

# A study of BOD reduction from hemodialysis wastewater using spent coffee grounds

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## RATIONALE

- ✓ The dialysate contains organic substances such as acetic acid and glucose, which increase biochemical oxygen demand (BOD).
- ✓ Dialysis facilities need to be equipped with wastewater treatment equipment because the pH and BOD of dialysis wastewater are significantly different from those of general domestic wastewater.
- ✓ However, the installation of wastewater treatment equipment that reduces BOD is not widespread. BOD represents the amount of oxygen consumed by bacteria and other microorganisms during the decomposition of organic matter under aerobic conditions. A higher BOD value indicates a higher amount of organic matter or pollution.
- ✓ We attempted to find a way to purify dialysis wastewater using carbonized coffee grounds instead of a wastewater treatment system to reduce the BOD in HD wastewater.

## METHODS

- 1) Coffee grounds were heated to produce carbide in an electric furnace.
- 2) 1-25 [g] of carbonized coffee grounds was added to the dialysate wastewater with dilution water and stirred for 5 [min], and the BOD value was measured. The diluted water was obtained from a river that was to be simulated for discharge into the river.
- 3) The samples were shaken in a thermostatic dark room at 20°C, and the BOD values were measured for 5 days. The BOD was measured by a respirometer using the BOD system BD600, Lovibond).



Fig. Carbonized coffee grounds

## RESULTS

- ✓ Five-day analyses were carried out for the BOD determination of dialysis wastewater with different volumes of carbonized coffee grounds and dilution water.
- ✓ Results show a significant decrease of the BOD load for the dialysate wastewater added the carbonized coffee grounds in compare to dialysate wastewater non-added the carbonized coffee grounds.

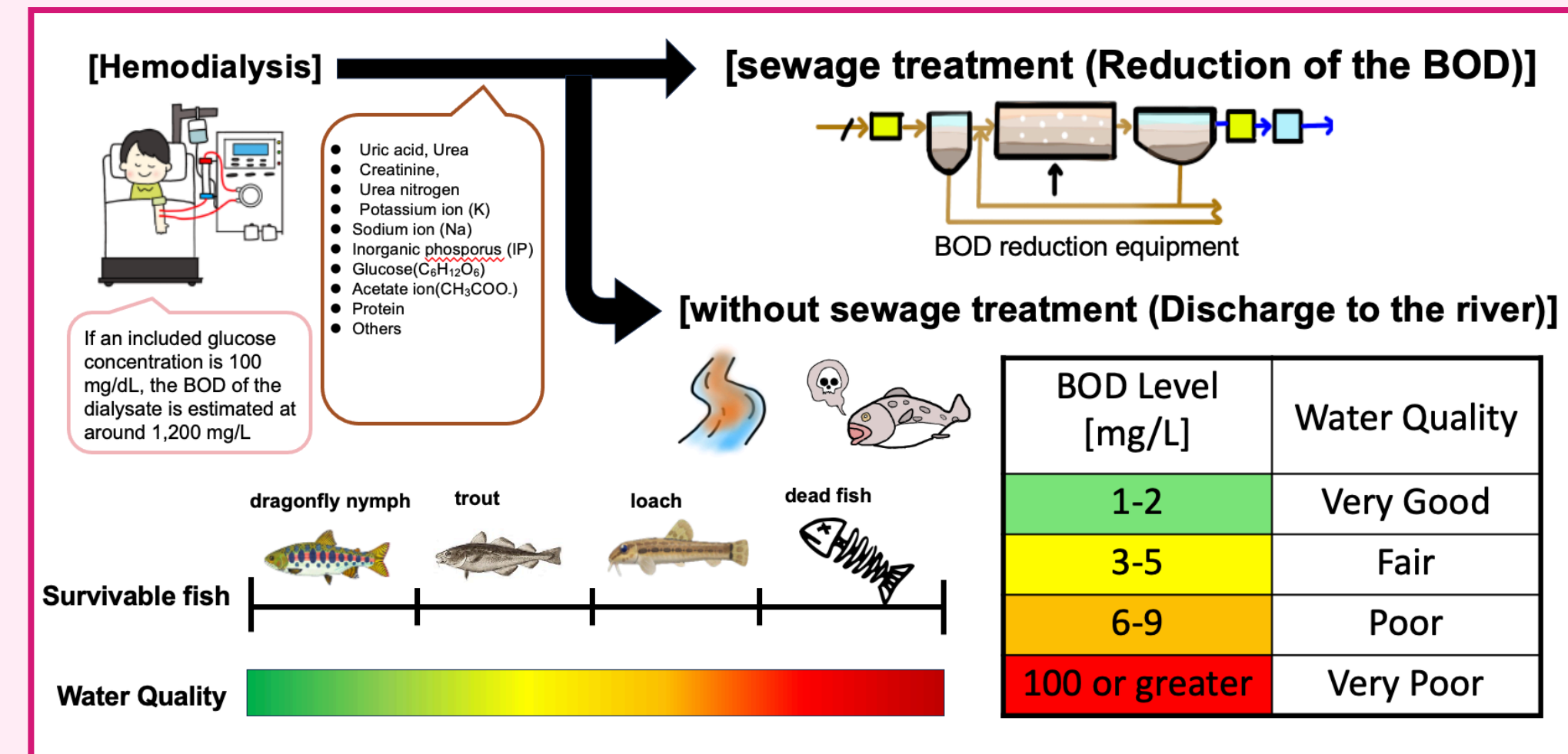
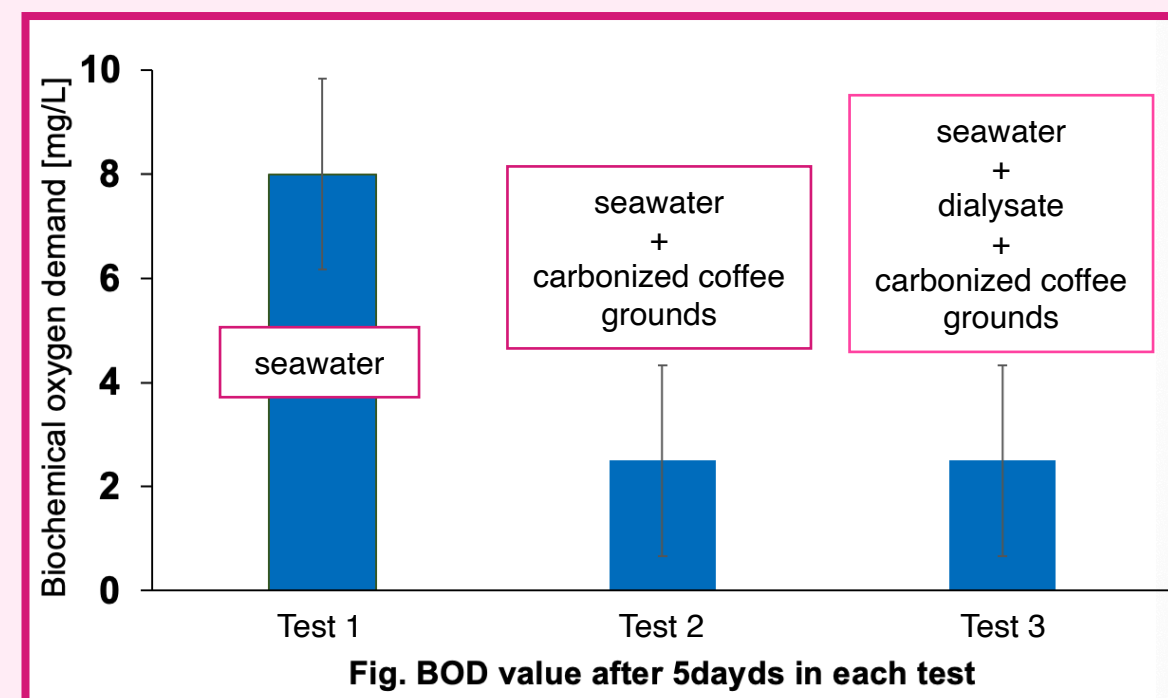


Fig. Treatment of BOD in hemodialysis treatment

## CONCLUSIONS & PERSPECTIVES

- This study showed that carbonized coffee grounds can reduce BOD in dialysis wastewater.
- In reality, the amount of adsorption by carbonized coffee grounds is considered to vary depending on various phenomena such as water velocity, stagnation time, and initial concentration of organic matter in the water.
- Further research is required to realize the practical use of coffee grounds for dialysis wastewater treatment and water purification.