Synergistic Effect between Hinokitiol and Surfactants (or Terpene Alcohols) Against Some Bacteria

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Abstract: Synergistic effect between hinokitiol and each of three surfactants (or terpene alcohols) used frequently in food, cosmetic and environmental field was performed by the evaluation method with microplate. *Staphylococcus aureus* NBRC13276, *Escherichia coli* NBRC3972, *Pseudomonas aeruginosa* NBRC13275 and *Bacillus subtilis* NBRC3134 were used as the test bacteria. Hinokitiol, three kinds of polyoxyethylene lauryl ether (blaunon EL-1502.2, blaunon EL-1503P and blaunon EL-1509P) and three kinds of terpene alcohol compounds such as α -terpinene, γ -terpinene and geraniol, were used as the test compounds, respectively. Hinokitiol possessed the inhibitory effect against the test bacteria. Hinokitiol in combination with polyoxyethylene lauryl ether or terpene alcohol was also indicated the inhibitory effect against the test bacteria. Especially, hinokitiol in combination with 2000 $\mu\text{g/mL}$ of blaunon EL-1509P possessed the synergistic effect. MIC value against the test strains became 15.6 $\mu\text{g/mL}$. Two range reduction of MIC value (from 62.5 $\mu\text{g/mL}$ to 15.6 $\mu\text{g/mL}$) was successful. Hinokitiol in combination with 500 $\mu\text{g/mL}$ of blaunon EL-1509P also possessed the synergistic effect. MIC value against the test strains except for *P. aeruginosa* was also 15.6 $\mu\text{g/mL}$. In our test results we found the synergistic effect between hinokitiol and the test surfactant. Combination between hinokitiol of natural compound and surfactant (or terpene alcohol) would be suitable for the control of the bacteria, and would contribute to apply the several field such as food, cosmetic and environmental field etc..

Key words: Synergistic effect, hinokitiol, surfactants, terpene alcohols, bacteria.