

Anti-Acanthamoeba Activities of Fatty Acid Salts and Fatty Acids

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Abstract : Objectives: Fatty acid salts are a type of anionic surfactant and are produced from fatty acids and alkali. Moreover, fatty acid salts are known to have potent antibacterial activities. Acanthamoeba is ubiquitously distributed in the environment including sea water, fresh water, soil and even from the air. Although generally free-living, Acanthamoeba can be an opportunistic pathogen, which could cause a potentially blinding corneal infection known as Acanthamoeba keratitis. So, in this study, we evaluated the anti-amoeba activity of fatty acid salts and fatty acids to Acanthamoeba castellanii ATCC 30010. Materials and Methods: The antibacterial activity of 9 fatty acid salts (potassium butyrate (C4K), caproate (C6K), caprylate (C8K), caprate (C10K), laurate (C12K), myristate (C14K), oleate (C18:1K), linoleate (C18:2K), linolenate (C18:3K)) tested on cells of Acanthamoeba castellanii ATCC 30010. Fatty acid salts (concentration of 175 mM and pH 10.5) were prepared by mixing the fatty acid with the appropriate amount of KOH. The amoeba suspension mixed with KOH with a pH adjusted solution was used as the control. Fatty acids (concentration of 175 mM) were prepared by mixing the fatty acid with Tween 80 (20 %). The amoeba suspension mixed with Tween 80 (20 %) was used as the control. The anti-amoeba method, the amoeba suspension (3.0×10^4 cells/ml trophozoites) was mixed with the sample of fatty acid potassium (final concentration of 175 mM). Samples were incubated at 30°C, for 10 min, 60 min, and 180 min and then the viability of A. castellanii was evaluated using plankton counting chamber and trypan blue stainings. The minimum inhibitory concentration (MIC) against Acanthamoeba was determined using the two-fold dilution method. The MIC was defined as the minimal anti-amoeba concentration that inhibited visible amoeba growth following incubation (180 min). Results: C8K, C10K, and C12K were the anti-amoeba effect of 4 log-unit (99.99 % growth suppression of A. castellanii) incubated time for 180 min against A. castellanii at 175mM. After the amoeba, the suspension was mixed with C10K or C12K, destroying the cell membrane had been observed. Whereas, the pH adjusted control solution did not exhibit any effect even after 180 min of incubation with A. castellanii. Moreover, C6, C8, and C18:3 were the anti-amoeba effect of 4 log-unit incubated time for 60 min. C4 and C18:2 exhibited a 4-log reduction after 180 min incubation. Furthermore, the minimum inhibitory concentration (MIC) was determined. The MIC of C10K, C12K and C4 were 2.7 mM. These results indicate that C10K, C12K and C4 have high anti-amoeba activity against A. castellanii and suggest C10K, C12K and C4 have great potential for anti-amoeba agents.

Keywords : Fatty acid salts, anti-amoeba activities, Acanthamoeba, fatty acids

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