

## **Inhibitory Action of Fatty Acid Salts against *Cladosporium cladosporioides* and *Dermatophagoides farinae***

**Authors :** Yui Okuno, Mariko Era, Takayoshi Kawahara, Takahide Kanyama, Hiroshi Morita

**Abstract :** Introduction: Fungus and mite are known as allergens that cause an allergic disease for example asthma bronchiale and allergic rhinitis. *Cladosporium cladosporioides* is one of the most often detected fungi in the indoor environment and causes pollution and deterioration. *Dermatophagoides farinae* is major mite allergens indoors. Therefore, the creation of antifungal agents with high safety and the antifungal effect is required. Fatty acid salts are known that have antibacterial activities. This report describes the effects of fatty acid salts against *Cladosporium cladosporioides* NBRC 30314 and *Dermatophagoides farinae*. Methods: Potassium salts of 9 fatty acids (C4:0, C6:0, C8:0, C10:0, C12:0, C14:0, C18:1, C18:2, C18:3) were prepared by mixing the fatty acid with the appropriate amount of KOH solution to a concentration of 175 mM and pH 10.5. The antifungal method, the spore suspension ( $3.0 \times 10^4$  spores/mL) was mixed with a sample of fatty acid potassium (final concentration of 175 mM). Samples were counted at 0, 10, 60, 180 min by plating (100  $\mu$ L) on PDA. Fungal colonies were counted after incubation for 3 days at 30 °C. The MIC (minimum inhibitory concentration) against the fungi was determined by the two-fold dilution method. Each fatty acid salts were inoculated separately with 400  $\mu$ L of *C. cladosporioides* at  $3.0 \times 10^4$  spores/mL. The mixtures were incubated at the respective temperature for each organism for 10 min. The tubes were then contacted with the fungi incubated at 30 °C for 7 days and examined for growth of spores on PDA. The acaricidal method, twenty *D. farinae* adult females were used and each adult was covered completely with 2  $\mu$ L fatty acid potassium for 1 min. The adults were then dried with filter paper. The filter paper was folded and fixed by two clips and kept at 25 °C and 64 % RH. Mortalities were determined 48 h after treatment under the microscope. *D. farinae* was considered to be dead if appendages did not move when prodded with a pin. Results and Conclusions: The results show that C8K, C10K, C12K, C14K was effective to decrease survival rate (4 log unit) of the fatty acids potassium incubated time for 10 min against *C. cladosporioides*. C18:3K was effective to decrease 4 log unit of the fatty acids potassium incubated time for 60 min. Especially, C12K was the highest antifungal activity and the MIC of C12K was 0.7 mM. On the other hand, the fatty acids potassium showed no acaricidal effects against *D. farinae*. The activity of *D. farinae* was not adversely affected after 48 hours. These results indicate that C12K has high antifungal activity against *C. cladosporioides* and suggest the fatty acid potassium will be used as an antifungal agent.

**Keywords :** fatty acid salts, antifungal effects, acaricidal effects, *Cladosporium cladosporioides*, *Dermatophagoides farinae*

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