

## Studies of Collagen Binding with Immobilized *Salmonella enteritidis* and Inhibition with Synthetic and Naturally Occurring Food Additives by a Surface Plasmon Resonance Biosensor

Takahisa Miyamoto\*, Yuri Shimizu, Hiroshi Kobayashi,  
Ken-ichi Honjoh and Masayoshi Iio

Laboratory of Food Hygienic Chemistry, Division of Food Biotechnology,  
Department of Bioscience and Biotechnology, Faculty of Agriculture, Kyushu University  
6-10-1, Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan

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The binding interaction of *Salmonella enteritidis* with collagen was investigated using the surface plasmon (SPR) biosensor. Collagen I bound to *S. enteritidis* immobilized on the sensor surface. The mixture of collagen I and laminin generated a synergistic response in the binding interaction with *S. enteritidis*. *Escherichia coli* IFO 3301, pathogenic *E. coli* O157:H7, *S. aureus* IFO 3060 and 14 strains of *Salmonella* were immobilized on the gold surface of the sensor chip with different generated refractive index (RI) units. The treatment of *S. enteritidis* on the sensor surface with hexametaphosphate, citrate, mannose and alginate showed no inhibitory effect on the subsequent binding interaction of collagen I with *S. enteritidis*. On the other hand, the pretreatment of *S. enteritidis* with monoglycerol monocaprylate, monocaprinate, monolaurate and monomyristate did not show significant effects on the binding interaction of collagen with *S. enteritidis*; however, the RI unit was largely decreased by the subsequent treatment with the same monoglycerol esters. After treatment of *S. enteritidis* immobilized on the sensor with natural colors such as San-red MR, San-red YM, San-yellow No.3L, Purple corn extract, Annatto AN and Curcumin “San-Ei,” the collagen I binding with bacterial cells was strongly inhibited. When the mixture of additive and collagen was injected, the RI value was lower in the presence of hexametaphosphate, citrate, mannose, alginate, monoglycerol fatty acid esters, diglycerol monomyristate, Japanese horseradish extract, chili extract, peach extract, concentrated tomato juice, San-red MR, San-red YM, San-yellow No. 3L, and Annatto AN than that of the control.

\*Corresponding author, e-mail address: tmiyamot@agr.kyushu-u.ac.jp