전처리 패각을 이용한 인 제거 평가

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Evaluation of phosphorous removal using pre-treated oyster shell

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I. Introduction

Water pollution is caused by several harmful materials added into the water. One of the common problems linked to water pollution is the excessive amount of waste oyster shells along the coasts of rich-aquaculture communities. The disposal of these pollutants is often difficult if not impossible. In this study, waste oyster shells were tested for their capacity to remove phosphorous in the form of phosphate which can also be considered as one of water pollutants that causes eutrophication which is the enrichment of the water body together with nitrogen.

II. Materials and Methods

Raw oyster shell powder was prepared by directly crushing the previously sundried waste oyster shells. Using a mesh net, the raw oyster shell powder (ROSP) was sieved to 1.00 mm pore size to insure uniform sizes. In an oven, the shells were heated to 750°C for 1 hour to make the shells brittle for crushing, after the allotted heating time, the shells were crushed until the desired size and once again sieved to 1.00 mm pore size. The heated oyster shell powder (HOSP) was then cooled in room temperature and was further dried in order to get rid of the atmospheric moisture at 115°C oven.

III. Results and Discussion

The figure below shows the phosphate removal efficiency of heated oyster shell powder with regards to increasing pH and differing concentrations of HOSP. Removal of phosphate from the solution was greatly increased with HOSP relative to that of the ROSP. Increasing the pH similarly, showed high removal efficiency for phosphate across all concentrations (OSP g/L).

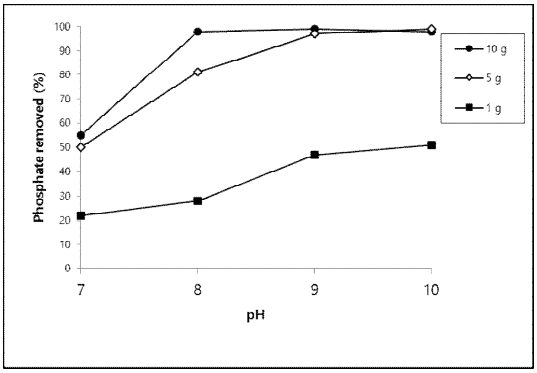

Fig. 1. Removal efficiency of HOSP depending on the pH across 1g, 5g, and 10g OSP/L.

IV. Conclusion

It can be concluded for the batch test that high phosphate removal efficiency can be attained using heated oyster shell powder. This is due to the release of CO_2 gas from the stable compound $CaCO_3$ toform CaO, which is a readily reactive to precipitate HAP.