

Original Paper

Antibacterial effect of Berberin and Curcumin complexes on *Escherichia coli* and *Bacillus pedillus* bacteria and comparison of their cytotoxicity on the cell line of bladder and stomach cancer cells

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Abstract

Background and Objective: Curcumin is a combination of active polyphenol from the Curcuma Langa plant, which has extensive biological activities including effects anti-inflammatory, anti-bacterial and cytotoxic markers for multiple cancer cells. Berberine is an alkaloid isokinolin that is present in berberine and suppresses the growth of many tumor cells. This study was designed to determine the antibacterial effect of berberine and indium curcumin and indium diastile curcumin complexes against *E-coli* and *Bacillus pumilus* and comparison of their cytotoxicity on the cell lines of the bladder and stomach cancer cells.

Methods: In this descriptive-analytic study, antimicrobial activity and cytotoxicity effect of berberine and indium curcumin and indium diastile curcumin complexes was investigated by MTT and dilution test method respectively. *E-coli* [BL21 (DE 3)], *Bacillus pumilus* (PTCC 1529), cell lines of bladder (5637) and stomach (AGS) were evaluated.

Results: The minimum inhibitory concentration (MIC) of berberin for *E-coli* was determined 5 mM. At 100 micromolar concentration of berberine approximately 100% of the bladder cancer cells have disappeared. Cytotoxic effect of curcumin complexes on two bladder and stomach cancer cell lines showed that both complexes have different inhibitory effects on cell line life. Cytotoxicity of 20µM indium curcumin and indium diastile curcumin complexes for bladder cancer cells were 58% and 55%, respectively, and for stomach cancer cells were 61% and 34 %, respectively. Antibacterial activity of complexes against *Bacillus pumilus* and *E-coli* showed that none of the complexes has antimicrobial effect against *Bacillus Pamilus*, but both complexes inhibited the growth of *E-coli* bacteria. The bacteria population in the presence of indium curcumin and indium diastile curcumin complexes was reduced to 40% and 24%, respectively.

Conclusion: This study indicated that indium complexes of curcumin and diacetyl curcumin have a potential for anticancer and antibacterial therapy. Furthermore, berberine as an alkaloid has anticancer and antibacterial activity.

Keywords: Curcumin, Berberine, Anticancer, Antibacterial, Cytotoxicity, *E-coli*, *Bacillus pumilus*

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