FORMULASI DAN KARAKTERISASI *MICRONEEDLE* α-MANGOSTIN VARIASI PERBANDINGAN PVA-PVP K30 DAN UJI PENETRASI *IN VITRO*

TESIS

RIANINGSIH DWI ASTUTI
C242010

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SEKOLAH TINGGI FARMASI INDONESIA
YAYASAN HAZANAH
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Sebagai salah satu syarat untuk memperoleh gelar Magister Farmasi

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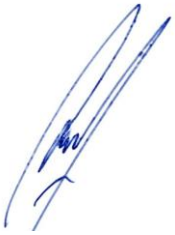
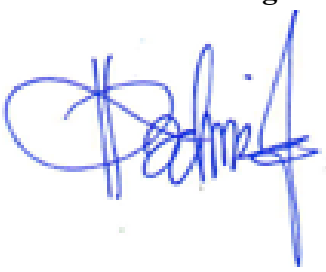
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Disetujui oleh :

Pembimbing	**Pembimbing**
	
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ABSTRAK

Formulasi *dissolving microneedle* memerlukan polimer biokompatibel dengan kekuatan mekanik memadai untuk penetrasi kulit. Penelitian ini bertujuan mengoptimalkan kombinasi PVA-PVP K30 dan konsentrasi α-mangostin untuk menghasilkan *Microneedle* dengan karakteristik dan difusi *in vitro* yang baik. Penelitian meliputi validasi metode analisis, pembuatan melalui *micromoulding*, optimasi basis dan konsentrasi α-mangostin, serta pengujian difusi menggunakan *Franz cell*. Delapan formula basis dibuat dengan variasi rasio PVA:PVP K30. F1 tidak homogen, sedangkan F2-F8 homogen dengan bobot jenis 1,002-1,029 g/mL, viskositas 2,833-75,667 cP, dan pH 4,647-5,553. Basis yang dihasilkan memiliki LOD 1,897-15,913%, *sharpness* 8,389-12,150 N, *fracture force* 20,65-66,00 N, dan *tensile strengt*h 12,56-19,97 MPa. F6 dipilih sebagai basis pembawa α-mangostin 0,1-0,4%. Peningkatan konsentrasi α-mangostin menurunkan LOD dan kekuatan mekanik serta meningkatkan gaya penetrasi. Konsentrasi 0,2% menghasilkan karakteristik terbaik berupa tekstur keras, jarum tajam, seragam, dan elastis, dengan LOD 6,840%, *sharpness* 11,065 N, *fracture force* 28,35 N, dan *tensile strength* 14,13 MPa. Pengamatan SEM menunjukkan struktur jarum utuh, kompak, relatif seragam, dan memiliki ujung yang terdefinisi. Uji difusi menunjukkan peningkatan pelepasan α-mangostin hingga 48 jam dengan fluks 1,7072 µg/cm²/menit ± 0,0017 dan Q/A akhir 5.925,34 µg/cm² ± 10,21

Kata Kunci: *Dissolving Microneedle,* Polimer, Kombinasi PVA-PVP K30*,* α-mangostin.

ABSTRACT

The formulation of dissolving Microneedles requires a biocompatible polymer with adequate mechanical strength for skin penetration. This study aimed to optimize the combination of PVA–PVP K30 and the concentration of α-mangostin to produce Microneedles with good characteristics and in vitro diffusion. The research included analytical method validation, fabrication via micromoulding, optimization of the base and α-mangostin concentration, and diffusion testing using a Franz cell. Eight base formulas were prepared with variations in the PVA:PVP K30 ratio. F1 was found to be non-homogeneous, whereas F2–F8 were homogeneous, with specific gravity of 1.002-1.029 g/mL, viscosity of 2.833-75.667 cP, and pH of 4.647–5.553. The resulting bases exhibited LOD of 1.897-15.913%, sharpness of 8.389–12.150 N, fracture force of 20.65-66.00 N, and tensile strength of 12.56-19.97 MPa. F6 was selected as the carrier base for α-mangostin at concentrations of 0.1–0.4%. An increase in α-mangostin concentration decreased the LOD and mechanical strength while increasing the penetration force. The 0.2% concentration produced the best characteristics, namely a hard texture and needles that were sharp, uniform, and elastic, with an LOD of 6.840%, sharpness of 11.065 N, fracture force of 28.35 N, and tensile strength of 14.13 MPa. SEM observation revealed an intact, compact, relatively uniform needle structure with well-defined tips. The diffusion test showed an increase in α-mangostin release up to 48 hours, with a flux of 1,7072 *μg/cm²/min* ± 0,0017 *and a final Q/A of 5.925,34 μg/cm²* ± *10.21.*

Keywords: *Dissolving Microneedle, Polymer, PVA-PVP K30 combination, α-mangostin.*

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Penulis

DAFTAR ISI

LEMBAR PENGESAHAN ii
KUTIPAN iii
PERSEMBAHAN iv
ABSTRAK v
ABSTRACT vi
KATA PENGANTAR vii
DAFTAR ISI viii
DAFTAR TABEL x
DAFTAR GAMBAR xi
DAFTAR LAMPIRAN xii
BAB I PENDAHULUAN 1
1. 1 Latar Belakang 1
1. 2 Identifikasi Masalah 4
1. 3 Tujuan Riset 4
1. 4 Kegunaan Riset 4
1. 5 Waktu dan Tempat Riset 5
BAB II TINJAUAN PUSTAKA 6
2. 1 Mangostin 6
2.1.1 Sifat Fisikokimia Mangostin 6
2.1.2 Xanthone 7
2. 2 *Microneedle* 9
2.2.1 Pengertian, Formula, Karakteristik 9
2.2.2 Polimer *Microneedle* 13
2. 3 Kulit 17
2.3.1 Anatomi Kulit 17
2.3.2 Penghantaran Obat Melalui Kulit 18
2. 4 Uji Penetrasi *In Vitro* 19
2. 5 Kerangka Berpikir 19
2. 6 Premis-premis 21
2. 7 Hipotesis 21
BAB III TATA KERJA 22
3.1 Alat 22
3.2 Bahan 22
3.3 Metode Riset 22
3.3.1 Validasi Analisis α-Mangostin 22
3.3.2 Formula Basis *Microneedle* 22
3.3.3 Evaluasi Massa Siap Cetak Basis *Microneedle* 23
3.3.4 Pembuatan Basis *Microneedle* 24
3.3.5 Karakterisasi dan Evaluasi Mekanik Basis *Microneedle* 25

3.3.6 Prosedur Pembuatan Massa Siap Cetak *Microneedle* α-Mangostin 26
3.3.7 Evaluasi Massa Siap Cetak *Microneedle* α-Mangostin 26
3.3.8 Pembuatan *Microneedle* α-Mangostin 26
3.3.9 Karakterisasi dan Evaluasi Mekanik *Microneedle* α-Mangostin 26
3.3.10 Evaluasi Lanjutan sediaan *Microneedle* α-Mangostin Optimum 26
BAB IV HASIL RISET DAN PEMBAHASAN 28
4.1 Hasil Evaluasi Massa Siap Cetak Basis *Microneedle* 28
4.2 Hasil Karakterisasi dan Evaluasi Mekanik Basis *Microneedle* 30
4.2.1 Hasil Karakterisasi Basis *Microneedle* .....
4.2.2 Hasil Evaluasi Mekanik Basis *Microneedle* 33
4.3 Hasil Evaluasi Massa Siap Cetak *Microneedle* α-Mangostin..... 37
4.4 Hasil Karakterisasi dan Evaluasi Mekanik *Microneedle* α-Mangostin 39
4.4.1 Hasil Karakterisasi *Microneedle* α-Mangostin 39
4.4.2 Hasil Evaluasi Mekanik *Microneedle* α-Mangostin 41
4.5 Hasil Evaluasi Lanjutan Sediaan *Microneedle* α-Mangostin Optimum 45
4.5.1 Hasil Pengamatan Morfologi SEM..... 45
4.5.2 Penetapan kadar 46
4.5.3 Hasil Uji Profil Difusi..... 46
BAB V SIMPULAN DAN ALUR PENELITIAN SELANJUTNYA..... 51
5. 1 Simpulan..... 51
5. 2 Alur Penelitian Selanjutnya..... 51
DAFTAR PUSTAKA 52
LAMPIRAN..... 59

DAFTAR TABEL

Tabel Halaman
2. 1 Riset *Microneedle* 17
3. 1 Formula Basis *Microneedle* 23
4. 1 Hasil Evaluasi Massa Siap Cetak Basis *Microneedle* 28
4. 2 Morfologi Formula Basis *Microneedle* 30
4. 3 Nilai LOD Formula Basis *Microneedle* 32
4. 4 Nilai *Sharpness* Formula Basis *Microneedle* 33
4. 5 *Fracture Force* Formula Basis *Microneedle* 34
4. 6 *Tensile Strenght* Formula Basis *Microneedle* 35
4. 7 Hasil Evaluasi Massa Siap Cetak *Microneedle* dengan Penambahan Variasi Konsentrasi α-Mangostin 37
4. 8 Morfologi *Microneedle* dengan Penambahan Variasi Konsentrasi α-Mangostin 39

DAFTAR GAMBAR

Gambar Halaman

2. 1 Struktur Kimia α-Mangostin 6
2. 2 Ilustrasi Bentuk *Solid Microneedle* 10
2. 3 Ilustrasi *Coated Microneedle* 10
2. 4 Ilustrasi *Dissolving Microneedle* 11
2. 5 Ilustrasi *Hollow Microneedle* 12
2. 6 Ilustrasi *Hydrogel Microneedle* 13
2. 7 Anatomi Kulit 18
4. 1 Basis *Microneedle* 31
4. 2 *Microneedle* dengan Penambahan Variasi Konsentrasi α-Mangostin 40
4. 3 Hasil Uji *Sharpness* Formula Basis Optimum (F6) dan F6 dengan Penambahan Variasi Konsetrasi α-Mangostin 41
4. 4 Hasil Uji *Fracture Force* Formula Basis Optimum (F6) dan F6 dengan Penambahan Variasi Konsetrasi α-Mangostin 42
4. 5 Uji *Tensile Strenght* Formula Basis Optimum (F6) dan F6 dengan Penambahan Variasi Konsetrasi α-Mangostin 43
4. 6 Hasil pengamatan *Microneedle* F6 + 0,2% α-Mangostin menggunakan SEM (a) Tampak Samping dan (b) Tampak Atas 45
4. 7 Perbandingan Q/A Kumulatif *Microneedle* F6 + 0,2% α-Mangostin Garis Biru) dan Larutan α -Mangostin (Garis Jingga). 47

DAFTAR LAMPIRAN

Lampiran Halaman

1. *Certificate of Analysis* 59
2. Persetujuan Etik Penggunaan dan Pemeliharaan Hewan Percobaan 63
3. Validasi Metode Analisis Spektrofotometer UV-Vis 64
4. Kadar α-Mangostin Dalam *Microneedle* 71
5. Evaluasi Massa Siap Cetak Basis 72
6. Karakterisasi dan Evaluasi Basis 75
7. Evaluasi Massa Siap Cetak *Microneedle* α-Mangostin 77
8. Karakterisasi dan Evaluasi *Microneedle* α-Mangostin 79
9. Dokumentasi *Microneedle* α-Mangostin 86
10. Dokumentasi Hasil Uji *Sharpness* 87

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