

The Hong Kong Polytechnic University
Department of Civil and Environmental Engineering
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Laboratory Worksheet C14 : **Breakpoint Chlorination.**

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Objective : To determine the breakpoint of chlorine dosage of a water sample.

Introduction

Disinfection of portable water one of the most important process in water treatment. A successful disinfection process will break the waterborne disease transmission cycle and protect the health of the public. Treated sewage is sometimes disinfected, depending on the beneficial use of the receiving waters. If the treated effluent is to be reused, disinfection is usually required.

Chlorine is the most common disinfectant used in water and wastewater treatment. The success of a chlorination process usually depends on the levels of free and combined chlorine residuals of the treated water. Many impurities in water will react with chlorine and thus exert a chlorine demand of the process. Chlorine residuals are often measured in operation of treatment processes while chlorine demand test should be performed to obtain data for process design and analysis.

Apparatus and Materials

- Apparatus for chlorine residual determination
- Pipette and pipette filler
- pH meter
- 150 mL Erlenmeyer flask
- Stop watch
- Light proof incubator
- Standard Chlorine Solution

Procedure

1. Measure the pH and temperature of the original sample.
2. Measure 100 mL sample into each 150 mL Erlenmeyer flasks.
3. Add 2mL, 3mL, 5mL, 6mL, 8mL, 10ml, 12mL,..., etc. of standard chlorine solution to each 100 mL samples in the Erlenmeyer flasks (Allow a time lag of not less than 3 minutes between each dosage).
4. With distilled water, make up each flask to the final volume of 120 mL.
5. Mix the sample well and allow them to stand in the dark for 20 minutes to allow reactions to take place.
6. When time is up, determine chlorine residual in the mixture immediately.

Calculations

Plot the chlorination breakpoint curve and hence determine the chlorine demand of the sample.

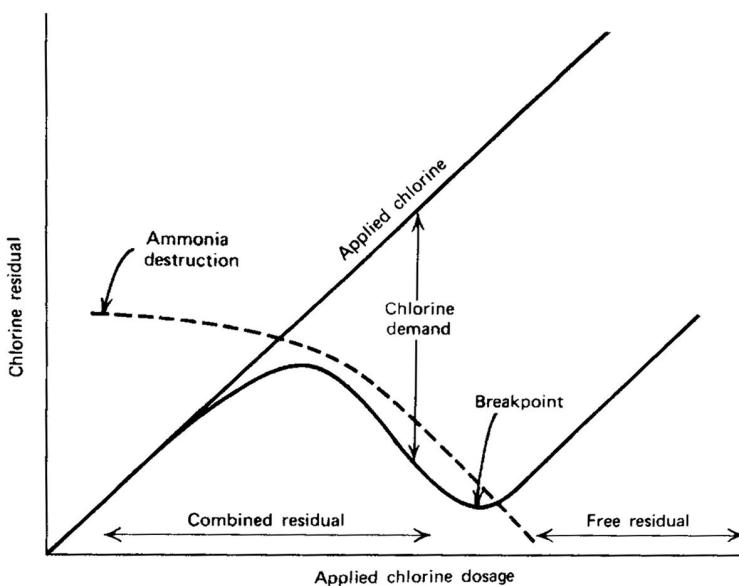


Fig. 1 General chlorination breakpoint curve.

Questions

1. Environmental engineers are now switching away from using chlorine as disinfectant. What are the major considerations of such a trend ?
2. Besides chlorine, what can be used as disinfectants in water treatment and compare their pros and cons ?