

Antimicrobial Activity of Fatty Acid Salts against Microbes for Food Safety

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Abstract : Objectives— Fungi and bacteria are present in a wide range of natural environments. They are bred in the foods such as vegetables and fruit, causing corruption and deterioration of these foods in some cases. Furthermore, some species of fungi and bacteria are known to cause food intoxication or allergic reactions in some individuals. To prevent fungal and bacterial contamination, various fungicides and bactericidal have been developed that inhibit fungal and bacterial growth. Fungicides and bactericides must show high antifungal and antibacterial activity, sustainable activity, and a high degree of safety. Therefore, we focused on the fatty acid salt which is the main component of soap. We focused on especially C10K and C12K. This study aimed to find the effectiveness of the fatty acid salt as antimicrobial agents for food safety. Materials and Methods— *Cladosporium cladosporioides* NBRC 30314, *Penicillium pinophilum* NBRC 6345, *Aspergillus oryzae* (Akita Konno store), *Rhizopus oryzae* NBRC 4716, *Fusarium oxysporum* NBRC 31631, *Escherichia coli* NBRC 3972, *Bacillus subtilis* NBRC 3335, *Staphylococcus aureus* NBRC 12732, *Pseudomonas aenuginosa* NBRC 13275 and *Serratia marcescens* NBRC 102204 were chosen as tested fungi and bacteria. *Hartmannella vermiformis* NBRC 50599 and *Acanthamoeba castellanii* NBRC 30010 were chosen as tested amoeba. Nine fatty acid salts including potassium caprate (C10K) and laurate (C12K) at 350 mM and pH 10.5 were used as antifungal activity. The spore suspension of each fungus (3.0×10^4 spores/mL) or the bacterial suspension (3.0×10^5 or 3.0×10^6 or 3.0×10^7 CFU/mL) was mixed with each of the fatty acid salts (final concentration of 175 mM). Samples were counted at 0, 10, 60, and 180 min by plating (100 μ L) on potato dextrose agar or nutrient agar. Fungal and bacterial colonies were counted after incubation for 1 or 2 days at 30 °C. Results— C10K was antifungal activity of 4 log-unit incubated time for 10 min against fungi other than *A. oryzae*. C12K was antifungal activity of 4 log-unit incubated time for 10 min against fungi other than *P. pinophilum* and *A. oryzae*. C10K and C12K did not show high anti-yeast activity. C10K was antibacterial activity of 6 or 7 log-unit incubated time for 10 min against bacteria other than *B. subtilis*. C12K was antibacterial activity of 5 to 7 log-unit incubated time for 10 min against bacteria other than *S. marcescens*. C12K was anti-amoeba activity of 4 log-unit incubated time for 10 min against *H. vermiformis*. These results suggest C10K and C12K have potential in the field of food safety.

Keywords : food safety, microbes, antimicrobial, fatty acid salts

Conference Title : ICFMS 2016 : International Conference on Food Manufacturing and Safety

Conference Location : Kyoto, Japan

Conference Dates : November 10-11, 2016