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Water Purification with Oyster Shells

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Abstract

We thought that oyster shells could purify water because of the many holes on their surface. Comparative experiments were conducted with model wastewater using oyster shells and marbles without holes. The results showed that oyster shells were superior in removing COD and ammonium ions, but increased phosphate ions.

1 Introduction

In rural areas of the Hyogo Prefecture, there are no sewage treatment facilities due to financial reasons, and the disposal of oyster shells is also a problem. Therefore, we investigated a water purification method using oyster shells.

2 Experiment

① The oyster shells and marbles were submerged in river water for about 10 days to allow microorganisms to attach.

② Three tanks were prepared: 1) A model effluent with oyster shells, 2) A model effluent with marbles, and 3) A model effluent alone. The tanks were all aerated

③ Concentrations of COD, phosphate ions, and ammonium ions were then meusured using a pack test and a special application.

3 Results

The oyster shell tanks showed the fastest decrease in COD, followed by the marble tanks and model effluent tanks. Ammonium ions were not detected in the oyster shell tanks but were detected after 7 days in the marble tank and after 10 days in the model effluent tank. Phosphate ions were highest in the oyster shell tanks and were always detected in the oyster shell tanks, whereas in the other tanks they were below the measurable range. It appearsoyster shells are more effective at purifying water than marbles, and microscopic observation confirmed that microorganisms are attached to the surface.

4 Conclusion

The uneven and porous structure of oyster shells help microorganisms adhere to the shells, making them effective for water purification. However, there is a disadvantage in that phosphoric acid leaches out.

5 References

Japan Environmental Maintenance and Education Center, “Maintenance of Septic Tanks”

Ministry of the Environment, Septic Tank Promotion Office, "Septic Tank Self-Management Manual for Better Water Environment.