

عنوان مقاله:

New antibacterial wound dressing designed with DOE

محل انتشار:

بیستمین کنگره بین المللی میکروب شناسی ایران (سال: 1398)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

Introduction and Objectives: As antibiotic resistance is rising, use of intrinsic antimicrobial polymer like chitosan is increasing. chitosan is biodegradable, wound healing material for delivery drugs as wound dressing. Hydroxyl group in structure of polyvinyl alcohol (PVA) interacts with rigid molecule of chitosan and make hydrogen bonding on molecular level. Zinc oxide nanoparticles (ZnO NPs), individually or in combination with antibiotics loaded in chitosan, can be considered as good candidates for struggling against drug resistant bacteria. Major Nosocomial infections by multi-drug resistant (MDR) *Pseudomonas aeruginosa* is difficult to treat with usual antibiotics, these pathogens cause tardiness in wound healing. **Materials and Methods:** Design Of Experiments (DOE), central composite designs were used to optimization of drugs in formulation of films and three parameters, the amount of ceftazidime(x1), ZnO (x2), sucralfate as antimicrobial agents. Antimicrobial effect (Y2) as response were checked. Formulations were prepared by solvent casting method. 1.5% chitosan and 5% PVA were dissolved in acetic acid 1% and distilled water (1:1) under magnetic stirring at room temperature for overnight, drugs and ZnO NPs were loaded on polymer. Antibacterial activity of formulations against 3 MDR *P. aeruginosa* strains, isolates from burn wounds and 3 standard strains of *P. aeruginosa* were tested by viable cell counting method. Determination of folding endurance of each formulation was carried out by repeatedly folding the film at 180-angle at the same place until it broke. **Results:** Antimicrobial activity of 17 formulations were tested against standards and isolates *P. aeruginosa*. All of studied strains were inhibited by formulation number 12 with 20µg/ml of ceftazidime and 6% ZnO NPs and 14% sucralfate more than 90%. The folding endurance of formulation number 12 was found to range of standard. **Conclusion:** formulation number 12 with 20µg/ml of ceftazidime and 6% ZnO NPs and 14% sucralfate has the highest antibacterial effect and the best folding .endurance needs further in vivo study for wound dressing application

کلمات کلیدی:

antimicrobial resistance, chitosan, wound dressing, ZnO NPs, ceftazidime

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