

LAMPIRAN

Lampiran 1: CoA Adapalen



AARTI INDUSTRIES LIMITED

Factory : Unit - IV, Plot No. E-50, MIDC, Tarapur,
Taluka & District- Palghar, Pin - 401506, Maharashtra, INDIA.
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CERTIFICATE OF ANALYSIS ADAPALENE BP

Batch No.	: AD-18202(JM-01)-001RP	Date of Mfg.	: JUN-2018
AR. No.	: FG/0484/18	Date of Exp.	: MAY-2023
Batch Qty.	: 22.27 Kg	Date of Release	: 22/08/18
Sr. #	TESTS	RESULTS	SPECIFICATION
1.	Description	Almost white powder	White or almost white powder.
2.	Solubility	Complies	Sparingly soluble in Tetrahydrofuran, Practically insoluble in water and ethanol (95%)
3.	Identification A) By IR	Complies	The Infra Red spectrum of Sample should concordant with similar preparation of that of Adapalene WS.
	B) By HPLC	Complies	The retention time of the major peak of the sample solution corresponds to that of standard solution, as obtained in the assay
4.	Appearance of Solution	Complies	The solution is clear and not more intensely coloured than reference solution BY _s
5.	Related substances (By HPLC)	Below disregard limit	Impurity A : Not more than 0.3%
		Below disregard limit	Impurity C : Not more than 0.15%
		Below disregard limit	Impurity D : Not more than 0.2%
		Below disregard limit	Unspecified impurities : Not more than 0.10%
		Below disregard limit	Total impurities : Not more than 0.5%
6.	Heavy metals	Complies	Not more than 20 ppm
7.	Loss on drying (At 105°C for 4 hours)	0.19 %	Not more than 0.5 %
8.	Sulphated ash	0.04%	Not more than 0.1 %
9.	Assay (By HPLC)	100.27 %	Between 98.0 % to 102.0 % on dried substances
10.	Residual solvents (By HSGC)	Not detected	Dichloromethane : NMT 600 ppm
		27 ppm	Ethyl acetate : NMT 5000 ppm
		113 ppm	Tetrahydrofuran : NMT 720 ppm
		640 ppm	Toluene : NMT 890 ppm
11.	Triethylamine content (By HSGC)	Not detected	Diglyme : NMT 500 ppm
		10 ppm	Not more than 80 ppm

Remark: The material complies as per BP and above specification.

Analyst	Checked By	Approved By
For 22/08/18 Vikas Pardeshi Analyst	 22/08/18 Mahendra Girase Head Quality Control	 22/08/18 Shyamsundar Desai Head Quality Assurance

AARTI INDUSTRIES LTD.

Unit - IV, Plot No. E-50,
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Lampiran 2: CoA precirol® ATO5



GATTEFOSSE
Certificate of Analysis

Product name : PRECIROL ATO 5			
Item N° : 3092PPD			
Batch N° : 189604			
Manufacturing date : 05/2018			
Expiry date : 05/2020			
CHEMICAL DEFINITION Glycerol distearate (type D) EP / Glyceryl distearate NF.			
Characteristic	Method	Specification	Result
MANUFACTURING PLANT		Gattefosse - Q1 / Imphy - D6	Q1/Q1
APPEARANCE	MA0193	Fine white powder	Conforms
ODOUR	MA0170	Faint	Conforms
COLOUR (Gardner Scale)	MA0214	< = 3.0	0.9
DROP POINT (METTLER)	MA0003	53.0 to 57.0 °C	58.3
ACID VALUE	MA0008	< = 5.00 mgKOH/g	1.76
SAPONIFICATION VALUE	MA0172	165 to 195 mgKOH/g	167
IODINE VALUE	MA0082	< = 3.0 gI2/100g	< = 3.0*
FREE GLYCEROL CONTENT	MA0006	< = 1.0 %	0.2
TOTAL MONOGLYCERIDES CONTENT	MA0006	8.0 to 22.0 %	17.4
TOTAL DIESTERS CONTENT	MA0006	40.0 to 60.0 %	50.7
TOTAL TRIESTERS CONTENT	MA0006	25.0 to 35.0 %	30.8
PALMITIC ACID (C16)	MA0002	40.0 to 60.0 %	44.5
STEARIC ACID (C18)	MA0002	40.0 to 60.0 %	53.2
SUM OF PALMITIC AND STEARIC ACIDS	MA0002	> = 90.0 %	97.7
WATER CONTENT	MA0007	< = 1.0 %	< 0.1
TOTAL ASHES CONTENT	MA0028	< = 0.1 %	< = 0.1*
NICKEL CONTENT	MA0256	< 1 ppm	Conforms
HEAVY METALS CONTENT (Pb)	MA0032	< 10 ppm	Conforms*
* Characteristic guaranteed but not tested. This batch was released by our authorized Quality Manager and was found to meet the specifications as stated above. The above results do not discharge the customer from the obligation to carry out an inspection of goods received. This report has been produced electronically and does not require a signature.			
Printing Date : 11.12.2018		Quality Manager Magali DRONNIER	

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Lampiran 3: karakterisasi SLN Adapalen

Formula	Ukuran partikel (nm)	Pdi	Zp (mV)
PAT 2%	314,56 ± 3,49	0,41 ± 0,02	-33,56 ± 0,56
PAT 3%	391 ± 115,42	0,5 ± 0,04	-34,03 ± 2,49
PAT 4%	317,6 ± 4,01	0,43 ± 0,01	-29,1 ± 0,7
PAT 5%	238,2 ± 3,84	0,34 ± 0,01	-29,03 ± 0,32
PAT 6%	251,5 ± 1,12	0,37 ± 0,01	-31,7 ± 0,79

Keterangan:

PAT: Precirol® ATO5+Adapalen+TEGO®care 450

Pdi: *Polidispersity Index*

Zp: Zeta Potensial

Lampiran 4: kurva kalibrasi adapalen

4.1 Perhitungan pembuatan larutan adapalen

4.1.1 Larutan induk

$$\begin{aligned}\text{Konsentrasi larutan} &= \frac{\text{Bobot Adapalen}}{\text{Volume}} \\ 100 \text{ ppm} &= \frac{\text{Bobot Adapalen}}{100 \text{ mL}} \\ &= 100 \text{ ppm} \times 100 \text{ mL} \\ \text{Bobot adapalen} &= 10.000 \mu\text{g} = 10 \text{ mg}\end{aligned}$$

4.1.2 Pengenceran larutan

a. konsentrasi 1 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 10 \text{ mL} \times 1 \text{ ppm} \\ V_1 &= \frac{10 \text{ mL} \times 1 \text{ ppm}}{100 \text{ ppm}} \\ V_1 &= 0,1 \text{ mL} = 100 \mu\text{L}\end{aligned}$$

b. konsentrasi 2 ppm

$$\begin{aligned}V_1 \times C_1 &= V_2 \times C_2 \\ V_1 \times 100 \text{ ppm} &= 10 \text{ mL} \times 2 \text{ ppm}\end{aligned}$$

$$V_1 = \frac{10 \text{ mL} \times 2 \text{ ppm}}{100 \text{ ppm}}$$

$$V_1 = 0,2 \text{ mL} = 200\mu\text{L}$$

c. konsentrasi 3 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 3 \text{ ppm}$$

$$V_1 = \frac{10 \text{ mL} \times 3 \text{ ppm}}{100 \text{ ppm}}$$

$$V_1 = 0,3 \text{ mL} = 300\mu\text{L}$$

d. konsentrasi 4 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 4 \text{ ppm}$$

$$V_1 = \frac{10 \text{ mL} \times 4 \text{ ppm}}{100 \text{ ppm}}$$

$$V_1 = 0,4 \text{ mL} = 400\mu\text{L}$$

e. konsentrasi 5 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

$$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 5 \text{ ppm}$$

$$V_1 = \frac{10 \text{ mL} \times 5 \text{ ppm}}{100 \text{ ppm}}$$

$$V_1 = 0,5 \text{ mL} = 500\mu\text{L}$$

f. konsentrasi 6 ppm

$$V_1 \times C_1 = V_2 \times C_2$$

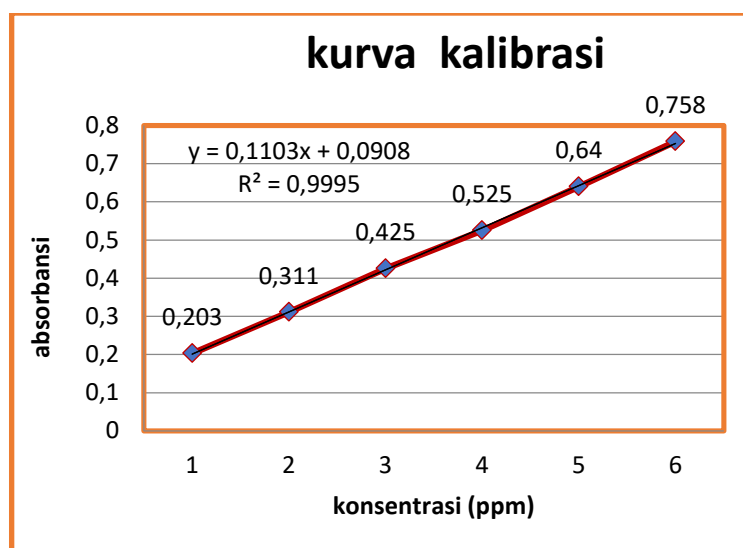
$$V_1 \times 100 \text{ ppm} = 10 \text{ mL} \times 6 \text{ ppm}$$

$$V_1 = \frac{10 \text{ mL} \times 6 \text{ ppm}}{100 \text{ ppm}}$$

$$V_1 = 0,6 \text{ mL} = 600\mu\text{L}$$

4.2 kurva kalibrasi adapalen

Konsentrasi	Absorpsi
1 ppm	0,203
2 ppm	0,311
3 ppm	0,425
4 ppm	0,525
5 ppm	0,640
6 ppm	0,758



Lampiran 5: perhitungan % EE SLN adapalen

Konsentrasi larutan

$$\text{Konsentrasi} = \frac{y-a}{b}$$

Bobot zat aktif bebas

$$\text{Bobot zat aktif bebas} = \text{konsentrasi} \times \text{volume} \times \text{fp}$$

$$\% \text{ EE} = \frac{\text{total zat aktif} - \text{zat aktif bebas}}{\text{total zat aktif}} \times 100\%$$

Formula	Absorbansi	Efisiensi entrapment
PAT 2%	0,419	99%
PAT 3%	0,476	98,83%
PAT 4%	0,489	98,79%
PAT 5%	0,482	98,81%
PAT 6%	0,492	98,78 %

1. PAT 2%

$$\text{Konsentrasi} = \frac{0,419 - 0,0908}{0,1103} = 2,97 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 2,89 \text{ ppm} \times 10 \text{ mL} \times 10$$

$$= 297 \mu\text{g} = 0,297 \text{ mg}$$

$$\% \text{ EE} = \frac{30 \text{ mg} - 0,297 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 99\%$$

2. PAT 3%

$$\text{Konsentrasi} = \frac{0,476 - 0,0908}{0,1103} = 3,49 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 3,49 \text{ ppm} \times 10 \text{ mL} \times 10$$

$$= 349 \mu\text{g} = 0,349 \text{ mg}$$

$$\% \text{ EE} = \frac{30 \text{ mg} - 0,349 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 98,83 \%$$

3. PAT 4%

$$\text{Konsentrasi} = \frac{0,489 - 0,0908}{0,1103} = 3,61 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 3,61 \text{ ppm} \times 10 \text{ mL} \times 10$$

$$= 361 \mu\text{g} = 0,361 \text{ mg}$$

$$\% \text{ EE} = \frac{30 \text{ mg} - 0,361 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 98,79\%$$

4. PAT 5%

$$\text{Konsentrasi} = \frac{0,482-0,0908}{0,1103} = 3,54 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 3,54 \text{ ppm} \times 10 \text{ mL} \times 10$$

$$= 354 \mu\text{g} = 0,354 \text{ mg}$$

$$\% \text{ EE} = \frac{30 \text{ mg} - 0,354 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 98,81\%$$

5. PAT 6%

$$\text{Konsentrasi} = \frac{0,492-0,0908}{0,1103} = 3,63 \text{ ppm}$$

$$\text{Bobot zat aktif bebas} = 3,63 \text{ ppm} \times 10 \text{ mL} \times 10$$

$$= 363 \mu\text{g} = 0,363 \text{ mg}$$

$$\% \text{ EE} = \frac{30 \text{ mg} - 0,363 \text{ mg}}{30 \text{ mg}} \times 100\%$$

$$= 98,78 \%$$

Lampiran 6: Uji pH pada suhu ruang

Formula	P1	P2
PAT 2%	7,24±0,02	7,02±0
PAT 3%	7,45±0,01	6,93±0,02
PAT 4%	7,07±0	6,78±0,02
PAT 5%	6,94±0,10	6,52±0,02
PAT 6%	6,9±0,01	6,43±0,01

Keterangan:

PAT: Precirol[®]ATO5+Adapalen+TEGO[®]care 450

P1: pengukuran 1

P2: pengukuran 2