

Effect of a Muscarinic Antagonist Drug on Extracellular Lipase Activity of *Pseudomonas aeruginosa*

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Abstract : *Pseudomonas aeruginosa* is a Gram-negative, rod shape and aerobic bacterium that has shown to be resistance to many antibiotics. This resistance makes the bacterium very harmful in some diseases. It can also generate diseases in any part of the gastrointestinal tract from oropharynx to rectum. *P. aeruginosa* has become an important cause of infection, especially in patients with compromised host defense mechanisms. One of the most important reasons that make *P. aeruginosa* an emerging opportunistic pathogen in patients is its ability to use various compounds as carbon sources. Lipase is an enzyme that catalyzes the hydrolysis of lipids. Most lipases act at a specific position on the glycerol backbone of lipid substrate. Some lipases are expressed and secreted by pathogenic organisms during the infection. Muscarinic antagonist used as an antispasmodic and in urinary incontinence. The drug has little effect on glandular secretion or the cardiovascular system. It does have some local anesthetic properties and is used in gastrointestinal, biliary, and urinary tract spasms. Aim: In this study the inhibitory effect of a muscarinic antagonist on lipase of *P. aeruginosa* was investigated. Methods: *P. aeruginosa* was cultured in minimal salt medium with 1% olive oil as carbon source. The cells were harvested and the supernatant, which contained lipase, was used for enzyme assay. Results: Our results showed that the drug can inhibit *P. aeruginosa* lipase by competitive manner. In the presence of different concentrations of the drug, the V_{max} (2 mmol/min/mg protein) of enzyme did not change, while the K_m raised by increasing the drug concentration. The K_i (inhibition constant) and IC_{50} (the half maximal inhibitory concentration) value of drug was estimated to be about 30 μM and 60 μM which determined that the drug binds to enzyme with high affinity. Maximum activity of the enzyme was observed at pH 8 in the absence and presence of muscarinic antagonist, respectively. The maximum activity of lipase was observed at 60°C and the enzyme became inactive at 90°C. Conclusion: The muscarinic antagonist drug could inhibit lipase of *P. aeruginosa* and changed the kinetic parameters of the enzyme. The drug binded to enzyme with high affinity and did not change the optimum pH of the enzyme. Temperature did not affect the binding of drug to muscarinic antagonist.

Keywords : *Pseudomonas aeruginosa*, drug, enzyme, inhibition