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Evaluation of microbial inoculating capacity of *Patinopecten yessoensis* for improving water quality in biotope

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• Introduction

In Japan, biotopes have been created in many places since the end of the 20th century. However, because biotopes are closed water bodies, the occurrence of blue-green algae has often been a problem. Therefore, it is necessary to improve the water quality, but chemical treatment may damage biodiversity. Therefore, Water purification is necessary to incorporate with microbial materials. In recent years, methods using porous materials are expected to be used. I focused on *Patinopecten yessoensis*, which are inexpensive and easily available as porous materials. In this study, the microbial inoculating capacity in *Patinopecten yessoensis* was evaluated quantitatively as a preliminary step to utilize *Patinopecten yessoensis*.

• Objective

The purpose of this study is to determine if *Patinopecten yessoensis* shells can inoculate lactobacillus, and also to determine the optimal conditions for lactobacillus to be inoculated by burning and washing *Patinopecten yessoensis* shells.
Based on the number of colonies that appeared, we calculated the number of lactobacillus that could be inoculated onto about 1 g of *Patinopecten yessoensis* shells, and compared the results for each condition.

• Methodology

In this experiment, we used *Patinopecten yessoensis* shells from Aomori industrial waste and lactobacillus.
1)Treatment of *Patinopecten yessoensis*
After being crushed into some small pieces with a hammer, four conditions were applied.
(A)No treated shells
(B)shells burned at 300° C for 1 hour
(C)shells burnted at 600° C for 1 hour
(D)shells burned at 600° C for 1 hour and then washed with distilled water (D).
2)Immersion loading experiments
After placing the shells of each condition in MRS liquid medium, sterilize them at 121° C for 15 minutes. After that, about 1g of lactic acid bacteria was added to each medium and incubated in an incubator at 35℃ for 3 days. Then, colonies were measured by mixed culture method.

• Result

The results of the inoculating experiment were 2.5×10^6 cfu/g in the No treated shells, 3.5×10^5 cfu/g in the shells burned at 300 ℃, 1.3×10^4 cfu/g in the shells burned at 600 ℃, and 6.6×10^5 cfu/g in the shells burned at 600 ℃ + washed with distilled water. There was a significant difference at the 1% level between the No treated sells and the shells burned at 300 ℃, the No treated shells and the shells burned at 600 ℃, and the No treated shells and the shells burned at 600 ℃ + washed with distilled water. There was a significant difference at the 5% level between the shells burned at 600 ℃ and The shells burned at 600 ℃ + washed with distilled water. No significant difference was observed between the shells burned at 300 ℃ and shells burned at 600 ℃ and between the shells burned at 300 ℃ and shells burned at 600 ℃ + washed with distilled water.

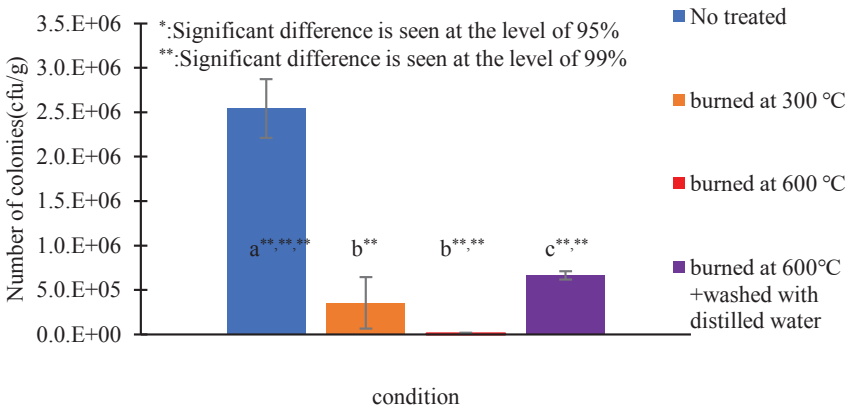

Fig.1 Amount of Lactobacillus supported per 1 g of *Patinopecten yessoensis* shells Soaked for 3 days

The reason for the highest inoculating in the No treated shells is thought to be due to the change in pore size caused by the burning of *Patinopecten yessoensis* and the change in PH caused by the change of calcium carbonate in *Patinopecten yessoensis* to calcium hydroxide. In addition, the amount of Lactobacillus inoculated was higher in the shells burned at 600 ℃ + washed with distilled water than in the shells burned at 600 ℃ , suggesting that calcium hydroxide was removed to some extent by water washing.

• Conclusion

The objectives of this experiment are as follows.
>To determine if *Patinopecten yessoensis* shells can inoculate Lactobacillus
>To determine the optimal conditions for Lactobacillus to be inoculated by burning and washing *Patinopecten yessoensis* shells.
As a result, it was possible to inoculate Lactobacillus onto *Patinopecten yessoensis* shells. The PH of the *Patinopecten yessoensis* shells was changed by burning and washing, and the pore size was also changed. This indicates that it is easy to evaluate the lactobacilli loading capacity of *Patinopecten yessoensis* without burning and washing.