Investigation of cytotoxicity effect of Curcumin-Encapsulated nanomicelle (OA400) on ciprofluxacin resistant strains of Pseudomonas aeroginosa and evaluation of mexX and oprM genes expression pattern

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Background and purpose: Curcumin, a polyphenolic compound turmeric (Curcuma longa) is a pharmacologically safe agent that has antibacterial activities. Pseudomonas aeruginosa as a major cause of nosocomial infection has obtained multidrug resistance. Antimicrobial resistance is an increasing threat in hospitals. In this study, the effect of micellar nanoparticles encapsulated Curcumin and ciprofloxacin on mexX and oprM genes expression was evaluated in ciprofloxacin resistant isolates of P. aeruginosa. Materials and methods: In this study, P. aeruginosa strains were obtained hospitals and laboratories in Guilan province. After disc difusion and MIC tests, four ciprofloxacin resistant strains of P. aeruginosa were treated by ciprofloxacin (1/2MIC) only (control sample) and in the combination with curcumin encapsulated in micellar nanoparticles (test sample). After 24h, two cell groups were cultured in Mueller Hinton agar to estimate cell death percentage. Also, RNA was extracted treated cells after 24h. After cDNA synthesis, the expression of mexX and oprM genes was evaluated quantitatively by Real-time PCR method in curcumin treated and un-treated cells. Results: Our results showed that a combined ciprofloxacin (1/2MIC) and curcumin-encapsulated in micellar nanoparticles treatment reduced the bacterial growth up to 50% after 24h. Epression of mexX and oprM genes in curcumin and ciprofloxacin treated cells was downregulated compared to the treated cells with ciprofloxacin alone. Conclusion: Our findings suggest that curcumin could inhibit bacterial growth through several ways such as decrease of mexXY-oprM efflux pump count in the cell surface. Also, it seems that curcumin synergically

increases antibacterial effects of ciprofloxacin in resistant isolates of P. aeruginosa.

Keywords : Keywords: Curcumin, efflux pump, mexX, oprM, micellar nanoparticles, Pseudomonas aeruginosa.