

Antimicrobial Activity of Igusa and the Application to Foam Materials for Food Industry

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Abstract : Objectives: Japanese uses TATAMI rather than flooring at home. Igusa (*Juncus effuses* var. *decipiens*), which is commonly known in the forms of TATAMI. *Juncus* spp. grow at a relatively high humidity area (Japan, China and Southeast Asia). Yatsushiro region in the southern part of Kumamoto prefecture is major producing area of Igusa. Igusa found to have honeycomb structure and was also shown to have the ability to control humidity. And Igusa has been used as a medicinal herb for diuretic and antiphlogistic agent. In previous study, we investigated antimicrobial effects of Igusa, and showed high antimicrobial activity against food poisoning bacteria. Therefore, the food trays blended Igusa can be kept clean by antimicrobial activity of Igusa. We focus on 'Igusa foam materials'. In this study, we investigated the antibacterial and antifungal activity of Igusa, and new application to foam materials for food industry. Materials and method: We used Igusa foam materials (3 × 3 × 3 cm) as a sample. We set about fifteen types of samples combined with a commercial antibacterial agent A, a commercial antibacterial agent B, potassium laurate (C12K) and a commercial antifungal agent C, a commercial antifungal agent D and a commercial antifungal agent E. We selected four bacteria strains (*Escherichia coli* NBRC 3972, *Staphylococcus aureus* NBRC 12732, *Salmonella typhimurium* NBRC 13245, *Bacillus subtilis* NBRC 3335) and three fungus strains (*Penicillium pinophilum* NBRC 6345, *Cladosporium cladosporioides* NBRC 30314, *Aspergillus oryzae* NBRC 5238). The fungus was cultured at 30 °C on Igusa foam materials after inoculation of the fungus for fourteen days. The bacteria was cultured at 30 °C on Igusa foam materials after inoculation of the bacteria for three days. And the Igusa foam materials were washed with 10 mL normal saline after three days. The normal saline washed Igusa foam materials plated the NA medium. After, It was cultured at 30 °C and used colony counting method. Result and Conclusion: The fifteen types of sample of Igusa foam materials had antifungal activity against *C. cladosporioides*, *A. oryzae* and *P. pinophilum* for fourteen days. The four types of sample contained potassium laurate and antibacterial agent A, sample contained antibacterial agent B and antifungal agent D, sample contained A and antifungal agent E, sample contained B and E had antibacterial activity against *B. subtilis*. The three types of sample contained potassium laurate and A, sample contained B and D, sample contained A and E had antibacterial activity against *S. typhimurium*. The five types of sample contained potassium laurate and A, sample contained B and D, sample contained A and E, sample contained B and E, sample contained B and antifungal agent C had antibacterial activity against *E. coli* and *S. aureus*. These results indicate that Igusa of Igusa foam materials had high antifungal activity. In addition, Igusa foam materials combined with a commercial antibacterial agent had antibacterial activity. In the future, we consider that use of Igusa foam materials may be spread from food industry.

Keywords : antibacterial, antifungal, foam materials, Igusa

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