

Antimicrobial activity of butyl p-hydroxybenzoate in relation to its solubilization behaviors by nonionic surfactants

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SYNOPSIS

The influence of various nonionic surfactants and other materials on the antimicrobial activity of butyl p-hydroxybenzoate (BP) and its solubilization behaviors in cosmetic formulations was investigated by means of the equilibrium dialysis technique.

The result proved that the antimicrobial activity of BP in combination with various nonionic surfactants differed according to the type of microorganisms. The concentration of free BP, which was not solubilized within surfactant micelles, contributed to its antimicrobial activity against *Can. albicans*, while the total concentration of BP added to the system contributed to its activity against *Ps. aeruginosa*.

The solubilization of BP conformed to the Langmuir's adsorption equation in all of the

surfactants used.

The combined parameter k_1k_2 corresponding to the distribution coefficient obtained from the reciprocal Langmuir's plots related to the solubilization behavior of BP; the more hydrophobic the surfactant used, the larger k_1k_2 value, hence the more solubilized BP was obtained.

When various materials were added to the above system, they were classified into the following four groups according to their influences on the cloud point, BP concentration (C_w) in the intermicellar aqueous phase, and its antimicrobial activity against *Can. albicans*.

- I. A group having "the salting-in effect by urea, etc."
- II. A group having "the inactivation of BP by PEG".