Preparasi dan karakterisasi kompleks polielektrolit kitosan karboksimetil selulosa natrium sebagai matriks tablet lepas lambat

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Abstrak

Chitosan is a natural cationic polymer that is non toxic, biodegradabel and biocompatibel. This polymer is also able to form hydrogel in aqueous medium but is only soluble in acidic medium and is not soluble in basic medium. Therefore why chitosan is not suitable as a matrix for sustained release dosage form. Chitosan can be modified phisically and chemically to obtain its optimum useful as a matrix for sustained release. It is preassumed that cationic properties of chitosan can form a polyelectrolyte complex with other anionic polymers.

The aim of this study was to make polyelectrolyte complex of chitosan – sodium carboxymethylcellulose as tablet matrix for prolonged drug release system with atenolol as drug model.

The polyelectrolyte was made by mixing 4% w/v chitosan solution in acetic acid 1% and 4% sodium carboxymethylcellulose solution, with mixing speed is 5000 rpm for 15 minuted, centrifuge (15.000 rpm, 15 minuted) and then dried (50oC, 24 hours), grinded and sieved with 100 mesh sieving analyzer. Then It was evaluated using FTIR spectrophotometer, SEM analyser, DSC analyser, swelling index and dissolution test.

The results showed that the characteristic of chitosan – sodium carboxymethil cellulose polyelectrolyte complex change physically and chemically compared to chitosan and sodium carboxymethylcellulose. The swelling index of chitosan – sodium carboxymethylcellulose polyelectrolyte complex was better than chitosan.

Futher study was subjected to obtain optimum chitosan – sodium carboxymethylcellulose polyelectrolyte complex concentration as a matrix of sustained release dosage form. The study was done by making four (4) tablet formulas with the chitosan – sodium carboxymethylcellulose polyelectrolyte complex matrix concentration 40%, 50%, 60% and 70%. The method of tablet preparation is wet granulation. The effect of various formulation process veriables, such as pollyelectrolyte complex content, harness of tablet and drug release from these tablet was examined. Drug release studies were conducted in 37oC hydrochloric acid solution pH 1,2 (2 hours) and buffer phosphat pH 7,4 (6 hours), with UV spectrophotometer.

Dissolution profiles showed that higher concentration matrix caused
more prolonged atenolol release. The mechanisms released were
diffusional and erosional. The 70% matrix polyelectrolyte chitosan sodium carboxymethylcellulose
concentration released atenolol 49,21% in
8 hours, so it could prolong atenolol release for 16 hours