BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan hasil studi deskriptif yang telah dilakukan maka dapat disimpulkan sebagai berikut:

Pertama, peningkatan variasi konsentrasi Na-CMC sebagai *gelling agent* dapat meningkatkan viskositas, daya lekat, dan penurunan daya sebar ibuprofen atau obat dengan kelarutan rendah dalam sediaan topikal berdasarkan hasil studi deskriptif.

Kedua, peningkatan variasi konsentrasi Na CMC sebagai *gelling agent* berpengaruh terhadap penurunan pelepasan ibuprofen atau obat dengan kelarutan rendah dalam sediaan topikal berdasarkan hasil studi deskriptif.

B. Saran

Berdasarkan hasil studi deskriptif yang telah dilakukan, disarankan pada peneliti selanjutnya agar didapatkan hasil yang lebih maksimal sebagai berikut :

Pertama, perlu dilakukan optimasi formula ibuprofen atau obat dengan kelarutan rendah dalam sediaan topikal untuk mengetahui formula yang paling optimum dalam sediaan tersebut.

Kedua, penelitian selanjutnya perlu dilakukan uji stabilitas sediaan topikal ibuprofen atau obat dengan kelarutan rendah dalam sediaan topikal untuk mengetahui efektivitasnya dalam suatu sediaan topikal.

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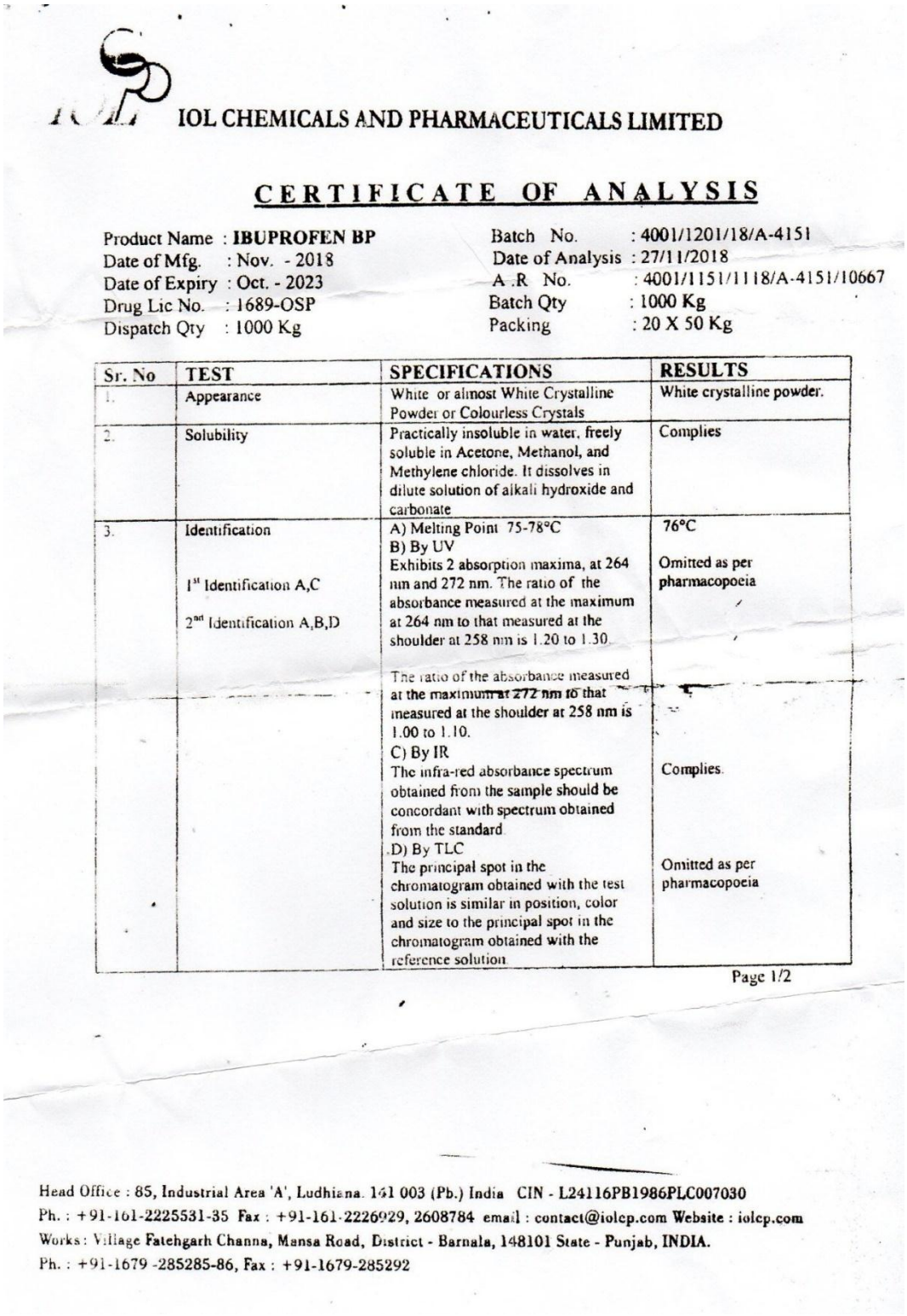
L A M P I R A N

Lampiran 1. Sertifikat analisis ibuprofen



IOL CHEMICALS AND PHARMACEUTICALS LIMITED

CERTIFICATE OF ANALYSIS

Product Name : **IBUPROFEN BP**
Date of Mfg. : Nov. - 2018
Date of Expiry : Oct. - 2023
Drug Lic No. : 1689-OSP
Dispatch Qty : 1000 Kg

Batch No. : 4001/1201/18/A-4151
Date of Analysis : 27/11/2018
A .R No. : 4001/1151/1118/A-4151/10667
Batch Qty : 1000 Kg
Packing : 20 X 50 Kg

Sr. No	TEST	SPECIFICATIONS	RESULTS
1.	Appearance	White or almost White Crystalline Powder or Colourless Crystals	White crystalline powder.
2.	Solubility	Practically insoluble in water, freely soluble in Acetone, Methanol, and Methylene chloride. It dissolves in dilute solution of alkali hydroxide and carbonate	Complies
3.	Identification 1st Identification A,C 2nd Identification A,B,D	A) Melting Point 75-78°C B) By UV Exhibits 2 absorption maxima, at 264 nm and 272 nm. The ratio of the absorbance measured at the maximum at 264 nm to that measured at the shoulder at 258 nm is 1.20 to 1.30. The ratio of the absorbance measured at the maximum at 272 nm to that measured at the shoulder at 258 nm is 1.00 to 1.10. C) By IR The infra-red absorbance spectrum obtained from the sample should be concordant with spectrum obtained from the standard. D) By TLC The principal spot in the chromatogram obtained with the test solution is similar in position, color and size to the principal spot in the chromatogram obtained with the reference solution.	76°C Omitted as per pharmacopoeia Complies. Omitted as per pharmacopoeia

Page 1/2

Head Office : 85, Industrial Area 'A', Ludhiana. 141 003 (Pb.) India CIN - L24116PB1986PLC007030
Ph. : +91-161-2225531-35 Fax : +91-161-2226929, 2608784 email : contact@iolcp.com Website : iolcp.com
Works : Village Fatehgarh Channa, Mansa Road, District - Barnala, 148101 State - Punjab, INDIA.
Ph. : +91-1679 -285285-86, Fax : +91-1679-285292

Lampiran 2. Penimbanganpembuatan larutan induk ibuprofen 294 ppm dan 1000 ppm.

A. Penimbangan pembuatan larutan induk ibuprofen 300 ppm (untuk panjang gelombang maksimum)

Aluminium foil + ibuprofen = 0,0630 g

Aluminium foil + sisa = 0,0336 g –

Ibuprofen = 0,0294 g

=29,4 mg / 100 ml

=294 mg / 1000 ml

= 294 ppm

B. Penimbangan pembuatan larutan induk ibuprofen 1000 ppm

Aluminium foil + ibuprofen = 0,1117 g

Aluminium foil + sisa = 0,0117 g –

Ibuprofen = 0,1000 g

=100 mg / 100 ml

=1000 mg / 1000 ml

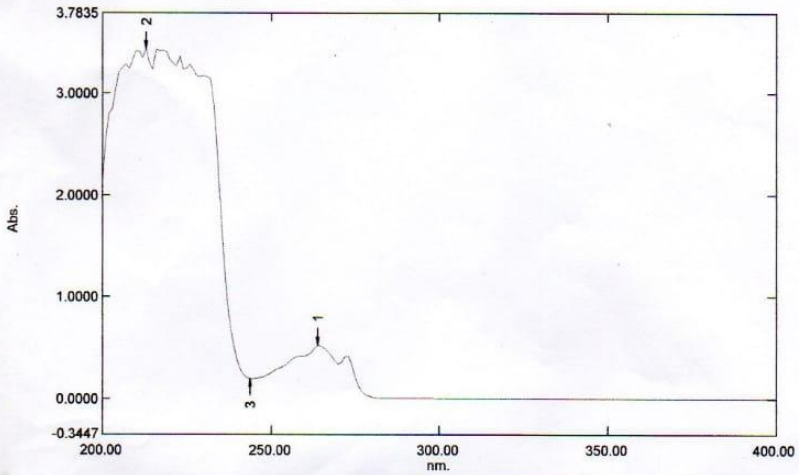
= 1000 ppm

Lampiran 3. Hasil penentuan panjang gelombang maksimum ibuprofen dalam larutan dapar fosfat pH 7,4.

Spectrum Peak Pick Report

02/17/2020 02:39:11 PM

Data Set: HESTY PANJANG GELOMBANG MAKS - RawData



No.	P/V	Wavelength	Abs.	Description
1	↑	264.00	0.5248	
2	↑	213.00	3.4395	
3	↓	244.00	0.1975	

[Measurement Properties]
Wavelength Range (nm.): 200.00 to 400.00
Scan Speed: Medium
Sampling Interval: 1.0
Auto Sampling Interval: Disabled
Scan Mode: Single

[Instrument Properties]
Instrument Type: UV-1800 Series
Measuring Mode: Absorbance
Slit Width: 1.0 nm
Light Source Change Wavelength: 340.0 nm
S/R Exchange: Normal

[Attachment Properties]
Attachment: None

[Operation]
Threshold: 0.0010000
Points: 4
InterPolate: Disabled
Average: Disabled

[Sample Preparation Properties]
Weight:
Volume:
Dilution:
Path Length:
Additional Information:

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Lampiran 4. Hasil penentuan *operating time*

Kinetics Data Print Report

02/18/2020 10:03:53 AM

Time (Minute)	RawData ...
0.000	0.545
1.000	0.545
2.000	0.545
3.000	0.545
4.000	0.545
5.000	0.546
6.000	0.546
7.000	0.546
8.000	0.546
9.000	0.546
10.000	0.547
11.000	0.547
12.000	0.547
13.000	0.547
14.000	0.547
15.000	0.548
16.000	0.548
17.000	0.548
18.000	0.549
19.000	0.548
20.000	0.549
21.000	0.549
22.000	0.549
23.000	0.549
24.000	0.549
25.000	0.549
26.000	0.550
27.000	0.549
28.000	0.550
29.000	0.550
30.000	0.549
31.000	
32.000	
33.000	
34.000	
35.000	
36.000	
37.000	
38.000	
39.000	
40.000	
41.000	
42.000	
43.000	
44.000	
45.000	
46.000	
47.000	
48.000	
49.000	
50.000	

Lampiran 5. Penimbangan kurva kalibrasi

Aluminium foil + ibuprofen = 0,1117 g
Aluminium foil + sisa = 0,0117 g –
Ibuprofen = 0,1000 g
=100 mg / 100 ml
=1000 mg / 1000 ml
= 1000 ppm
Pengenceran kurva baku

V1 x C1 = V2 x C2
10 mL x **150 ppm** = V2 x 1000 ppm
V2 = 1,5 ml

V1 x C1 = V2 x C2
10 mL x **200** ppm = V1 x 1000 ppm
V2= 2 mL

V1 x C1 = V2 x C2
10 mL x **250** ppm = V2 x 1000 ppm
V2 = 2,5 mL
V1 x C1 = V2 x C2
10 mL x **300** ppm = V2 x 1000 ppm
V2 = 3 mL
V1 x C1 = V2 x C2
10 mL x **350** ppm = V2 x 1000 ppm
V2 = 3,5 mL

V1 x C1 = V2 x C2
10 mL x **400** ppm = V1 x 1000 ppm
V2 = 4 mL
V1 x C1 = V2 x C2
10 mL x **450** ppm = V2 x 1000 ppm
V2 = 4,5 ml

Lampiran 6. Verifikasi metode analisis

A. Linieritas

V1 x N1 = V2 x N2

1,5 ml x 1000 ppm = 10 ml x N2

N1 = 150 ppm

V1 x N1 = V2 x N2

2 ml x 1000 ppm = 10 ml x N2

N1 = 200 ppm

V1 x N1 = V2 x N2

2,5 ml x 1000 ppm = 10 ml x N2

N1 = 250 ppm

V1 x N1 = V2 x N2

3 ml x 1000 ppm = 10 ml x N2

N2 = 300 ppm

V1 x N1 = V2 x N2

3,5 ml x 1000 ppm = 10 ml x N2

N2 = 350 ppm

V1 x N1 = V2 x N2

4 ml x 1000 ppm = 10 ml x N2

N2 = 400 ppm

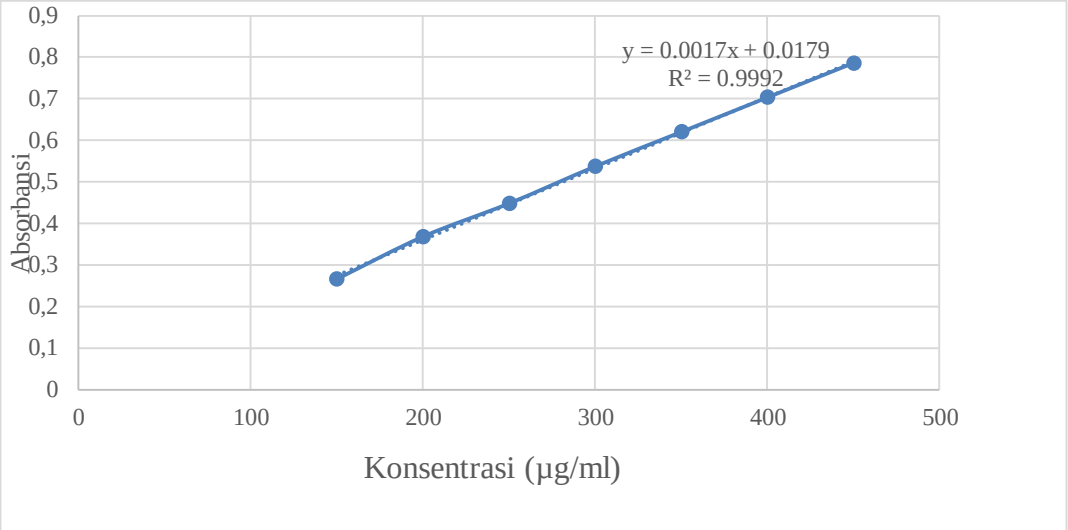
V1 x N1 = V2 x N2

4,5 ml x 1000 ppm = 10 ml x N2

N2 = 450 ppm

Konsentrasi	**Absorbansi**
150	0,266
200	0,368
250	0,448
300	0,537
350	0,620
400	0,703
450	0,786

a	0,01785714
b	0,00171571
r	0.999177016



B. Akurasi

Pengambilan larutan:

$$80\% \rightarrow \frac{80}{100} \text{ x } 300 = 250 \text{ ppm} \rightarrow \frac{250 \text{ ppm x } 10 \text{ ml}}{1000 \text{ ppm}} = 2{,}5 \text{ ml}$$

$$100\% \rightarrow \frac{100}{100} \text{ x } 300 = 300 \text{ ppm} \rightarrow \frac{300 \text{ ppm x } 10 \text{ ml}}{1000 \text{ppm}} = 3 \text{ ml}$$

$$120\% \rightarrow \frac{110}{100} \text{ x } 300 = 350 \text{ ppm} \rightarrow \frac{350 \text{ ppm x } 10 \text{ ml}}{1000 \text{ ppm}} = 3{,}5 \text{ ml}$$

KONSENTRASI	REPLIKASI	ABS	KONSENTRASI	PPM SEBENARNYA	%	RATA-RATA	RECOVERY
80%	1	0,447	250,1249	250	100%	100,44%	**99,98%**
	2	0,449	251,2906	250	102%		
	3	0,45	251,8734	250	102%		
100%	1	0,544	306,6611	300	102%	99,44%	
	2	0,522	293,8385	300	98%		
	3	0,523	294,4213	300	98%		
120%	1	0,613	346,8776	350	99%	100,05%	
	2	0,627	355,0375	350	102%		
	3	0,616	348,6261	350	100%		

C. Presisi

REPLIKASI	ABS	KONSENTRASI
1	0,368	204,0799
2	0,363	201,1657
3	0,360	199,4172
4	0,359	198,8343
5	0,363	201,1657
6	0,364	201,7485
7	0,358	198,2515
8	0,358	198,2515
9	0,358	198,2515
10	0,362	200,5828

SD	1,91418
RATA-RATA	200,1749
CV	0,009613

D. LOD dan LOQ

Konsentrasi (X)	Absorbansi (Y)	Y'	Y-Y'	(Y-Y')1
150	0,266	0,275214	-0,0092	0,00008490306122449
200	0,368	0,361	0,0070	0,00004900000000000
250	0,448	0,446786	0,0012	0,00000147448979592
300	0,537	0,531571	0,0044	0,00001961114489796
350	0,620	0,618357	0,0016	0,00000269897959184
400	0,703	0,704143	-0,0011	0,00000130612244898
450	0,786	0,789929	-0,0039	0,00001543367346939

Jumlah	0,0002
Jumlah/n-2	0,00004
Akar jumlah/n-2	0,00632

Perhitungan nilai LOD dan LOQ

LOD = $\frac{3{,}3\ sy/x}{b} = \frac{3{,}3 \text{ x } 0{,}00632}{0{,}0017} =$ 12,2682

LOQ = $\frac{10\ sy/x}{b} = \frac{10 \text{ x } 0{,}00632}{0{,}0017}$ =37,1765

Lampiran 7. Hasil uji *p*H gel ibuprofen*gelling agent* Na CMC

Replikasi	pH formula	
	Formula II Na CMC 3%	Formula III Na CMC 5%
1	5,33	6,48
2	5,44	6,45
3	5,46	6,40
Rata-rata±SD	5,41 ± 0,07	6,44 ± 0,04

Lampiran 8. Hasil uji viskositas gel ibuprofen *gelling agent* Na CMC.

Lampiran 9. Hasil uji daya sebar gel ibuprofen *gelling agent* Na CMC.

Replikasi	Beban (gram)									
	Tanpa beban		**50**		**100**		**150**		**200**	
	F2	**F3**	**F2**	**F3**	**F2**	**F3**	**F2**	**F3**	**F2**	**F3**
1	3,5	3,5	3,5	3,7	3,8	3,8	4,0	4,0	4,2	4,3
	4,0	3,4	4,2	3,5	4,3	3,7	4,5	4,1	4,3	4,2
	4,2	3,5	4,4	3,6	4,6	3,8	4,3	4,0	5,0	4,3
	4,0	3,4	4,2	3,5	4,3	3,5	4,6	4,1	4,3	4,2
Rata-rata	3,9	3,5	4,1	3,6	4,1	3,8	4,3	4,0	4,5	4,2
2	**Tanpa beban**		**50**		**100**		**150**		**200**	
	F2	**F3**	**F2**	**F3**	**F2**	**F3**	**F2**	**F3**	**F2**	**F3**
	3,4	3,6	4,2	3,7	4,4	3,8	4,7	4,0	5,0	4,3
	3,6	3,7	3,8	3,9	4,1	4,0	4,3	4,1	4,5	4,5
	4,0	3,8	4,3	3,9	4,5	4,1	4,9	4,2	5,1	4,4
	4,1	3,7	4,3	3,8	4,6	4,0	4,8	4,2	5,1	4,3
Rata-rata	3,8	3,7	4,1	3,8	4,4	4,0	4,7	4,1	5,0	4,4
3	**Tanpa beban**		**50**		**100**		**150**		**200**	
	F2	**F3**	**F2**	**F3**	**F2**	**F3**	**F2**	**F3**	**F2**	**F3**
	3,7	3,4	3,9	3,5	4,1	3,8	4,4	3,9	4,6	4,0
	3,9	3,4	3,9	3,5	4,2	3,7	4,4	3,9	4,6	4,1
	3,7	3,0	4,0	3,4	4,1	3,8	4,4	3,9	4,7	4,0
	3,7	3,4	3,9	3,5	4,1	3,6	4,2	3,8	4,4	4,0
Rata-rata	3,8	3,3	4,0	3,5	4,1	3,7	4,4	3,9	4,6	4,0

Lampiran 10. Hasil uji daya lekat gel ibuprofen *gelling agent* Na CMC.

Replikasi	Daya lekat formula(detik)	
	Formula II	Formula III
Replikasi 1	19,1	48,7
Replikasi 2	15,0	47,6
Replikasi 3	19,1	38,1
Rata-rata	17,8 ± 1,4	45,0 ± 5,8