

**OPTIMASI KONSENTRASI HIDROKSIPROPIL METILSELULOSA (HPMC) SEBAGAI POLIMER *HYDROCOLLOID MATRIX DIABETIC WOUND HEALING* DENGAN ZAT AKTIF PIROKSIKAM**

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**ABSTRAK**

Peningkatan enzim MMP-9 secara berlebihan pada penderita diabetes mellitus menjadi penyebab utama terjadinya komplikasi ulkus kaki diabetik. Piroksikam memiliki aktivitas penghambatan enzim MMP-9 diduga mampu mempercepat penyembuhan ulkus kaki diabetik. *Hydrocolloid dressing* direkomendasikan untuk pengobatan ulkus kaki diabetik. HPMC digunakan sebagai polimer untuk mengontrol pelepasan zat aktif. Penelitian ini bertujuan untuk mengetahui konsentrasi HPMC yang optimal sebagai polimer *hydrocolloid diabetic wound healing matrix*. Karakteristik fisikokimia dievaluasi. Formula optimal diaplikasikan setiap 24 jam pada luka eksisi tikus jantan terinduksi dan tidak terinduksi aloksan. Persen penutupan luka dihitung hingga 100% dan dilanjutkan uji histopatologi. Hasil evaluasi sediaan dan penutupan luka dianalisis menggunakan *software R* pada taraf kepercayaan 95%. Berdasarkan analisis statistik, F2 adalah formula optimal karena memiliki  $DE_{360}$  paling besar ( $53,05 \pm 8,894\%$ ), kemampuan menyerap lembab yang besar ( $19,96 \pm 1,228\%$  dan  $4,5 \times 10^{-4} \pm 6 \times 10^{-5} \text{ g/jam}$ ), persen kandungan obat ( $81,568 \pm 15,867\%$ ), stabil pada suhu  $37^\circ\text{C}$  ( $84,258 \pm 4,093\%$ ), serta terdapat perbedaan antara lama waktu penyembuhan antarluka pada kelompok tikus normal dan diabetes ( $p\text{-value} < 0,05$ ). Hasil uji histopatologi menunjukkan *hydrocolloid matrix* dengan zat aktif piroksikam memberikan kualitas penyembuhan luka diabetik yang baik.

**Kata kunci:** *diabetic wound healing*, HPMC, *hydrocolloid matrix*, piroksikam

**OPTIMIZATION OF HYDROXYPROPYL METHYLCELLULOSE (HPMC) CONCENTRATION AS POLYMER OF HYDROCOLLOID MATRIX DIABETIC WOUND HEALING WITH PIROXICAM AS ACTIVE INGREDIENT**

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**ABSTRACT**

Excess elevation of MMP-9 enzyme in people with diabetes is the main cause of diabetic foot ulcer complications. Piroxicam which has inhibitory activity of the MMP-9 enzyme allegedly able to accelerate the healing of diabetic foot ulcers. Hydrocolloid dressings are recommended for the treatment of diabetic foot ulcers. HPMC is used as polymer to control the release of active substances. This study aims to determine the optimal concentration of HPMC as polymer in hydrocolloid matrix diabetic wound healing. Physicochemical characterizations were evaluated. The optimal formula was applied every 24 hours in the wound excision of male rats induced and not induced with alloxan. The wound closure percentage was calculated up to 100% and continued with histopathology test. The results of the evaluation and the wound closure was analyzed using R software with a 95% confidence level. Based on statistical analysis, F2 was the optimal formula because of its highest  $DE_{360}$  ( $53,05 \pm 8,894\%$ ), highest moisture absorption ability ( $19,96 \pm 1,228\%$  and  $4,5 \times 10^{-4} \pm 6 \times 10^{-5} \text{ g/h}$ ), drug content ( $81,568 \pm 15,867\%$ ), stable in  $37^\circ\text{C}$  ( $84,258 \pm 4,093\%$ ), and difference between the length of wound healing in normal and diabetic rats group ( $p\text{-value} < 0,05$ ). Histopathology test results showed that piroxicam hydrocolloid matrix provide good quality for the diabetic wound healing.

**Keywords:** diabetic wound healing, HPMC, hydrocolloid matrix, piroxicam