Pengaruh enkapsulasi liposom pada aktivitas imipenem terhadap bakteri pseudomonas aeruginosa ATCC 27853 dan multidrug resistant pseudomonas aeruginosa = The effect of liposomal encapsulation on imipenem activity against pseudomonas aeruginosa ATCC 27853 and multidrug resistant pseudomonas aeruginosa

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Abstrak

[ABSTRAK
Perkembangan resistensi bakteri yang cepat menyebabkan diperlukan juga pengembangan terapi pengobatan baru agar mampu mengatasi penyakit yang telah berkembang. Imipenem merupakan antibakteri golongan karbapenem yang merupakan obat pilihan dalam mengatasi infeksi Pseudomonas aeruginosa. Seiring penggunaan Imipenem sebagai terapi menyebabkan munculnya Pseudomonas aeruginosa yang resisten terhadap Iimipenem. Liposom sebagai sistem penghantaran obat terbukti dapat meningkatkan aktivitas beberapa antibiotik terhadap bakteri Multidrug Resistant Pseudomonas aeruginosa. Tujuan penelitian ini adalah mengetahui pengaruh enkapsulasi liposom pada aktivitas Imipenem terhadap bakteri Pseudomonas aeruginosa dan Multidrug Resistant Pseudomonas aeruginosa. Liposom diformulasi dengan metode hidrasi lapis tipis kemudian dilanjutkan dengan sonikasi dan ekstrusi bertingkat dengan membran polikarbonat berpori 0,4 μm dan 0,1 μm steril untuk mengecilkan ukuran liposom dan juga mensterilkan liposom. Penentuan aktivitas antibakteri dilakukan dengan metode dilusi cair. Hasil penelitian menunjukkan bahwa konsentrasi hambat minimum (KHM) larutan Imipenem terhadap Pseudomonas aeruginosa ATCC 27853 dan Multidrug Resistant Pseudomonas aeruginosa adalah 1,49 ppm. Konsentrasi bunuh minimum (KBM) larutan Imipenem terhadap Pseudomonas aeruginosa ATCC 27853 dan Multidrug Resistant Pseudomonas aeruginosa adalah 2,97 ppm. Sedangkan konsentrasi bunuh minimum suspensi liposom Imipenem terhadap Pseudomonas aeruginosa ATCC 27853 dan Multidrug Resistant Pseudomonas aeruginosa adalah 5,95 ppm. Dengan demikian dapat ditarik kesimpulan bahwa enkapsulasi liposom menghambat aktivitas antibakteri Imipenem terhadap bakteri Pseudomonas aeruginosa ATCC 27853 dan Multidrug Resistant Pseudomonas aeruginosa
<hr><i>ABSTRACT
Rapid escalation of bacterial resistance lead to the necessity of new drug developments to overcome it. Imipenem is an antibiotic in carbapenem class which is used as drug of choice to treat Pseudomonas aeruginosa infection. Concominant use of Imipenem as therapeutic drug led to the resistance of Pseudomonas aeruginosa towards Imipenem. Liposom as drug delivery system has been proven to increase the activity of some antibiotics against Multidrug resistant Pseudomonas aeruginosa. This study was aimed to determine the effect of liposomal encapsulation on antibacterial activity of Imipenem against Pseudomonas aeruginosa and Multidrug Resistant Pseudomonas aeruginosa. Liposomes were prepared with thin-film hydration method and then followed by sonication and extrusion using sterile polycarbonate membrane with pore size 0,4 μm and 0,1 μm to reduce the size and sterilize the liposomes. Liquid dilution method is used to determine the antibacterial activity. The result of this research showed that the minimum inhibitory concentrasion (MIC) of Imipenem solution against Pseudomonas aeruginosa ATCC

27853 and Multidrug Resistant Pseudomonas aeruginosa are both 1,49 ppm. Minimum bactericidal concentration (MBC) of meropenem solution against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa are both 2,97 ppm. Minimum bactericidal concentration of Imipenem liposome against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa are both 5,95 ppm. Thus it can be concluded that liposome encapsulation inhibits antibacterial activity of Imipenem against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa.</i>, Rapid escalation of bacterial resistance lead to the necessity of new drug developments to overcome it. Imipenem is an antibiotic in carbapenem class which is used as drug of choice to treat Pseudomonas aeruginosa infection. Concominant use of Imipenem as therapeutic drug led to the resistance of Pseudomonas aeruginosa towards Imipenem. Liposom as drug delivery system has been proven to increase the activity of some antibiotics against Multidrug resistant Pseudomonas aeruginosa. This study was aimed to determine the effect of liposomal encapsulation on antibacterial activity of Imipenem against Pseudomonas aeruginosa and Multidrug Resistant Pseudomonas aeruginosa. Liposomes were prepared with thin-film hydration method and then followed by sonication and extrusion using sterile polycarbonate membrane with pore size 0,4 μm and 0,1 μm to reduce the size and sterilize the liposomes. Liquid dilution method is used to determine the antibacterial activity. The result of this research showed that the minimum inhibitory concentrasion (MIC) of Imipenem solution against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa are both 1,49 ppm. Minimum bactericidal concentration (MBC) of meropenem solution against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa are both 2,97 ppm. Minimum bactericidal concentration of Imipenem liposome against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa are both 5,95 ppm. Thus it can be concluded that liposome encapsulation inhibits antibacterial activity of Imipenem against Pseudomonas aeruginosa ATCC 27853 and Multidrug Resistant Pseudomonas aeruginosa.]