zeolite and an insoluble salt is formed by the reaction between Ca^{2+} released from zeolite and PO_4^{3-} in aqueous solution.

3.2 Effect of synthesized zeolite and without zeolite applied to filter in an aquarium water

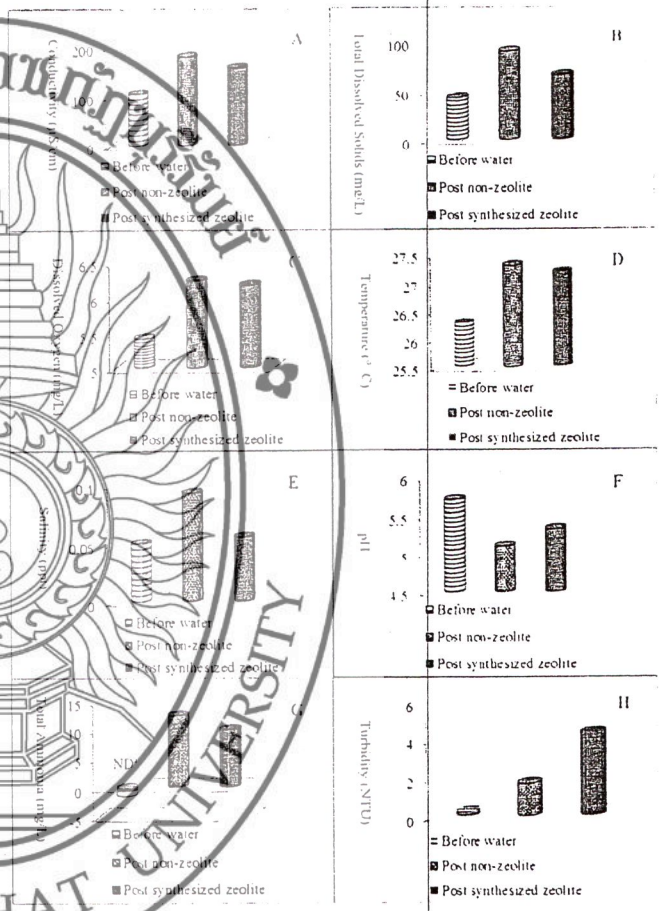


Figure 3 Comparison without zeolite and synthesized zeolite to quality of an aquarium water
a Triplicate measurements

Figure 3A to Figure 3H demonstrated the study on the factors affecting to water quality for aquatic life by comparing to 3 types of water. The factors consisted of conductivity, total dissolved solids, dissolved oxygen, salinity, turbidity, temperature, pH, and total ammonia. These factors were measured from 3 types of water which were water before adding fish, water after adding fish with and without filtration by synthesized Na-P zeolite. Figure 3A showed conductivity measured from 3 types of water. The result indicated that the lowest level of conductivity could be measured from the water before adding fish. The level of conductivity obtained from the fish tank water with filtration by synthesized Na-P zeolite was lower than conductivity obtained from the water without filtration. Therefore, conductivity was

direct variation to total dissolved solids. Figure 3B demonstrated the result of total dissolved solids measured from 3 types of water. It revealed that the lowest level of total dissolved solids went to the water before adding fish. Total dissolved solids level obtained from the water with filtration by synthesized Na-P zeolite was lower than total dissolved solids level obtained from the water without filtration. The result of total dissolved solids conformed to the result of conductivity. Total dissolved solids in the water after adding fish comprised of fish excrete and excess fish food. Figure 3C showed the dissolved oxygen level measured from 3 types of water. It indicated that 5.43 mg/L of dissolved oxygen appeared in the water before adding fish, 6.18 mg/L of dissolved oxygen could be measured from the water with filtration by synthesized Na-P zeolite, 6.24 mg/L of dissolved oxygen could be measured from the water without filtration. Therefore, less oxygen could dissolve under clean water and high temperature. Figure 3D illustrated the experiment of water temperature in 3 types of water. Water temperature before adding fish was 26.5 °C. There were slightly differences between water temperature with and without filtration by synthesized Na-P zeolite. Therefore, the result of experiment indicated that water temperature had no effect on dissolved oxygen. Figure 3E showed the level of salinity. The lowest level of salinity could be measured from the water before adding fish. Salinity level from the water with filtration by synthesized Na-P zeolite was lower than salinity level from the water without filtration by zeolite. Therefore, salinity was related to pH. Figure 3F demonstrated the pH of water. The result revealed that the pH of water without filtration was said to be acidic. Figure 3G showed the level of total ammonia. First, it could be considered that the high level of total ammonia appears in the water without filtration because of fish excretes and excess fish food. Fish excretes and excess fish foods were transformed to be nitrate, and then an accumulation of nitrate occurred. After that, Nitrate was transformed into nitric acid. This process led to the decrease of pH in the water. In addition, this process was also related to total ammonia. No total ammonia could be found in the water before adding fish. The total ammonia level of the water with filtration by synthesized Na-P zeolite was lower than total ammonia level of the water without filtration. Figure 3H also showed the level of turbidity. The result indicated that the lowest level of turbidity could be found in the water before adding fish. Turbidity level of the water with filtration by synthesized Na-P zeolite was higher than turbidity level of the water without filtration. The way a small scale of zeolite passed through the filter media caused an occurrence of turbidity. However, the turbidity from the experiment should not be up to 100 NTU in accordance with the standard. Generally, the zeolite are crystalline hydrated aluminosilicate with a three dimensions framework structure. It has been found that pores of framework structure, which are high cation exchange capacity ability as well as to the molecular sieves properties. In this research found that ammonium of important nitrogen ion from fish toxicity in receiving water which are mainly pollution in an aquarium Fish water. The results indicated that fish water with a filtration by synthesized Na-P zeolite, its show that lower concentration ammonium with an increase dissolved oxygen. When the ammonium concentration is decrease, change in the conductivity, total dissloved solids, salinity, pH and temperature but increase turbidity. Rozio et al. [12] reported that the removal of ammonium ion from aqueous solutions using a natural zeolite (clinoptilolite) and bentonite. The efficiency removal for $N\text{-}NH_4^+$ was 61.1 wt%, which achieved with the natural zeolite at the lowest initail concentration 100 mg $N\text{-}NH_4^+/L$. The increase concentration of ammonium ions was removal efficiency quickly decreased.

4. CONCLUSION

The synthesized Na-P zeolite of filter water in an aquarium water have successfully the quality water parameters better than non-synthesized zeolite of filter water in an aquarium fish. This happened with this conductivity, total dissolved solids, dissolved oxygen, temperature, salinity, pH and total ammonia. The results indicate that high treatment efficiency in all successive parameters and suggesting their potential application in an aquarium water treatment. The results have indicated that development as zeolite filter from the utilization of sugarcane bagasse ash waste.

ACKNOWLEDGMENT

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สำเนาถูกต้อง
สัทธนันท์ ทวดอาจ
(นางสาวสัทธนันท์ ทวดอาจ)

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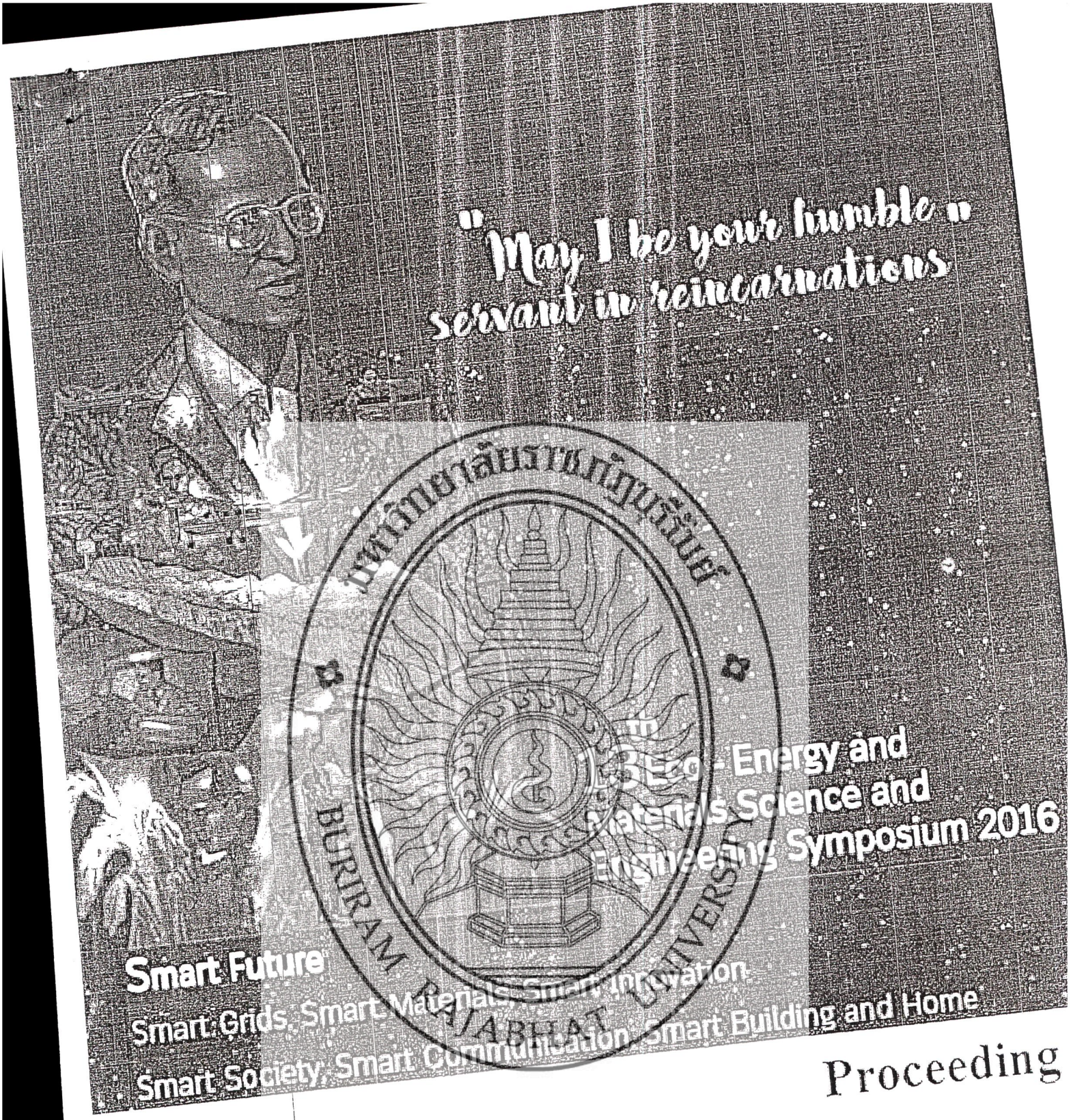

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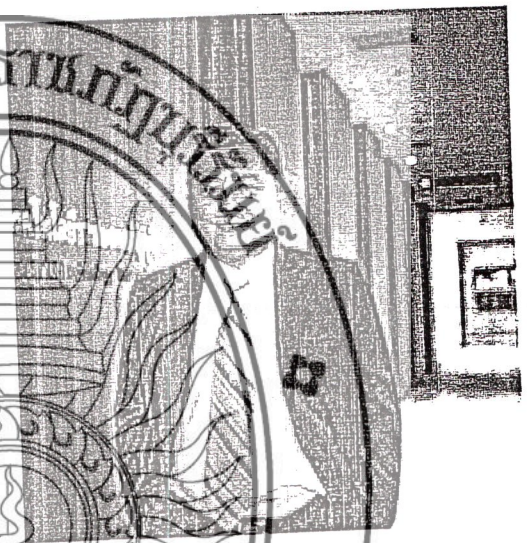

Rajamangala University of Technology Thanyaburi in collaboration Kyoto University, Kyoto Institute of Technology and National Institute of Technology, Kagawa College, is pleased to host the 13th Eco-Energy and Materials Science and Engineering Symposium 2016 (13th EMSES2016). This international conference is not only giving an opportunity for Thai and foreign researchers to present and discuss their research works and update their expertise but also to initially stimulate the development of research works on eco-energy, materials science and engineering. The program consists of seven research tasks; *Smart Grids, Smart Materials, Smart Society, Smart Innovation, Smart Mobility, Smart Communications and Smart Building and Home.*

I would like to take this opportunity to express my sincere gratitude to the plenary speakers for accepting our kind invitation. I deeply appreciate the very strong support given by Kyoto University and Kyoto Institute of Technology. Thanks to the spirited works of the organizing committee, the technical program committee, the invited speakers, and paper contributors and excellent program have been assembled to cover a broad spectrum of interesting topics.

I warmly welcome you to the EMSES 2016 on December 1 - 4, 2016, Udon Thani, Thailand.

P. Pinpathomrat

Associate Professor Prasert PINPATHOMRAT, Ph.D.
President of Rajamangala University of Technology Thanyaburi and
Honorary Advisory Chair of EMSES2016

สำเนาถูกต้อง
ศศิพันธ์ ทวดอาจ
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CONTENT

SM01

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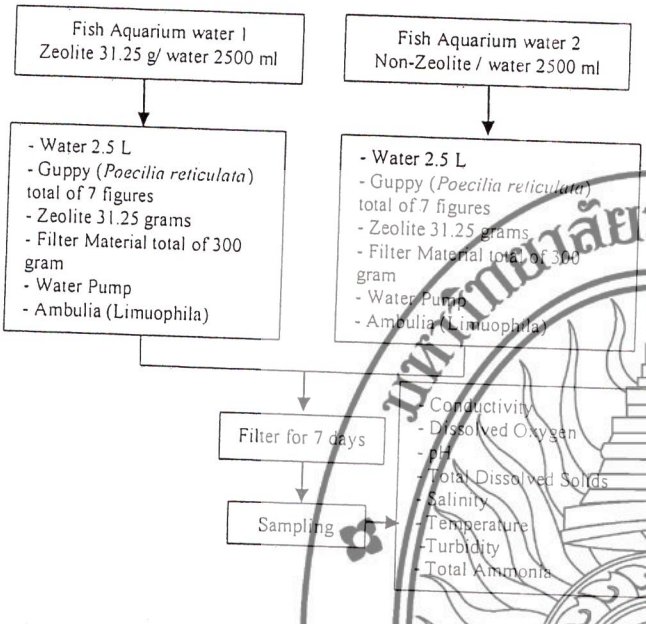

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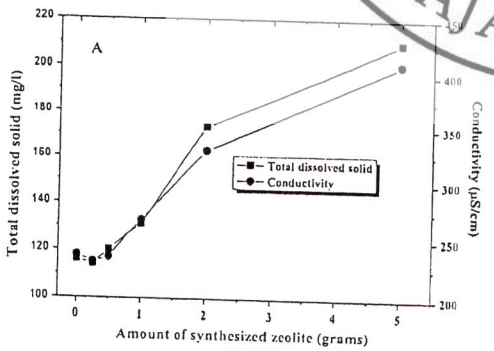

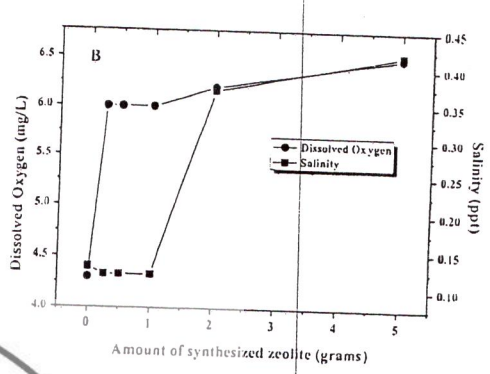

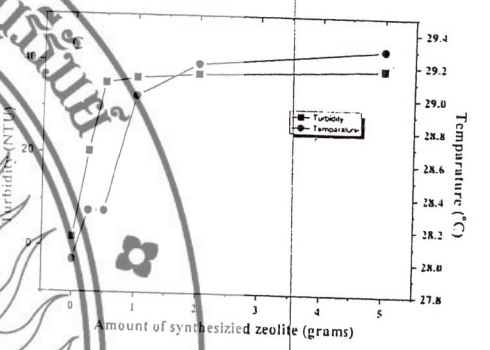

Figure 2 Quality water by various amount of zeolite treated in an aquarium water

The study was to evaluate the suitable use of zeolite in fish tank which were 0.25, 0.5, 1.0, 2.0, 5.0 g respectively, using in 20 ml of Aquarium fish water for 3 days. The result of the study led to an application of zeolite concentration as the fish tank filter media. Figure 2A demonstrated the amount of zeolite that effects to conductivity and total solids in fish tank water. First, it revealed that after adding 0.25g of zeolite in the water for 3 days, conductivity was 231 µS/cm. Second, Figure 2A indicated that after adding 0.25 g of zeolite in the Aquarium fish water for 3 days, total dissolved solids levels reached to 114.33 mg/l. additionally, and more addition of zeolite led to the increase of conductivity and total solids levels. The reason was that conductivity depend on concentration of types of ions, and water temperature [7]. Furthermore, conductivity was proportional to total dissolved solids. The experiment indicated that conductivity was in the range of 50 to 1500 µS/cm in accordance with the standard of water quality for aquatic life. Total dissolved solids consisted of fish excrete and excess fish food. Total dissolved solids were not up to 1300 mg/l in accordance with the standard of water quality for aquatic life. Figure 2B shows the amount of zeolite that had an effect on dissolved oxygen and salinity in fish tank water. First, it indicated that dissolved oxygen levels at 6.08 mg/l could be obtained after adding 0.25g of zeolite in the Aquarium fish water for 3 days. Moreover, the increase of zeolite had an effect on dissolved oxygen levels being stable until it reached to 1 g of zeolite concentration. Zeolite of 5 g made the highest level of dissolved oxygen due to the fact that less oxygen could be dissolved in clean water. The effectiveness of dissolve would decrease if the water has some contaminants,

in this experiment were suspension and salinity. Therefore, the experiment indicated that dissolved oxygen level should not be less than 3 mg/l in accordance with the standard of water quality for aquatic life. Second, Figure 2B demonstrated the result of salinity experiment. It revealed that the more zeolite concentration was added, the higher level of salinity was obtained. The lowest level of salinity was 0.12 ppt to be found after adding 0.25g of zeolite in the fish tank water for 3 days. In general, salinity in water obtained from sodium chloride. In this experiment, salinity in the fish tank water obtained from excess fish food. Therefore, the experiment revealed that salinity in the fish tank water should not be up to 7 ppt in accordance with the standard of water quality for aquatic life. Figure 2C showed the amount of zeolite having an effect on turbidity and water temperature in fish tank water. First, Figure 2C indicated the result of turbidity that the lowest level of turbidity was 20.16 NTU to be found after adding 0.25g of zeolite in the fish tank water for 3 days. However, the more zeolite concentration was added, the higher level of turbidity would get. The reason was that turbidity caused from suspension such as excess fish food, excretion, and zeolite. Zeolite could pass through the filters to block the transmission of light. Therefore, the experiment revealed that turbidity level should not be up to 100 NTU in accordance with the standard of water quality for aquatic life. Second, Figure 2C demonstrated the result of water temperature. It could be seen that after applying 0.25g of zeolite in the fish tank water for 3 days, the water temperature was about 28.33 °C. Therefore, there was no difference between water temperature both before and after adding zeolite. Water temperature took the highest degree at 29.5 °C when adding 5g of zeolite for 3 days. In addition, there were not much differences of the water temperature after adding different amount of zeolite. The reason was that water temperature depended on environmental condition. Therefore, the experiment indicated that water temperature in the range of 23 to 32 °C was suitable for aquatic life in accordance with the standard of water quality. Therefore, the result of the experiment indicated that all factors that effect on the water quality for aquatic life were acceptable in accordance with the standard of water quality [8].

Table 1 Total ammonia by various amount of synthesized zeolites

Amount of synthesized zeolite (g)	Total Ammonia (mg/L)
Pre-treat by Na-P zeolite	ND[a]
0.25	ND[a]
0.5	ND[a]
1	ND[a]
2	ND[a]
5	ND[a]

[a] Triplicate measurements, ND = NOT Detected

Table 1 showed the result of total ammonia. It could be seen that ammonia was not found in fish tank water with 0.25 to 5 g of zeolite and without filtration by zeolite in an aquarium water for 3 day, which is indicate that not detected value of ammonia. NH_4^+ (aquarium water) from and Na (synthesized zeolite) ions were exchange, resulting in the removal of NH_4^+ from aquarium fish water is as follow [9-10].

$$\text{Synthesized zeolite-Na}^+ + NH_4^+ \longrightarrow Na^+ + \text{Synthesized zeolite-}NH_4^-$$

Similar result was reported by Marayama et al. [11] removal of NH_4^+ and PO_4^{3-} in aqueous solution by synthesized zeolite from coal fly ash in the presence NH_4^+ is exchanged by Ca-P zeolite and an insoluble salt is formed by the reaction between Ca^{2+} released from zeolite and PO_4^{3-} in aqueous solution.

3.2 Effect of synthesized zeolite and without zeolite applied to filter in an aquarium water

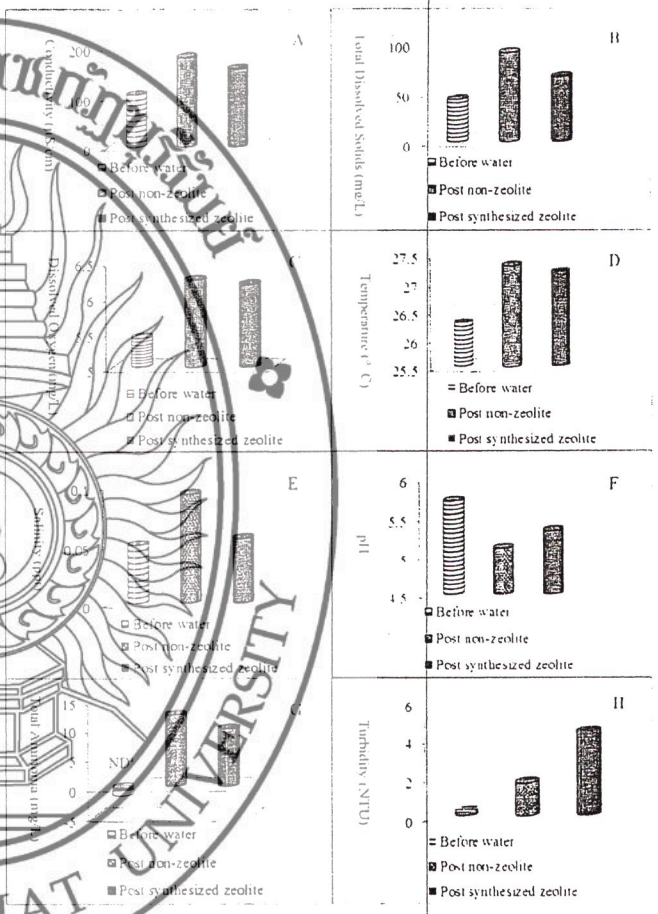

Figure 3 Comparison without zeolite and synthesized zeolite to quality of an aquarium water
a Triplicate measurements

Figure 3A to Figure 3H demonstrated the study on the factors affecting to water quality for aquatic life by comparing to 3 types of water. The factors consisted of conductivity, total dissolved solids, dissolved oxygen, salinity, turbidity, temperature, pH, and total ammonia. These factors were measured from 3 types of water which were water before adding fish, water after adding fish with and without filtration by synthesized Na-P zeolite. Figure 3A showed conductivity measured from 3 types of water. The result indicated that the lowest level of conductivity could be measured from the water before adding fish. The level of conductivity obtained from the fish tank water with filtration by synthesized Na-P zeolite was lower than conductivity obtained from the water without filtration. Therefore, conductivity was

direct variation to total dissolved solids. Figure 3B demonstrated the result of total dissolved solids measured from 3 types of water. It revealed that the lowest level of total dissolved solids went to the water before adding fish. Total dissolved solids level obtained from the water with filtration by synthesized Na-P zeolite was lower than total dissolved solids level obtained from the water without filtration. The result of total dissolved solids conformed to the result of conductivity. Total dissolved solids in the water after adding fish comprised of fish excrete and excess fish food. Figure 3C showed the dissolved oxygen level measured from 3 types of water. It indicated that 5.43 mg/L of dissolved oxygen appeared in the water before adding fish. 6.18 mg/L of dissolved oxygen could be measured from the water with filtration by synthesized Na-P zeolite. 6.24 mg/L of dissolved oxygen could be measured from the water without filtration. Therefore, less oxygen could dissolve under clean water and high temperature. Figure 3D illustrated the experiment of water temperature in 3 types of water. Water temperature before adding fish was 26.5 °C. There were slightly differences between water temperature with and without filtration by synthesized Na-P zeolite. Therefore, the result of experiment indicated that water temperature had no effect on dissolved oxygen. Figure 3E showed the level of salinity. The lowest level of salinity could be measured from the water before adding fish. Salinity level from the water with filtration by synthesized Na-P zeolite was lower than salinity level from the water without filtration by zeolite. Therefore, salinity was related to pH. Figure 3F demonstrated the pH of water. The result revealed that the pH of water without filtration was said to be acidic. Figure 3G showed the level of total ammonia. First, it could be considered that the high level of total ammonia appears in the water without filtration because of fish excretes and excess fish food. Fish excretes and excess fish foods were transformed to be nitrate, and then an accumulation of nitrate occurred. After that, Nitrate was transformed into nitric acid. This process led to the decrease of pH in the water. In addition, this process was also related to total ammonia. No total ammonia could be found in the water before adding fish. The total ammonia level of the water with filtration by synthesized Na-P zeolite was lower than total ammonia level of the water without filtration. Figure 3H also showed the level of turbidity. The result indicated that the lowest level of turbidity could be found in the water before adding fish. Turbidity level of the water with filtration by synthesized Na-P zeolite was higher than turbidity level of the water without filtration. The way a small scale of zeolite passed through the filter media caused an occurrence of turbidity. However, the turbidity from the experiment should not be up to 100 NTU in accordance with the standard. Generally, the zeolite are crystalline hydrated aluminosilicate with a three dimensions framework structure. It has been found that pores of framework structure, which are high cation exchange capacity ability as well as to the molecular sieves properties. In this research found that ammonium of important nitrogen ion from fish toxicity in receiving water which are mainly pollution in an aquarium Fish water. The results indicated that fish water with a filtration by synthesized Na-P zeolite, its show that lower concentration ammonium with an increase dissolved oxygen. When the ammonium concentration is decrease, change in the conductivity, total dissloved solids, salinity, pH and temperature but increase turbidity. Rozio et al. [12] reported that the removal of ammonium ion from aqueous solutions using a natural zeolite (clinoptilolite) and bentonite. The efficiency removal for $N\text{-}NH_4^+$ was 61.1 wt%, which achieved with the natural zeolite at the lowest initail concentration 100 mg $N\text{-}NH_4^+/L$. The increase concentration of ammonium ions was removal efficiency quickly decreased.

4. CONCLUSION

The synthesized Na-P zeolite of filter water in an aquarium water have successfully the quality water parameters better than non-synthesized zeolite of filter water in an aquarium fish. This happened with this conductivity, total dissolved solids, dissolved oxygen, temperature, salinity, pH and total ammonia. The results indicate that high treatment efficiency in all successive parameters and suggesting their potential application in an aquarium water treatment. The results have indicated that development as zeolite filter from the utilization of sugarcane bagasse ash waste.

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