



HOKKAIDO UNIVERSITY

Title	Development of eco-friendly biodegradable flocculant
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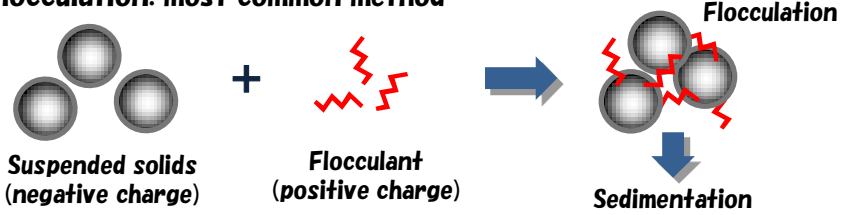
Introduction

Muddy Water Flows in the Sea
Sedimentation of suspended solids in estuary and coastal areas causes serious damage to coastal aquaculture fisheries.



Muddy water treatment is an important subject for the preservation of aquaculture environment.

Flocculation: most common method



Suspended solids (negative charge) + Flocculant (positive charge) → Flocculation → Sedimentation

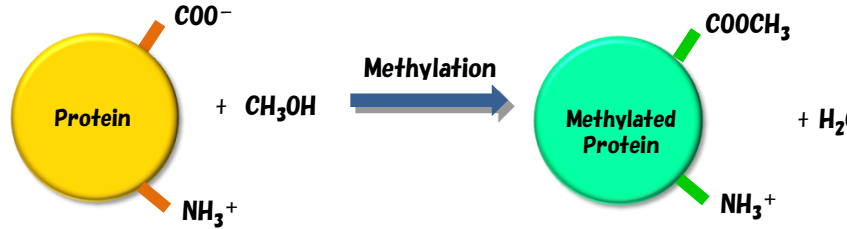
Flocculants Have Environmental Problem

Synthetic Polymer Flocculant Polyacrylamide (PAM) Inorganic Flocculants Polyaluminum chloride (PAC) Aluminum sulfate	→ →	Non biodegradable Contains carcinogenic monomer Inhibits the elongation of plant root
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Biodegradable flocculant (bioflocculant)
Microbial polymers, Chitosan
Cationic starch, etc.

→ Eco-friendly
Non toxic

Bioflocculant Developed in Our Laboratory

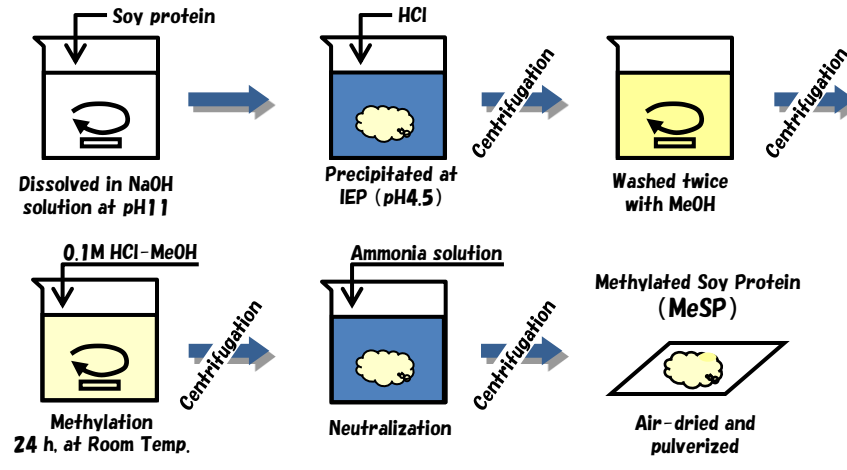


Japanese patent No. 3440054

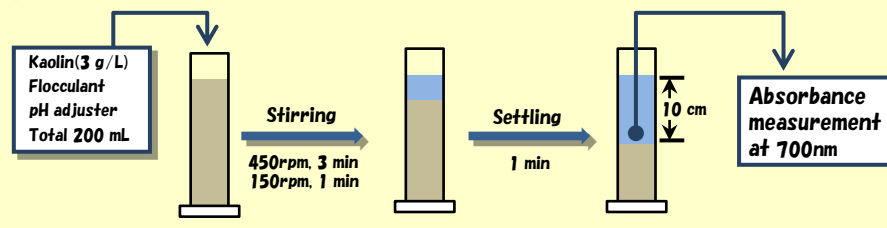
Anionic carboxyl group is modified to nonionic methyl carboxylate group.
Thus methylated proteins become to have positive charge in neutral solution.

Materials and Methods

Preparation of Soy Protein-based Bioflocculant



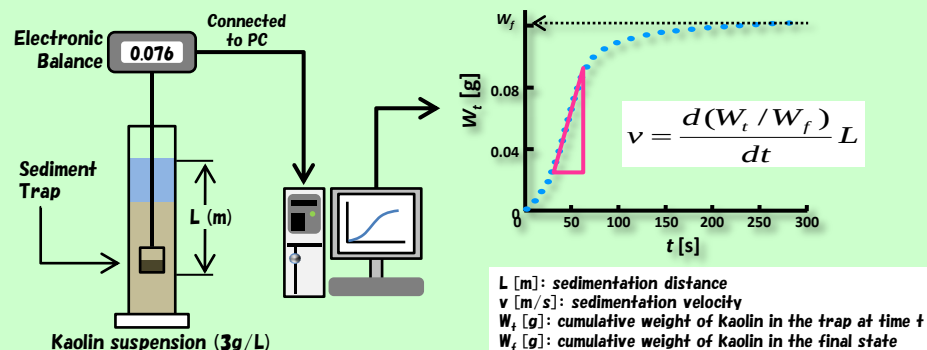
Jar Test Method (Clarity of supernatant solution)



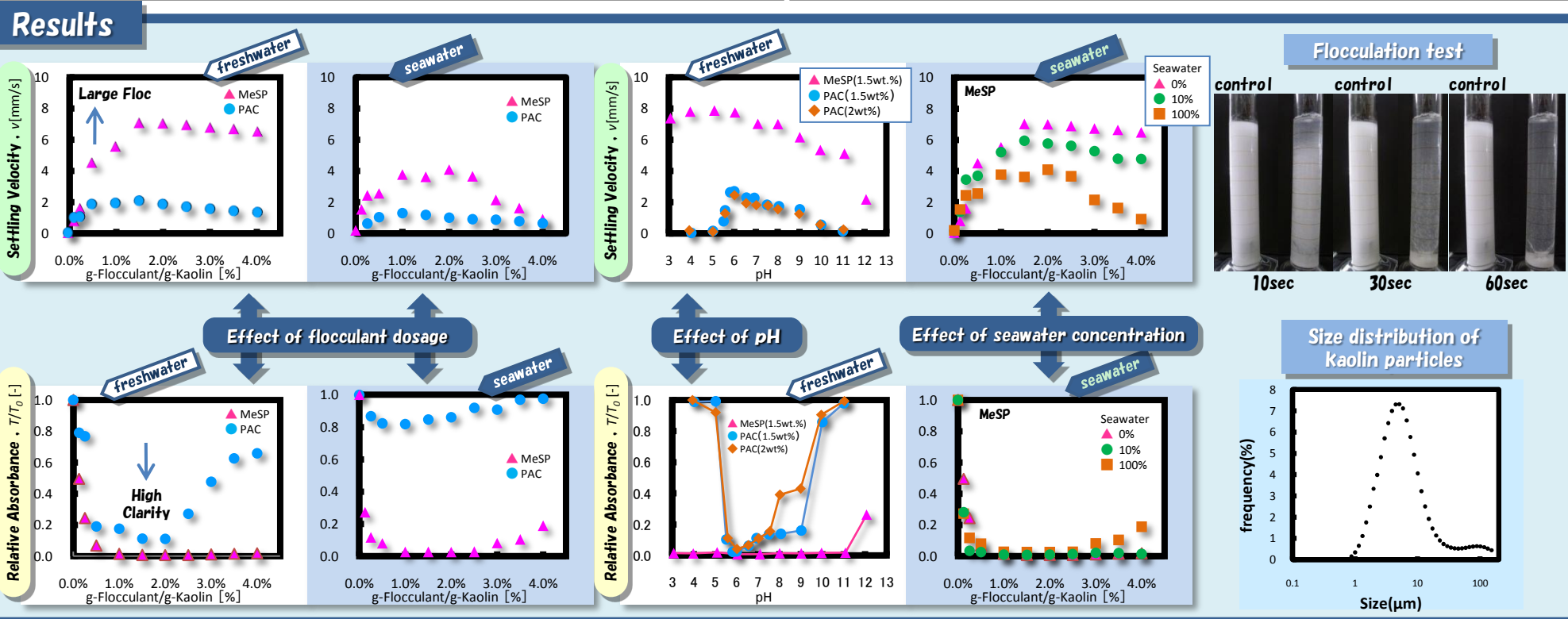
T/T_0 : Relative Tuibidity

T [g/L]: absorbance in the presence of flocculant
 T_0 [g/L]: absorbance in the absence of flocculant

Sedimentation Balance Method (Settling velocity of floc)



L [m]: sedimentation distance
 v [m/s]: sedimentation velocity
 W_t [g]: cumulative weight of Kaolin in the trap at time t
 W_f [g]: cumulative weight of Kaolin in the final state



Summary

- MeSP showed a much higher flocculation performance than that of PAC both in freshwater and seawater.
- MeSP was effective over a wide pH range from pH3 to11 in freshwater, while PAC was effective only at around pH 6.
- The flocculation efficiency of MeSP decreased with increasing seawater concentration.