Assessment the effect of Fe3O4 nanoparticle functionalized by thiosemicarbazone on expression pattern of norB gene in Staphylococcus aureus bacterium isolated Rasht hospitals

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Introduction: Staphylococcus aureus is one of the most important nosocomial infectious agents that is resistant to many common antibiotics such as ciprofloxacin and methysilin. Hence, researchers have tried to use antimicrobial agents that do not resist bacteria or produce the least resistance. One of these antimicrobial agents is nanoparticles that are not resistant to bacteria due to their very small size and their surface-to-volume ratio. Magnetic nanoparticles, such as Fe3O4, can produce antibacterial effects better by affecting bacteria-inducing genes, thus preventing increased resistance to bacteria. Methods: In a few months, 87 clinical specimens were collected different hospitals in Rasht. At first, Staphylococcus aureus isolates were identified by differential methods and disc diffusion, MIC, SubMIS and disc diffusion methods were evaluated for their antibiotic susceptibility. Finally, the effect of Fe3O4-TSC nanoparticle with antibiotic ciprofloxaline on the expression of norB gene expression, the most resistant strains were studied. Results: The results of microbial isolation showed that 46% of the strains were resistant to ciprofloxacin. During treatment with Fe3O4-TSC nanoparticle with antibiotic ciprofloxacin on resistant strains, we observed the effect of nanoparticles and decrease the expression of genes norB was resistant to strains. Conclusions: in recent study showed that the Fe3O4-TSC nanoparticle has the potential to effect on NorB pump Staphylococcus aureus and reduce the resistance of this bacterium.

Keywords : Staphylococcus aureus, NorB gene, Efflux pump, Fe3O4-TSC nanoparticle.

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