

한국된장에서 분리한 *Bacillus subtilis* BC1212가 생성하는 Surfactin의 항마이코플라즈마 및 항염증 활성

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Anti-mycoplasmal and anti-inflammatory activity of surfactins produced by *Bacillus*

subtilis BC2121 isolated from Korean soybean paste

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Objective

We investigated anti-mycoplasmal and anti-inflammatory activities of surfactins produced by *Bacillus subtilis* BC1212.

Materials and Method

Mycoplasmas were cultured in modified FF medium and RAW264.7 cell were incubated with DMEM medium at 37°C in 5 % CO₂. Antimycoplasmal activity were determined by MIC, FIC index, and time kill method. Antiinflammatory activity were investigated using RT-PCR and ELISA.

Results and Discussion

The FIC indexes for surfactins in combination with norfloxacin, oxytetracycline, streptomycin, and tiamulin against *M. hyopneumoniae* were 1.031, 1.031, 1.031, and 1.072, respectively. RAW264.7 cells infected *M. hyopneumoniae* were demonstrated significantly increased mRNA expression of COX-2(95%), IL-1 β (83%), IL-6(47%), and iNOS(55%). And the protein levels in supernatant were increased IL-1 β (59.94 pg/ml), IL-6(485.53 pg/ml), TNF- α (1023.60 pg/ml) and NO(10.61 μ M) compare with control with IL-1 β (23.54 pg/ml), IL-6(not detected), TNF- α (28.81 pg/ml) and NO(3.68 μ M). Expression of COX-2(54%), IL-1 β (25%) and IL-6(13%), and iNOS(22%) were inhibited at 50 μ g/ml of surfactins compare with control cells treated only mycoplasma(100 μ g/ml); COX-2(95%), IL-1 β (83%) and IL-6(47%), and iNOS(55%). The effects of surfactins on production of cytokine, however, were different from expression of those of mRNA. Although production of IL-6(from 460.92 to 423.77 pg/ml) and NO(from 11.62 to 5.58 μ M) were decreased very slightly compared with those of control, IL-1 β (from 15.84 to 19.34 pg/ml) and TNF- α (from 585.07 to 589.32 pg/ml) was increased.

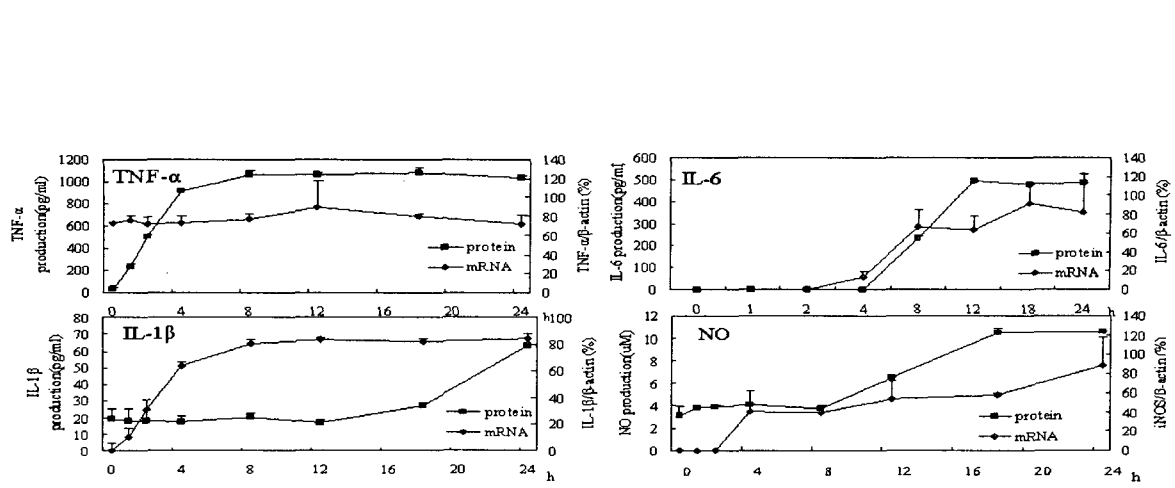


Figure 1. The effect of *M. hyopneumoniae* on the transcription and production of inflammatory cytokines in supernatant of RAW264.7 cells .

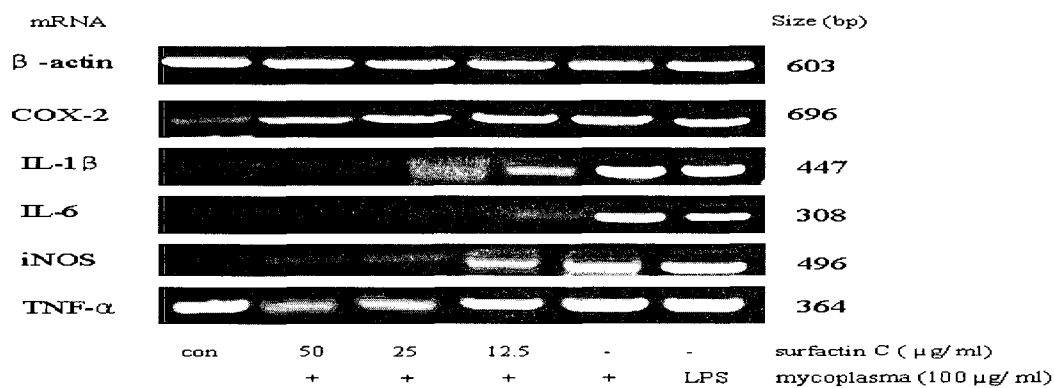


Figure 2. The effect of surfactins on *M. hyopneumoniae*-induced cytokine expression in RAW264.7 cells. RAW264.7 were treated with mycoplasma (100 μ g/ml) and with various concentrations of surfactins (12.5, 25, 50 μ g/ml).

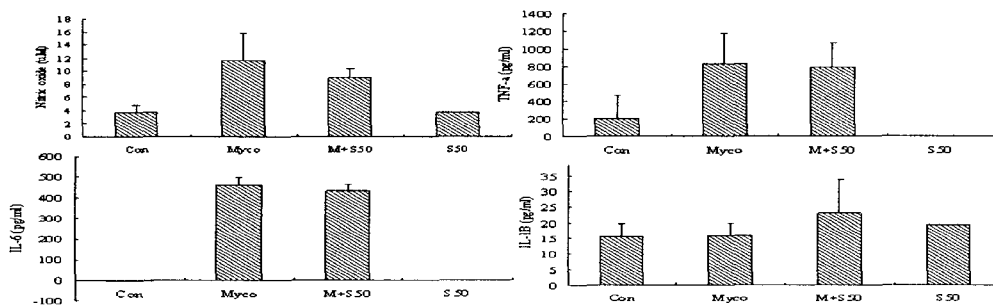


Figure 3. The effect of surfactins on *M. hyopneumoniae*-induced production of cytokines in RAW264.7 cells.