STUDI IN VITRO PELEPASAN KURKUMIN DARI MEMBRAN MAKROPORI KITOSAN-KARAGINAN MENGGUNAKAN SILIKA SEBAGAI POROGEN

Fransiska Dessy Marista Roman
11/313604/PA/13717

INTISARI

Telah dilakukan penelitian studi pelepasan kurkumin dari membran makropori kitosan–karaginan dengan menggunakan silika sebagai porogen. Penelitian ini bertujuan untuk mengetahui efektivitas membran makropori dalam melepaskan kurkumin di dalam larutan buffer:etanol (v/v). Dalam penelitian ini telah dipelajari pengaruh komposisi silika, komposisi kitosan–karaginan, komposisi asam stearat, komposisi kurkumin dan variasi pH medium pelepasan terhadap laju pelepasan kurkumin.

Membran makropori dibuat dengan cara memadukan larutan kitosan dalam asam asetat dengan larutan karaginan dalam akuades, kemudian ditambahkan asam stearat, glutaraldehida dan diakhiri dengan penambahan silika sebagai porogen. Membran makropori kemudian dikarakterisasi dengan FTIR dan SEM. Studi pelepasan kurkumin dilakukan dengan cara merendamkan membran makropori termuat kurkumin di dalam larutan buffer-etanol selama 6 jam, kemudian hasil rendeman dianalisis dengan spektrofotometer UV–Vis. Kinetika pelepasan kurkumin dikaji dengan persamaan orde nol, orde satu, model Higuchi dan model Korsmeyer Peppas.

Hasil FTIR menunjukkan membran dengan silika memunculkan puncak tajam pada daerah serapan 1096 cm^{-1} yang merupakan vibrasi asimetri dari Si–O–Si. Sementara itu, pada membran setelah pelepasan silika tidak ditemukan kembali vibrasi asimetri pada daerah serapan 1096 cm^{-1}. Hasil penelitian menunjukkan bahwa komposisi optimal membran makroprori adalah 70% kitosan, 30% karaginan dan 150% silika yang memberikan optimum pemuatan kurkumin sebesar 196 ppm dan melepaskannya sebesar 16,36 ppm selama 6 jam. Model farmakokinetik menunjukkan bahwa pelepasan kurkumin mengikuti persamaan Korsmeyer–Peppas dengan laju (k) sebesar 3,0945 $menit^{0,1665}$ dan mekanisme pelepasan kurkumin didominasi oleh faktor difusi.

Kata Kunci: membran makropori, silika, kurkumin, pelepasan

IN VITRO STUDY OF CONTROLLED RELEASE CURCUMIN FROM CHITOSAN–CARRAGEENAN MACROPOROUS MEMBRANE USING SILICA AS POROGEN

Fransiska Dessy Marista Roman
11/313604/PA/13717

ABSTRACT

The controlled release of curcumin from chitosan–carrageenan macroporous membrane that porogen using silica had been studied. The aim of this research was to identify the effectiviness of curcumin release in a buffer:etanol (v/v). The research has studied the effect of the amount of silica, the amount of chitosan–carrageenan, the amount of stearic acid, the amount of curcumin and the variation of the medium pH toward the release of curcumin.

Macroporous membrane prepared by mixing the acetic acid solution of chitosan and the aqueous solution of carrageenan, then adding stearic acid, glutaraldehyde and then added silica as porogen. The membranes were characterized by FTIR and SEM. Study on the release curcumin was conducted by soaking the curcumin loaded membrane macroporous in the buffer-ethanol solution during 6 hour and the release curcumin was measured by UV–Vis spectrophotometer. The kinetics study of releasing curcumin was analyzed by pharmacokinetics models such as zeroth order, first order, Higuchi and Korsmeyer–Peppas models.

Results of FTIR analysis showed membrane before silica released led to a sharp peak absorption at 1096 cm^{-1} which is vibration of Si–O–Si. Meanwhile, the membrane macroporous after release of silica not rediscovered vibration asymmetry of Si–O–Si at 1096 cm^{-1}. The result of this work showed that the optimum compositions for the film were 70% chitosan, 30% carrageenan and 150% silica which produced the optimum curcumin loading of 196 ppm and release 16.36 ppm of it during 6 hour. The pharmacokinetics model shows that the curcumin release from the macroporous membrane followed a Korsmeyer–Peppas model with rate constant (k) of 3.0945 $min^{0.1665}$ and the release mechanism was dominated by diffusion process.

Key word: macroporous membrane, silica, curcumin, release