

Fig.1 Photocatalytic antibacterial action against *S.mutans* in bacterial suspension with sodium chloride.

Concentration of sodium chloride/
mol · dm⁻³

● : 0.03, ▲ : 0.05, ◆ : 0.1, ○ : 0.2,
△ : 0.3.

antibacterial action can be accelerated by halide ions in bacterial suspension. As is shown in Fig.1, the inhibitory effect on the viability of *S.mutans* was observed when bacterial suspension containing TiO₂ was irradiated with near-UV light.

In the figure the time required for photocatalytic antibacterial effect became markedly short with increasing concentration of sodium chloride in bacterial suspension.

In either control experiment without light or powdered TiO₂, no inhibitory effect was observed on the viability of *S.mutans*. As is shown in Fig.2, the accelerative effect of chloride ion on photocatalytic antibacterial action was not influenced by counter ions, such as Na⁺, K⁺, Ca⁺⁺ or Mg⁺⁺, paired with chloride anion. Conversely in Fig.3, the

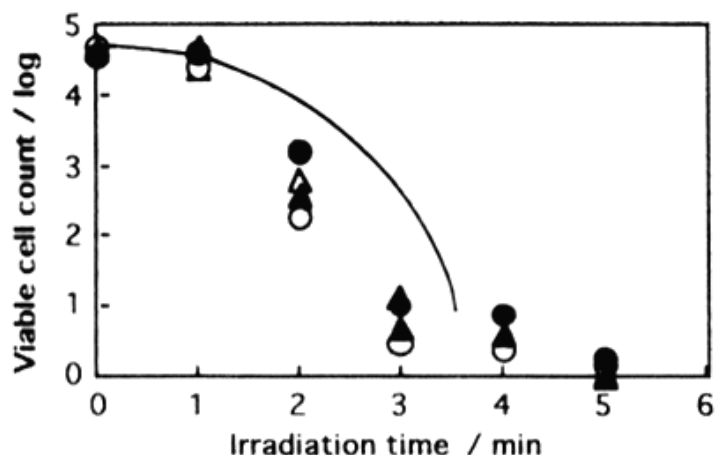


Fig.2 The influence of counter ions on photocatalytic antibacterial action of chloride.

● : 0.1 mol · dm⁻³ NaCl,
▲ : 0.1 mol · dm⁻³ KCl,
○ : 0.05 mol · dm⁻³ MgCl₂,
△ : 0.05 mol · dm⁻³ CaCl₂.

as effective as chloride ion. Those halide ions which accelerated the photocatalytic antibacterial action can be oxidized more easily than water according to their electrochemical oxidation potentials.

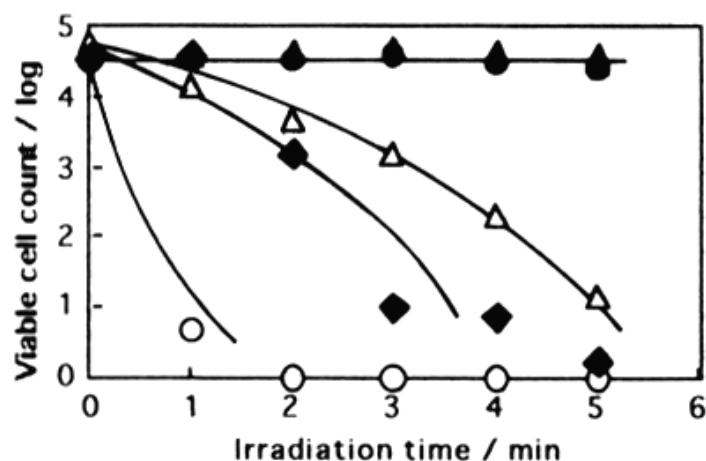


Fig.3 The effect of halide ions on photocatalytic antibacterial action.

dependency of the accelerative effect on the kind of halide ion derived the following features; (1) fluoride ion alone has no accelerative effect, (2) bromide ion is the most effective to the accelerative effect, (3) iodide ion is

- : distilled water,
- ▲: $0.1 \text{ mol} \cdot \text{dm}^{-3}$ NaF.
- ◆: $0.1 \text{ mol} \cdot \text{dm}^{-3}$ NaCl,
- : $0.1 \text{ mol} \cdot \text{dm}^{-3}$ NaBr,
- △: $0.1 \text{ mol} \cdot \text{dm}^{-3}$ NaI.