Formulation Design and Evaluation of Metronidazole Microspheres in a Bioadhesive Gel for Local Therapy of Vaginal Candidiasis

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**SUMMARY.** The purpose of this study was to design a novel vaginal delivery system composed of metronidazole microspheres dispersed within a bioadhesive gel. Microspheres were prepared by solvent evaporation method using Eudragit RS-100 and RL-100 polymers with different drug/polymer ratios. Microspheres were characterized by SEM, DSC, FT-IR and particle size analysis and evaluated for morphology, drug loading and **in vitro** drug release in simulated vaginal fluid. The % yield, actual drug loading and encapsulation were found to range between 79 ± 0.5 to 94 ± 0.6%, 19.6 ± 0.27 to 35.91 ± 0.66 %, 69.3 ± 0.78 to 81.2 ± 0.36 %, respectively. The FT-IR and DSC spectra revealed that there was no chemical interaction between drug and polymers used. SEM revealed that microspheres were spherical with nearly smooth surface morphology with a mean particle size ranging from 177 ± 0.4 to 456 ± 0.5 μm. The formulation F9 have shown better **in vitro** release 99 % at 10 h. To achieve bioadhesion to mucosal tissue, formulation F9 was incorporated in the bioadhesive gel made of carbopol 934P. Metronidazole microspheres gel (MTZ-MG) was characterized by **in vitro** drug release and antifungal activity. The drug release was controlled up to 12 h. Inhibition effect on the C. albicans j1012 growth, suggested their effectiveness in the treatment of vaginal candidiasis. It may be concluded from present study that MTZ-MG can be used as a novel delivery system for local therapy of vaginal candidiasis.

*KEY WORDS: Bioadhesive gel, Metronidazole microspheres, Vaginal candidiasis.*

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