

## Changes of Zeta Potentials and Pigment Adsorption of Bacteria by Monascus Pigment Derivatives

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### Abstract

Monascus pigment derivatives by amino acid were synthesized from the fermentation of *Monascus*. The antimicrobial activities of the derivatives were observed by our previous study. Pigment adsorption ratios and zeta potentials of bacterial cells<sup>1)</sup> were analyzed under various conditions of pigment concentration, pH, ionic strength, etc. High net negative charges of bacteria were observed regardless of Gram+ or Gram-. The antimicrobial activity and adsorption ratio of L-Phe derivative showed that they depend on the zeta potential of bacteria. Low MICs and high adsorption ratios of the derivatives were observed against bacteria with high zeta potentials. Two high antimicrobial active derivatives(L-Tyr, L-Phe) and low active derivatives(L-Glu, L-Asn) were tested for a strain of *E. coli*. First two L-Tyr and L-Phe derivatives showed higher maximum adsorption ratios than L-Glu and L-Asn derivatives. The addition of the pigments and an increasing concentration of the pigments increased the zeta potential of *E. coli* cells. When L-Phe derivative was added to the cells the zeta potential of *E. coli* cells increased at the pH range of 3~9, and decreased with increasing pH. The pattern of pigment adsorption ratios was similar to that of zeta potentials. The zeta potential of *E. coli* cells did not depend on the ionic strength. However, in addition of L-Phe derivative, it reached to charge neutralization point under ionic strengths less than or equal to 0.1. The pattern of pigment adsorption ratios at different ionic strengths was also similar to that of zeta potentials.

### Reference

1. W. William Wilson, Mary Margaret Wade, Steven C. Holman and Franklin R. Champlin, Status of methods for assessing bacterial cell surface charge properties based on zeta potential measurements(2001), *Journal of Microbiological Methods*, Vol 43(3), page 153-164.