

Effects of neutralization for acidic hemodialysis wastewater by using coffee grounds

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RATIONALE

- ▶ We attempted to neutralize acidic hemodialysis (HD) wastewater by using coffee grounds.
- ▶ Acidic cleaning solutions are usually used to clean the piping of HD systems. When the acidic cleaning solution is discharged into sewage, neutralizing equipment is used to neutralize the wastewater.
- ▶ A sodium hydroxide solution (NaOH) was used to neutralize the acidic wastewater.
- ▶ In this study, we investigated whether carbonized coffee grounds could be used as an alternative to aqueous NaOH for the neutralization of acidic wastewater.

METHODS

- 1) Coffee grounds were heated to produce carbide in an electric furnace.
- 2) The acidic HD wastewater sample was acidic wastewater (pH 1-3) from washing and sealing peracetic acid formulations.
- 3) Carbonized coffee grounds was immersed in acidic wastewater at different pH levels and the pH levels were measured.



Fig. Carbonized coffee grounds

RESULTS

Acidic HD wastewater was neutralized in each condition of this study by carbonized coffee grounds to a **neutral pH range of 5.8 to 8.6, which is acceptable for discharge into public water bodies.**

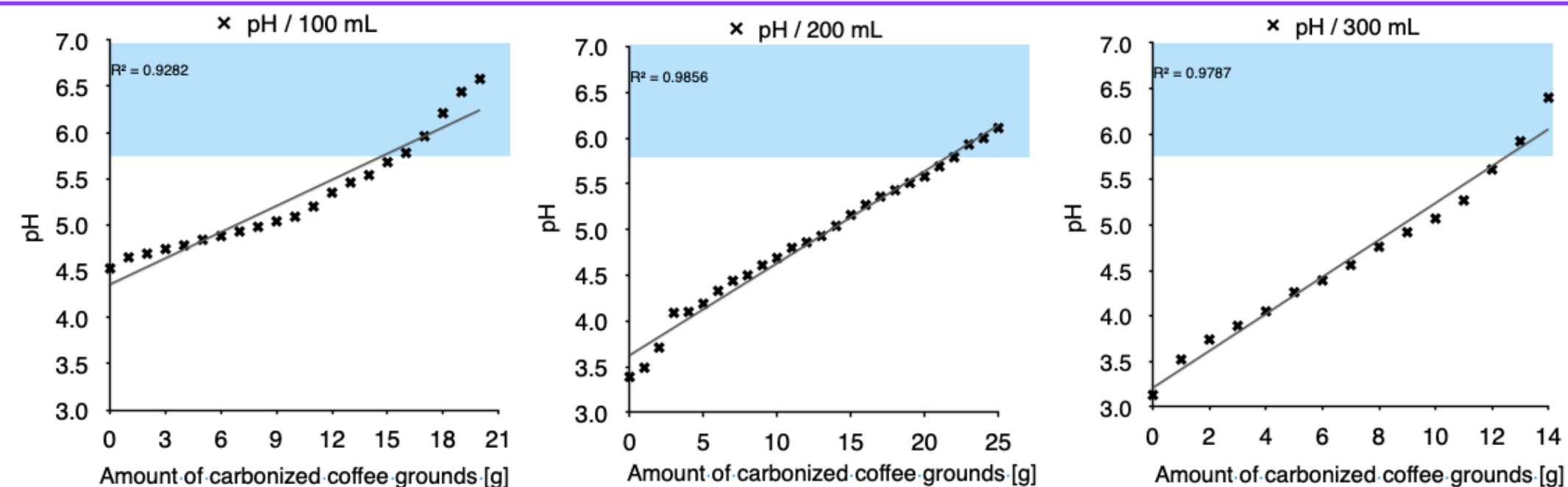


Fig. Changes in amount of carbonized coffee grounds and changes in pH

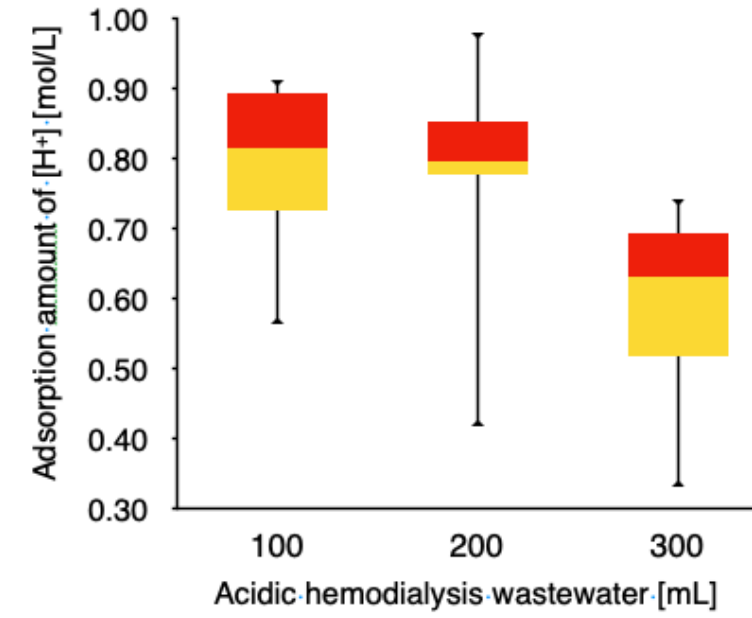
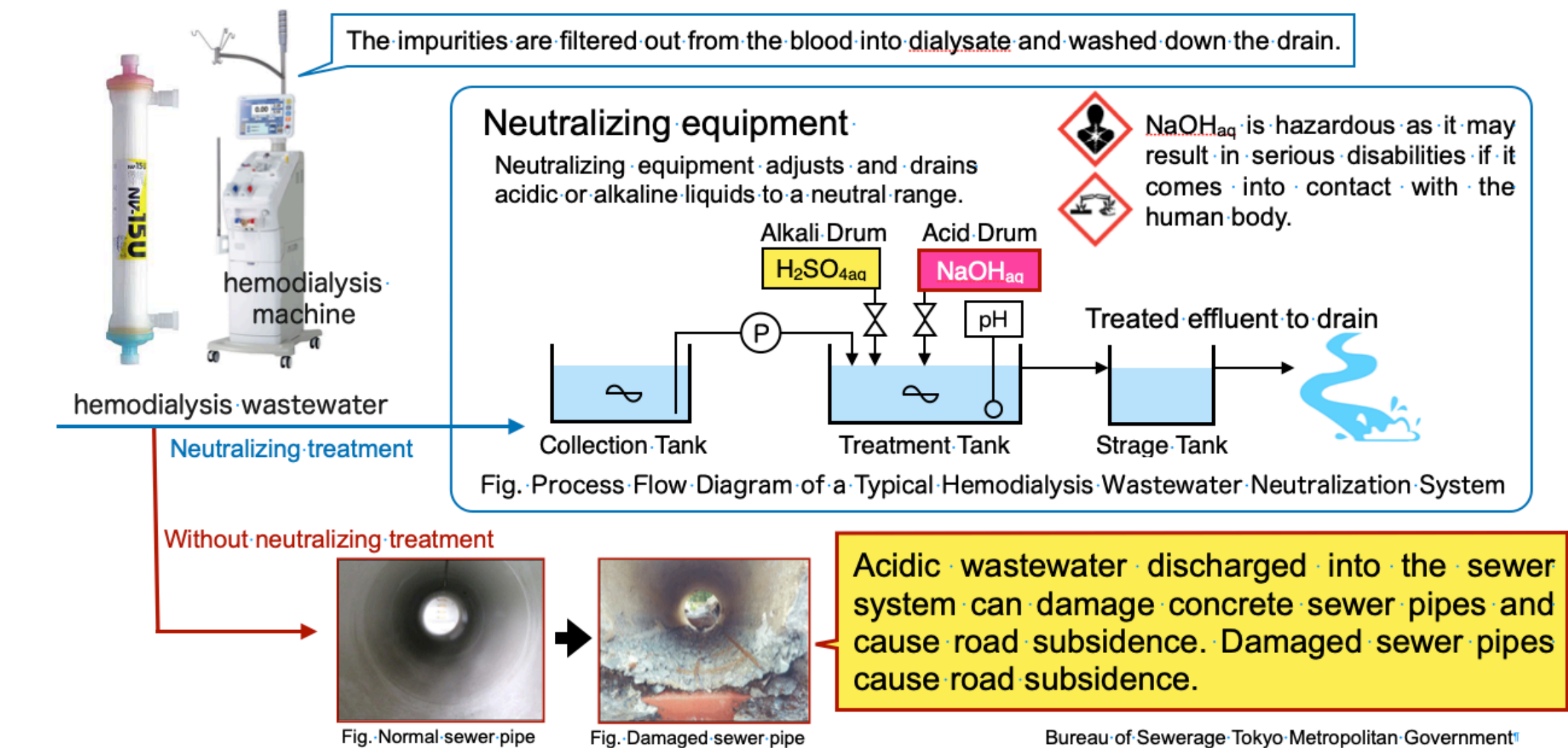


Fig. [H⁺] at which 1g of carbonized coffee grounds absorb

<Hemodialysis therapy>



CONCLUSIONS & PERSPECTIVES

- ▶ This study showed that carbonized coffee grounds neutralized acidic HD wastewater.
- ▶ To neutralize 100 L of approximately 1% acetic acid solution (pH 3) to pH 5.8-8.6, 100 times the volume of water or 10,000 L of diluted solution is required.
- ▶ **The neutralizing effect of carbonized coffee grounds on acidic HD wastewater is expected to reduce the use of aqueous NaOH and water and improve the aquatic environment.**