# BAB V

# KESIMPULAN DAN SARAN

## A. KESIMPULAN

Berdasarkan hasil penelitian dapat disimpulkan :

Pertama, imipenem 100 ppm merupakan antibiotik paling sensitiv dibanding antibiotik seftriakson, siprofloksasin, sefotaksim dan amikasin terhadap daya hambat bakteri *Klebsiella pneumoniae* ATCC 10031.

Kedua, kombinasi simvastatin 15 ppm dan 150 ppm dengan antibotik seftriakson, siprofloksasin, imipenem, dan amikasin tidak memberikan peningkatan efek terhadap diameter zona hambat bakteri *Klebsiella pneumoniae* ATCC 10031, hanya kombinasi sefotaksim 100 ppm dan simvastatin 150 ppm yang memberikan hasil diameter daya hambat beda signifikan.

Ketiga, kombinasi simvastatin 150 ppm dengan sefotaksim 100 ppm memberikan hasil diameter daya hambat berbeda signifikan terhadap pertumbuhan bakteri *Klebsiella pneumoniae* ATCC 10031.

## B. SARAN

Saran yang dapat diberikan untuk penelitian lebih lanjut :

Pertama, perlu dilakukan penelitian lebih lanjut efek kombinasi simvastatin dengan antibiotik yang berbeda dengan bakteri Gram negatif lain untuk mengetahui kemungkinan peningkatan efek antibakteri.

Kedua, perlu dilakukan penelitian efek antibakteri simvastatin pada konsentrasi dibawah 150 ppm untuk kemungkinan mendapatkan konsentrasi lebih kecil yang dapat memberikan aktivitas terhadap bakteri Gram negatif lain.

Ketiga, perlu dilakukan penelitian lanjutan untuk mengetahui secara pasti mekanisme kerja kombinasi sefotaksim 100 ppm dengan simvastatin 150 ppm agar dapat digunakan untuk pengobatan.

Keempat, perlu dilakukan penelitian lebih lanjut untuk mengetahui jenis kombinasi simvastatin 150 ppm dengan sefotaksim 100 ppm termasuk dalam kombinasi sinergisme adisi atau potensiasi.

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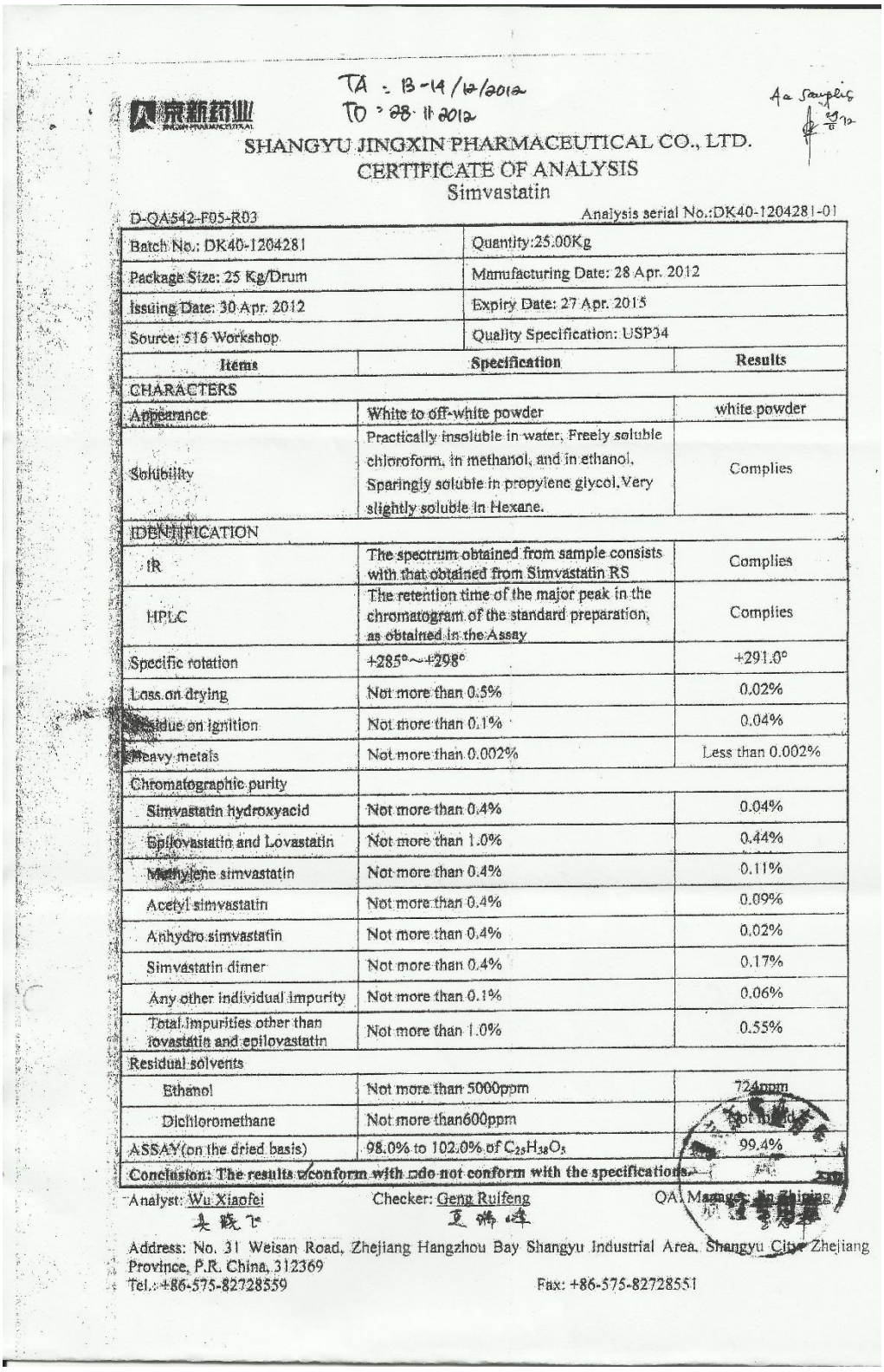
**Lampiran 1.** ***Certificate of Analysis*** **simvastatin**



TA : 13-12/12/2012
TO : 28-12-2012

As Sample

SHANGYU JINGXIN PHARMACEUTICAL CO., LTD.

CERTIFICATE OF ANALYSIS

Simvastatin

D-QA542-F05-R03 Analysis serial No.:DK40-1204281-01

| | |
|---|---|
| Batch No.: DK40-1204281 | Quantity:25.00Kg |
| Package Size: 25 Kg/Drum | Manufacturing Date: 28 Apr. 2012 |
| Issuing Date: 30 Apr. 2012 | Expiry Date: 27 Apr. 2015 |
| Source: 516 Workshop | Quality Specification: USP34 |

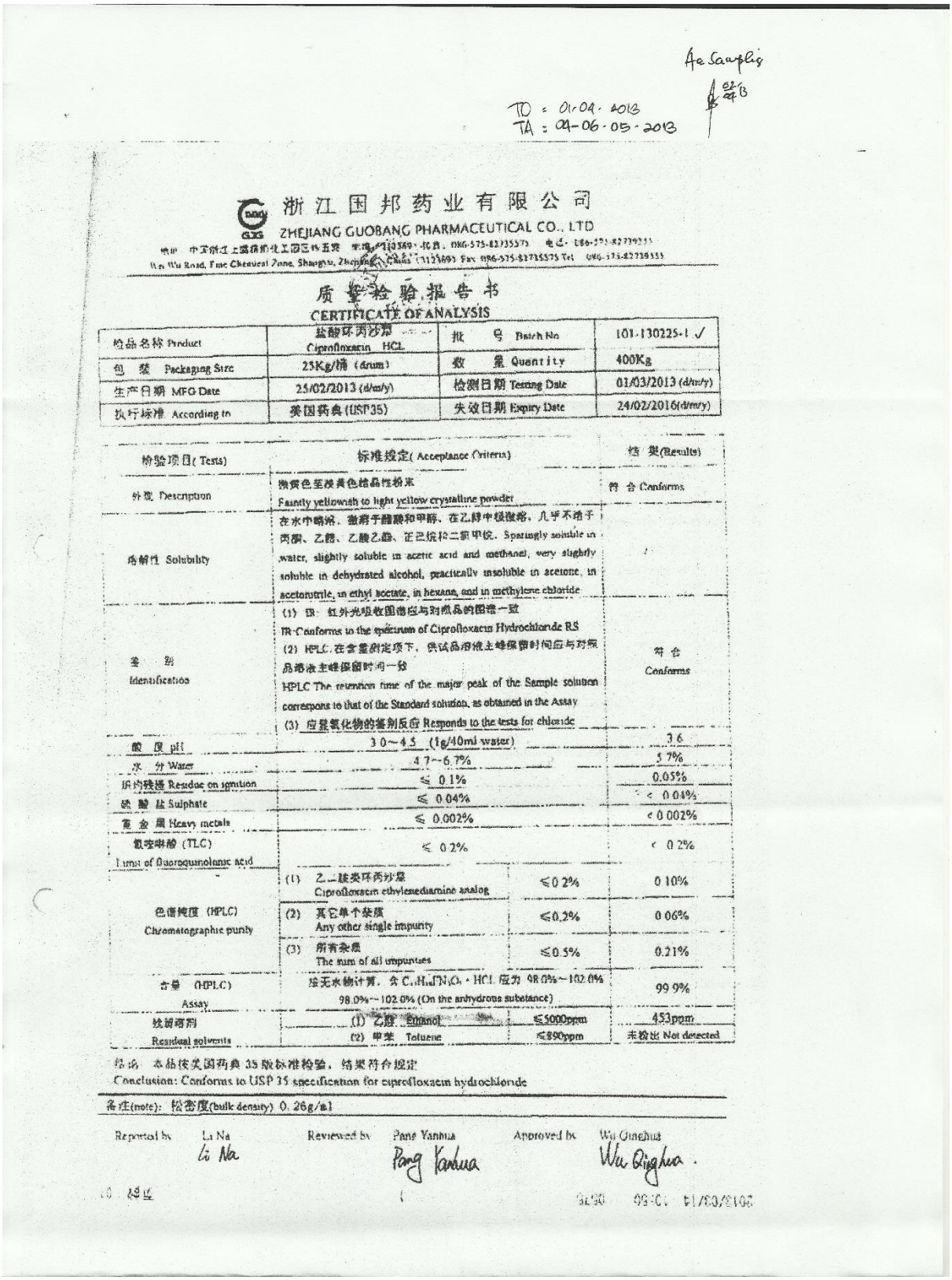
| Items | Specification | Results |
|---|---|---|
| CHARACTERS | | |
| Appearance | White to off-white powder | white powder |
| Solubility | Practically insoluble in water, Freely soluble chloroform, in methanol, and in ethanol, Sparingly soluble in propylene glycol, Very slightly soluble in Hexane. | Complies |
| IDENTIFICATION | | |
| IR | The spectrum obtained from sample consists with that obtained from Simvastatin RS | Complies |
| HPLC | The retention time of the major peak in the chromatogram of the standard preparation, as obtained in the Assay | Complies |
| Specific rotation | +285°~+298° | +291.0° |
| Loss on drying | Not more than 0.5% | 0.02% |
| Residue on ignition | Not more than 0.1% | 0.04% |
| Heavy metals | Not more than 0.002% | Less than 0.002% |
| Chromatographic purity | | |
| Simvastatin hydroxyacid | Not more than 0.4% | 0.04% |
| Epilovastatin and Lovastatin | Not more than 1.0% | 0.44% |
| Methylene simvastatin | Not more than 0.4% | 0.11% |
| Acetyl simvastatin | Not more than 0.4% | 0.09% |
| Anhydro simvastatin | Not more than 0.4% | 0.02% |
| Simvastatin dimer | Not more than 0.4% | 0.17% |
| Any other individual impurity | Not more than 0.1% | 0.06% |
| Total impurities other than lovastatin and epilovastatin | Not more than 1.0% | 0.55% |
| Residual solvents | | |
| Ethanol | Not more than 5000ppm | 724ppm |
| Dichloromethane | Not more than600ppm | Not detected |
| ASSAY(on the dried basis) | 98.0% to 102.0% of $C_{25}H_{38}O_5$ | 99.4% |

**Conclusion: The results ☑conform with ☐do not conform with the specifications.**

Analyst: Wu Xiaofei 吴晓飞 Checker: Geng Ruifeng 耿瑞峰 QA Manager: Jin Zhiqiang

Address: No. 31 Weisan Road, Zhejiang Hangzhou Bay Shangyu Industrial Area, Shangyu City, Zhejiang Province, P.R. China, 312369
Tel.: +86-575-82728559 Fax: +86-575-82728551

**Lampiran 2. *Certificate of Analysis* siprofloksasin**



As Sample

TD : 01-04-2013
TA : 04-06-05-2013

浙江国邦药业有限公司
ZHEJIANG GUOBANG PHARMACEUTICAL CO., LTD
No.Wu Road, Fine Chemical Zone, Shangyu, Zhejiang, China (312369) Fax 0086-575-82735575 Tel 0086-575-82738333

质量检验报告书
CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| 检品名称 Product | 盐酸环丙沙星 Ciprofloxacin HCL | 批 号 Batch No | 101-130225-1 ✓ |
| 包 装 Packaging Size | 25Kg/桶 (drum) | 数 量 Quantity | 400Kg |
| 生产日期 MFG Date | 25/02/2013 (d/m/y) | 检测日期 Testing Date | 01/03/2013 (d/m/y) |
| 执行标准 According to | 美国药典 (USP35) | 失效日期 Expiry Date | 24/02/2016(d/m/y) |

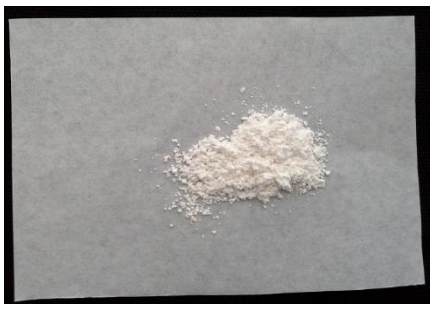
| 检验项目( Tests) | 标准规定( Acceptance Criteria) | | 结 果(Results) |
|---|---|---|---|
| 外观 Description | 微黄色至淡黄色结晶性粉末<br>Faintly yellowish to light yellow crystalline powder | | 符 合 Conforms |
| 溶解性 Solubility | 在水中略溶，微溶于醋酸和甲醇，在乙醇中极微溶，几乎不溶于丙酮、乙醚、乙酸乙酯、正己烷和二氯甲烷。Sparingly soluble in water, slightly soluble in acetic acid and methanol, very slightly soluble in dehydrated alcohol, practically insoluble in acetone, in acetonitrile, in ethyl acetate, in hexane, and in methylene chloride | | |
| 鉴 别 Identification | (1) IR：红外光吸收图谱应与对照品的图谱一致<br>IR-Conforms to the spectrum of Ciprofloxacin Hydrochloride RS<br>(2) HPLC：在含量测定项下，供试品溶液主峰保留时间应与对照品溶液主峰保留时间一致<br>HPLC The retention time of the major peak of the Sample solution corresponds to that of the Standard solution, as obtained in the Assay<br>(3) 应呈氯化物的鉴别反应 Responds to the tests for chloride | | 符 合 Conforms |
| 酸 度 pH | 3.0～4.5 (1g/40ml water) | | 3.6 |
| 水 分 Water | 4.7～6.7% | | 5.7% |
| 炽灼残渣 Residue on ignition | ≤ 0.1% | | 0.05% |
| 硫 酸 盐 Sulphate | ≤ 0.04% | | < 0.04% |
| 重 金 属 Heavy metals | ≤ 0.002% | | < 0.002% |
| 氟喹啉酸 (TLC)<br>Limit of fluoroquinolonic acid | ≤ 0.2% | | < 0.2% |
| 色谱纯度 (HPLC)<br>Chromatographic purity | (1) 乙二胺类环丙沙星<br>Ciprofloxacin ethylenediamine analog | ≤0.2% | 0.10% |
| | (2) 其它单个杂质<br>Any other single impurity | ≤0.2% | 0.06% |
| | (3) 所有杂质<br>The sum of all impurities | ≤0.5% | 0.21% |
| 含量 (HPLC)<br>Assay | 按无水物计算，含 $C_{17}H_{18}FN_3O_3 \cdot HCl$ 应为 98.0%～102.0%<br>98.0%～102.0% (On the anhydrous substance) | | 99.9% |
| 残留溶剂<br>Residual solvents | (1) 乙醇 Ethanol | ≤5000ppm | 453ppm |
| | (2) 甲苯 Toluene | ≤890ppm | 未检出 Not detected |

结论：本品按美国药典 35 版标准检验，结果符合规定
Conclusion: Conforms to USP 35 specification for ciprofloxacin hydrochloride

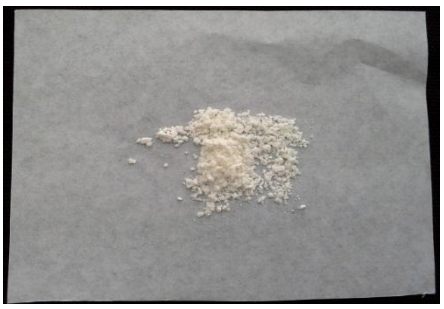
备注(note): 松密度(bulk density) 0.26g/ml

Reported by: Li Na — Li Na
Reviewed by: Pang Yanhua — Pang Yanhua
Approved by: Wu Qinghua — Wu Qinghua

**Lampiran 3. Foto bahan penelitian**



**3a. Foto simvastatin serbuk**



**3b. Foto siprofloksasin serbuk**


**3c. Foto injeksi imipenem**


**3d. Foto injeksi amikasin**


**3e. Foto injeksi seftriakson**


**3f. Foto injeksi sefotaksim**


**3g. Foto *Sodium chloride* 0,9%**


**3h. Foto ringer laktat**

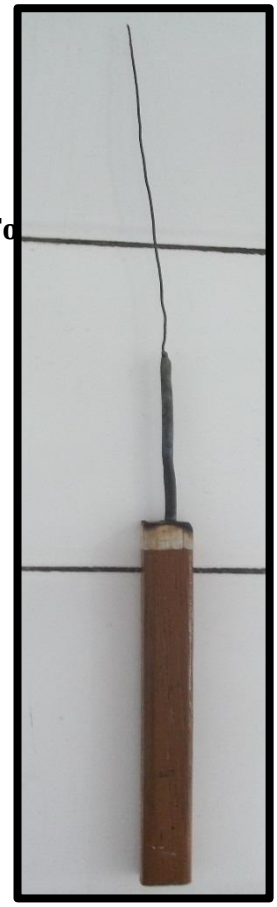


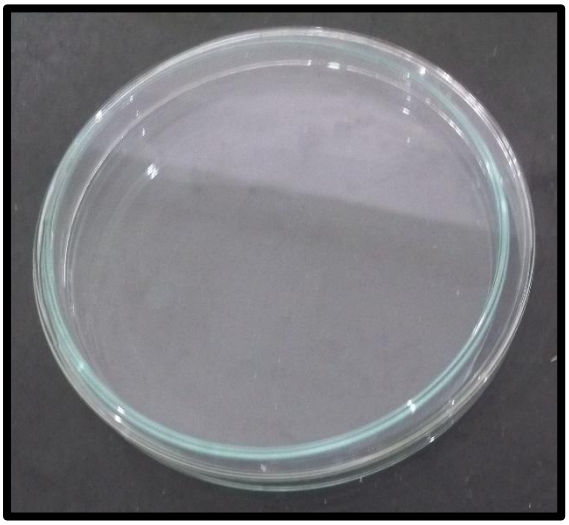
**3i. Foto *sterille water for injection*** **3j. Foto aqudest steril**

**Lampiran 4. Foto alat penelitian.**


**4a. Foto mikropipet dan tip**

**4b. Fo**

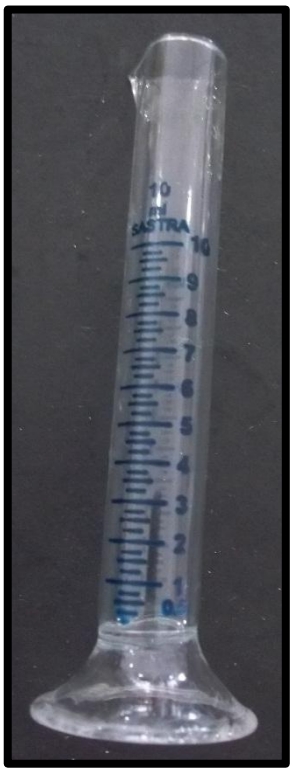




**4c. Foto jarum ose**

**4d. Foto cawan petri**

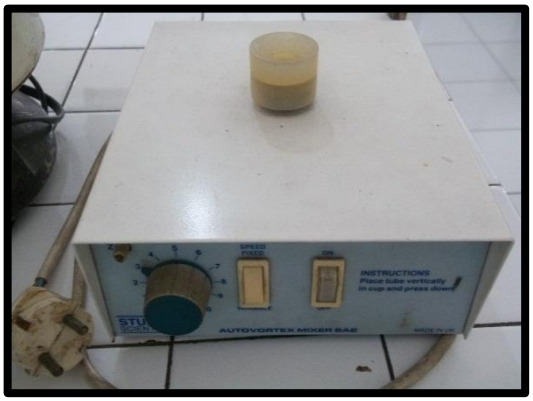
**4e. Foto inkas**




**4f. Foto gelas ukur**


**4g. Foto labu takar**

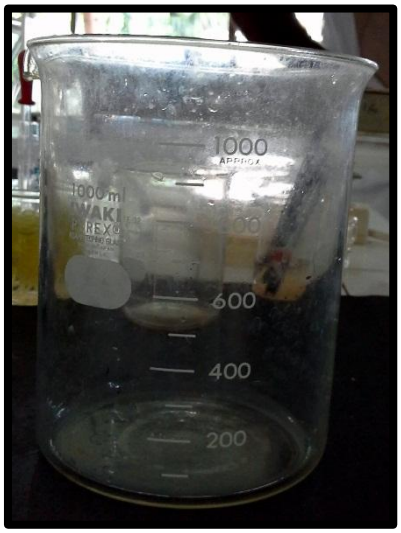
**4h. Foto bunsen**




**4i. vortex**


**4j. foto timbangan analitik**

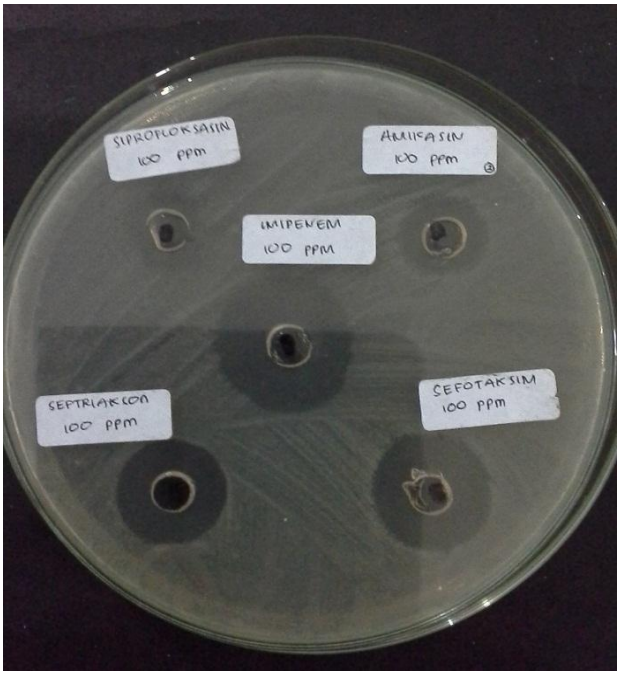
**4l. Foto beaker glass**



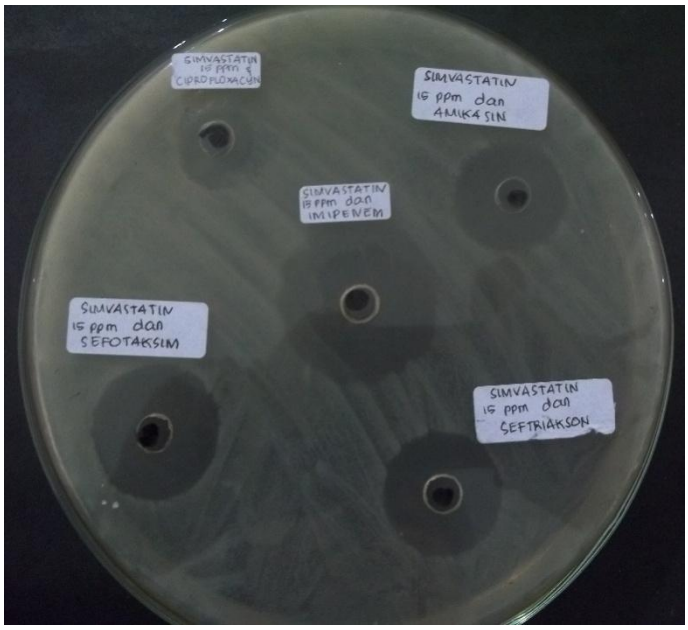

**4k. Foto autoklav**

**Lampiran 5. Foto hasil percobaan**

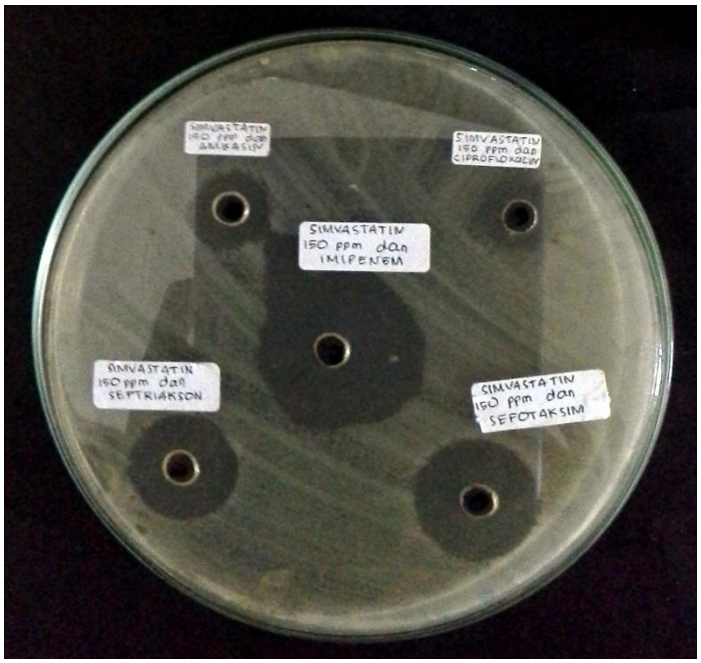

**5a. foto hasil efek simvastatin 15 dan 150 ppm terhadap bakteri *Klebsiella pneumoniae***



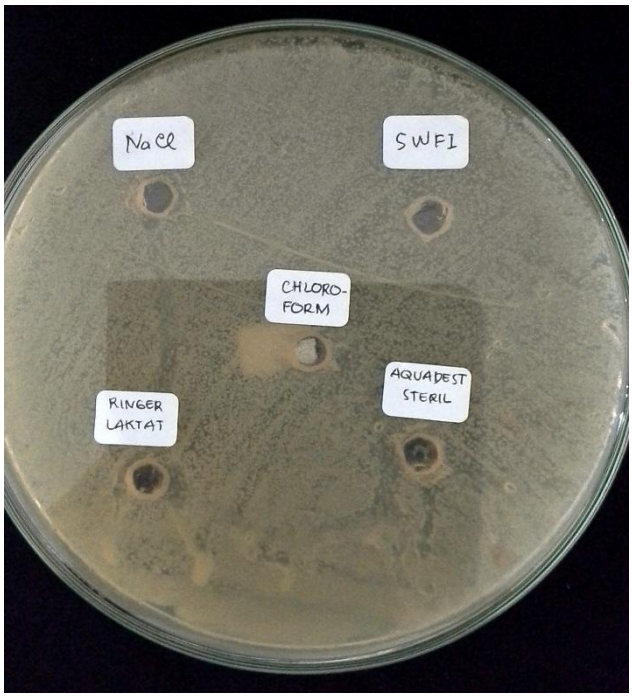

**5b. foto hasil efek antibiotik seftriakson, siprofloksasin, sefotaksim, imipenem, dan amikasin 100 ppm terhadap bakteri *Klebsiella pneumoniae.***




**5c. foto hasil efek kombinasi simvastatin 15 ppm dengan kelima antibiotik terhadap bakteri *Klebsiella pneumoniae***




**5d. foto hasil efek kombinasi simvastatin 150 ppm dengan kelima antibiotik terhdap bakteri *Klebsiella pneumoniae.***




**5f. foto kontrol pelarut.**

**Lampiran 6. Tabel hasil uji statistik.**
**6a. Hasil uji statistik perbandingan diameter daya hambat seftriakson dan kombinasi seftriakson dengan simvastatin 15 dan 150ppm.**

## Npar Tests

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| diameter daya hambat | 9 | 25.22 | 2.108 | 23 | 29 |

**One-Sample Kolmogorov-Smirnov Test**

| | | diameter daya hambat |
|---|---|---|
| N | | 9 |
| Normal Parameters[a,,b] | Mean | 25.22 |
| | Std. Deviation | 2.108 |
| Most Extreme Differences | Absolute | .209 |
| | Positive | .209 |
| | Negative | -.146 |
| Kolmogorov-Smirnov Z | | .626 |
| Asymp. Sig. (2-tailed) | | .828 |

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

**Test of Homogeneity of Variances**

diameter daya hambat

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 1.968 | 2 | 6 | .220 |

**ANOVA**

diameter daya hambat

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 13.556 | 2 | 6.778 | 1.848 | .237 |
| Within Groups | 22.000 | 6 | 3.667 | | |
| Total | 35.556 | 8 | | | |

**6b. Hasil uji statistik perbandingan diameter daya hambat sefotaksim dan kombinasi sefotaksim dengan simvastatin 15 dan 150 ppm.**

## NPar Tests

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| diameter daya hambat | 9 | 25.67 | 4.000 | 18 | 30 |

**One-Sample Kolmogorov-Smirnov Test**

| | | diameter daya hambat |
|---|---|---|
| N | | 9 |
| Normal Parameters[a,,b] | Mean | 25.67 |
| | Std. Deviation | 4.000 |
| Most Extreme Differences | Absolute | .311 |
| | Positive | .169 |
| | Negative | -.311 |
| Kolmogorov-Smirnov Z | | .933 |
| Asymp. Sig. (2-tailed) | | .349 |

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

**Test of Homogeneity of Variances**

diameter daya hambat

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 4.989 | 2 | 6 | .053 |

**ANOVA**

diameter daya hambat

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 88.667 | 2 | 44.333 | 6.763 | .029 |
| Within Groups | 39.333 | 6 | 6.556 | | |
| Total | 128.000 | 8 | | | |

**Post Hoc Tests**

**Multiple Comparisons**

Dependent Variable:diameter daya hambat

| | (I) sampel | (J) sampel | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound |
| Tukey HSD | sefotaksim | sefotaksim + simvastatin 15 ppm | -5.667 | 2.091 | .078 | -12.08 | .75 |
| | | sefotaksim + simvastatin 150 ppm | -7.333* | 2.091 | .029 | -13.75 | -.92 |
| | sefotaksim + simvastatin 15 ppm | sefotaksim | 5.667 | 2.091 | .078 | -.75 | 12.08 |
| | | sefotaksim + simvastatin 150 ppm | -1.667 | 2.091 | .718 | -8.08 | 4.75 |
| | sefotaksim + simvastatin 150 ppm | sefotaksim | 7.333* | 2.091 | .029 | .92 | 13.75 |
| | | sefotaksim + simvastatin 15 ppm | 1.667 | 2.091 | .718 | -4.75 | 8.08 |
| Bonferroni | sefotaksim | sefotaksim + simvastatin 15 ppm | -5.667 | 2.091 | .105 | -12.54 | 1.21 |
| | | sefotaksim + simvastatin 150 ppm | -7.333* | 2.091 | .038 | -14.21 | -.46 |
| | sefotaksim + simvastatin 15 ppm | sefotaksim | 5.667 | 2.091 | .105 | -1.21 | 12.54 |
| | | sefotaksim + simvastatin 150 ppm | -1.667 | 2.091 | 1.000 | -8.54 | 5.21 |
| | sefotaksim + simvastatin 150 ppm | sefotaksim | 7.333* | 2.091 | .038 | .46 | 14.21 |
| | | sefotaksim + simvastatin 15 ppm | 1.667 | 2.091 | 1.000 | -5.21 | 8.54 |

*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

**diameter daya hambat**

| | sampel | N | Subset for alpha = 0.05 | |
|---|---|---|---|---|
| | | | 1 | 2 |
| Tukey HSD[a] | sefotaksim | 3 | 21.33 | |
| | sefotaksim + simvastatin 15 ppm | 3 | 27.00 | 27.00 |
| | sefotaksim + simvastatin 150 ppm | 3 | | 28.67 |
| | Sig. | | .078 | .718 |

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

**6c. Hasil uji statistik perbandingan diameter daya hambat siprofloksasin dan kombinasi siprofloksasin dengan simvastatin 15 dan 150 ppm.**

## NPar Tests

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| diameter daya hambat | 9 | 21.00 | 3.428 | 17 | 28 |

**One-Sample Kolmogorov-Smirnov Test**

| | | diameter daya hambat |
|---|---|---|
| N | | 9 |
| Normal Parameters[a,,b] | Mean | 21.00 |
| | Std. Deviation | 3.428 |
| Most Extreme Differences | Absolute | .170 |
| | Positive | .170 |
| | Negative | -.122 |
| Kolmogorov-Smirnov Z | | .511 |
| Asymp. Sig. (2-tailed) | | .957 |

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

**Test of Homogeneity of Variances**

diameter daya hambat

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| .630 | 2 | 6 | .564 |

**ANOVA**

diameter daya hambat

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 18.667 | 2 | 9.333 | .743 | .515 |
| Within Groups | 75.333 | 6 | 12.556 | | |
| Total | 94.000 | 8 | | | |

**6d. Hasil uji statistik perbandingan diameter daya hambat imipenem dan kombinasi imipenem dengan simvastatin 15 dan 150 ppm.**

## NPar Tests

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| diameter daya hambat | 9 | 32.11 | 2.472 | 29 | 37 |

**One-Sample Kolmogorov-Smirnov Test**

| | | diameter daya hambat |
|---|---|---|
| N | | 9 |
| Normal Parameters[a,,b] | Mean | 32.11 |
| | Std. Deviation | 2.472 |
| Most Extreme Differences | Absolute | .185 |
| | Positive | .185 |
| | Negative | -.149 |
| Kolmogorov-Smirnov Z | | .554 |
| Asymp. Sig. (2-tailed) | | .919 |

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

**Test of Homogeneity of Variances**

diameter daya hambat

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 3.564 | 2 | 6 | .095 |

**ANOVA**

diameter daya hambat

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 20.222 | 2 | 10.111 | 2.116 | .202 |
| Within Groups | 28.667 | 6 | 4.778 | | |
| Total | 48.889 | 8 | | | |

**6e. Hasil uji statistik perbandingan diameter daya hambat amikasin dan kombinasi amikasin dengan simvastatin 15 dan 150ppm.**

## NPar Tests

**Descriptive Statistics**

| | N | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| diameter daya hambat | 9 | 19.11 | 1.364 | 17 | 22 |

**One-Sample Kolmogorov-Smirnov Test**

| | | diameter daya hambat |
|---|---|---|
| N | | 9 |
| Normal Parameters[a,,b] | Mean | 19.11 |
| | Std. Deviation | 1.364 |
| Most Extreme Differences | Absolute | .310 |
| | Positive | .310 |
| | Negative | -.245 |
| Kolmogorov-Smirnov Z | | .931 |
| Asymp. Sig. (2-tailed) | | .352 |

a. Test distribution is Normal.

b. Calculated from data.

## Oneway

**Test of Homogeneity of Variances**

diameter daya hambat

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 2.261 | 2 | 6 | .185 |

**ANOVA**

diameter daya hambat

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 3.556 | 2 | 1.778 | .941 | .441 |
| Within Groups | 11.333 | 6 | 1.889 | | |
| Total | 14.889 | 8 | | | |

**Lampiran 7. Perhitungan pembuatan larutan uji**

**7a. Perhitungan pembuatan simvastatin 15 dan 150ppm.**

- Pembuatan larutan stock simvastatin 600 ppm dengan cara melarutkan simvastatin 60 mg, masukkan labu takar 100 ml, larutkan dengan kloroform ad 100 mL.
- Pengenceran simvastatin 600 ppm menjadi 150 ppm.

  V1 . C1 = V2 . C2

  100 . 150 = V2 . 600

  $V2 = \frac{15000}{600}$

  = 25

Pipet 25 ml dari larutan stock 600 ppm, masukkan dalam labu takar 100 ml, tambahkan kloroform ad 100 ml.

- Pengenceran simvastatin 150 ppm menjadi 15 ppm

  V1. C1 = V2 .C2

  100 . 15 = V2 . 15

  $V2 = \frac{1500}{150}$

  = 10

Pipet 10 ml dari larutan simvastatin 150 ppm, masukkan labu takar 100 ml, tambahkan kloroform ad 100 ml.

**7b. Perhitungan pembuatan antibiotik siprofloksasin 100 ppm**

- Membuat larutan stock dengan menimbang siprofloksasin 100 mg, masukkan labu takar 100 ml, larutkan dengan aquadest steril ad 100 ml.
- Pengenceran siprofloksasin 1000 ppm menjadi 100 ppm

C1 . V1 = C2 . V2

1000 . 10 = C2 . 100

$$C2 = \frac{10000}{100}$$

= 100 ppm

Pipet 10 ml larutan siprofloksain1000 ppm, masukkan labu takar 100 ml, tambahkanaquadest steril ad 100 ml.

**7c. Perhitungan pembuatan antibiotik seftriakson 100 ppm**

- Tersedia injeksi seftriakson $1^{g}/_{10\ ml}$ pelarut, dibuat konsentrasi 100 ppm.
- Seftriakson $1^{g}/_{10\ ml}$ = 100000 $^{mg}/_{1000\ ml}$ = 100000 ppm larutan stock diencerkan menjadi 100 ppm

C1 . V1 = C2 . V2

100000 . 0,1 = C2 . 100

$$C2 = \frac{10000}{100}$$

= 100 ppm

Pipet 0,1 ml injeksi seftriakson, masukkan labu takar 100 ml, tambahkan dengan *Sterille Water for Injection* ad 100 ml.

**7d. Perhitungan pembuatan antibiotik sefotaksim 100 ppm**

- Tersedia injeksi sefotaksim $1^{g}/_{4\ ml}$ pelarut, dibuat konsentrasi 100 ppm.
- Sefotaksim $1^{g}/_{4\ ml}$ = 250000 $^{mg}/_{1000\ ml}$ = 250000 ppm diencerkan menjadi5000 ppm

C1 . V1 = C2 . V2

250000 . 1 = C2 . 50

$$C2 = \frac{250000}{50}$$

= 5000 ppm

Pipet 1 ml injeksi sefotaksim dari larutan stock 250000 ppm, masukkan labu takar 50 ml, tambahkan dengan *Sterille Water for Injection* ad 50 ml.

- Pengenceran sefotaksim 5000 ppm menjadi 100 ppm

C1. V1 = C2 . V2

5000 . 1 = C2 . 50

$$C2 = \frac{5000}{50}$$

= 100 ppm

Pipet larutan injeksi sefotaksim 5000 ppm, masukkan labu takar 50 ml, tambahkan *Sterille Water for Injection* ad 50 ml.

**7e. Perhitungan pembuatan antibiotik imipenem 100 ppm.**

- Tersedia injeksi imipenem 500 $^{mg}/_{100\ ml}$ pelarut, dibuat konsentrasi 100 ppm.
- Imipenem 5000 $^{mg}/_{1ooo\ ml}$ = 5000 ppm diencerkan menjadi 100 ppm

C1 . V1 = C2 . V2

$5000 \cdot 1 = C2 \cdot 50$

$$C2 = \frac{5000}{50}$$

$= 100$ ppm

Pipet 1 ml larutan injeksi imipenem dari larutan stock 5000 ppm, masukkan labu takar 50 ml, tambahkan pelarut NaCl ad 50 ml.

**Lampiran 16. Perhitungan pembuatan antibiotik amikasin 100 ppm**

- Tersedia injeksi amikasin 250 $^{mg}/_{2\ ml}$ pelarut, dibuat konsentrasi 100 ppm
- Amikasin 250 $^{mg}/_{2\ ml}$ = 125000 $^{mg}/_{1000\ ml}$ = 125000 ppm dijadikan 500 ppm

  $C1 \cdot V1 = C2 \cdot V2$

  $125000 \cdot 0{,}1 = C2 \cdot 25$

  $$C2 = \frac{12500}{25}$$

  $= 500$ ppm

Pipet 0,1 ml larutan injeksi amikasin dari larutan stock 125000 ppm, masukkan labu takar 25 ml, tambahkan ringer laktat ad 25 ml.

- Pengenceran amikasin 500 ppm menjadi 100 ppm

  $C1 \cdot V1 = C2 \cdot V2$

  $500 \cdot 5 = C2 \cdot 25$

  $$C2 = \frac{2500}{25}$$

  $= 100$ ppm

Pipet 5 ml larutan injeksi amikasin dari 500 ppm, masukkan labu takar 25 ml, tambahkan ringer laktat ad 25 ml.