

DISINFECTION

Introduction

It is essential that drinking water is free of pathogenic organisms. Storage, sedimentation, coagulation, flocculation and filtration of water, both individually and jointly, reduce the number of bacteria in the water to a certain extent. However, disinfection is needed for the complete removal of germs. It is possible to disinfect water with a low turbidity by direct exposure to sunlight for at least 60 minutes around midday. Occasional vigorous agitation will increase the effect of the sunlight.

Chlorination

Chlorination is the most widely used method of disinfection. It is both effective and economical, but must be administered constantly and safely.

Chlorine is available in various forms, but all are corrosive and need careful handling. Chlorine gas is available in cylinders and drums and requires specialist equipment to enable the gas to be injected into a water flow. In powder form, chlorine is available as sodium hypochlorite (bleaching powder) or HTH powder. A solution can be prepared from these powders and injected into the water flow at a rate proportional to the flow.

The amount of chlorine required at any given time varies according to the flow, the impurities in the water, the temperature and the pH value of the water. A contact time with the water of about 20 minutes is necessary to achieve complete reaction. Since almost all water contains some ammonia, the initial reaction of the chlorine is with the ammonia to form chloramines, which are further oxidised by more chlorine to give a free chlorine residual. This is commonly called "breakpoint chlorination".

The actual dose of chlorine needed could vary from 0.3 milligrams per litre for an underground water to 4 mg/l for a turbid river water, when a chlorine residual of 0.5 mg/l would be expected after 20 minutes contact.

The chlorine residual, or the amount of chlorine left in the water after complete sterilization, can be measured as either the free chlorine or combined chlorine. Colour comparator equipment with the necessary tablets is required for this test.

REFERENCES

- 1 Edited by Shaw R (1999) *Water Lines*, Vol 14, No 2, Technical Brief No 46 and published in *Running Water*, IT Publications
- 2 Davis J and Lambert R (1995) *Engineering in Emergencies*, IT Publications