

〈一般論文〉

Birch Tar Oil の抗菌活性

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Antibacterial Activity of Birch Tar Oil

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Abstract

Birch tar oil (BT), a natural fragrance ingredient obtained from wood and bark of *Betula lenta* L., is a sticky brown material consisting mainly of phenolic compounds as volatile components. Antimicrobial activities of BT against bacteria and fungi have been reported by author's group, however, the antimicrobial mechanism has not been known. In the present study, the mode of antibacterial effect of BT was investigated in comparison with that of cinnamic aldehyde (CA) against 6 bacterial strains; *Bacillus subtilis*, *Staphylococcus aureus* (MSSA and MRSA), *Escherichia coli*, *Pseudomonas aeruginosa* and *Burkholderia cepacia*. BT and CA exhibited high bactericidal activities against *E. coli* and *B. cepacia* at the concentration of $2 \times \text{MIC}$; colony forming unit (CFU) was not detectable at 1-6 h after addition of BT and CA. CA also exhibited a high bactericidal activity against *P. aeruginosa* whilst BT exhibited bacteriostatic activity against the same strain. The growth of *S. aureus* was strongly inhibited by BT; CFU was not detectable at 6 h (MSSA) and 12 h (MRSA) after addition of BT, however, after 24 h incubation, the CFU was again detectable. Leakage of intracellular material(s) was examined by estimation of absorbance at 260 nm for incubation filtrates before and after co-incubation of bacterial cells with CA or BT. When the bacterial cells of above 6 strains were co-incubated with BT, no significant increase of the absorbance was observed for any strains. In contrast, in the case of CA, marked increases of the absorbance were observed for 4 [*B. subtilis*, *S. aureus* (MSSA and MRSA) and *B. cepacia*] out of 6 strains. Thus, it was suggested that BT has a potent antibacterial activity against Gram-positive and -negative bacteria, but its antibacterial mode may be different from that of CA.

Key words: birch tar oil, antibacterial activities, bactericidal activity, bacteriostatic activity, *Betula lenta*.