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APPENDICES

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## APPENDIX 1

Calibration Data of Indomethacin in  
Phosphate Buffer of pH 7.2:DIW (1:4).

| Conc. (ug/ml) | Absorbance* |
|---------------|-------------|
| 10.36         | 0.203       |
| 15.54         | 0.305       |
| 20.72         | 0.411       |
| 31.08         | 0.618       |
| 41.44         | 0.818       |
| 51.80         | 1.023       |

\* = Average from three determinations.

## Regression Output:

|                     |              |
|---------------------|--------------|
| Constant            | -0.000356725 |
| Std Err of Y Est    | 0.0025418524 |
| R Squared           | 0.9999481538 |
| No. of Observations | 6            |
| Degrees of Freedom  | 4            |
| X Coefficient(s)    | 0.0197757908 |
| Std Err of Coef.    | 0.000071199  |

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## APPENDIX 2

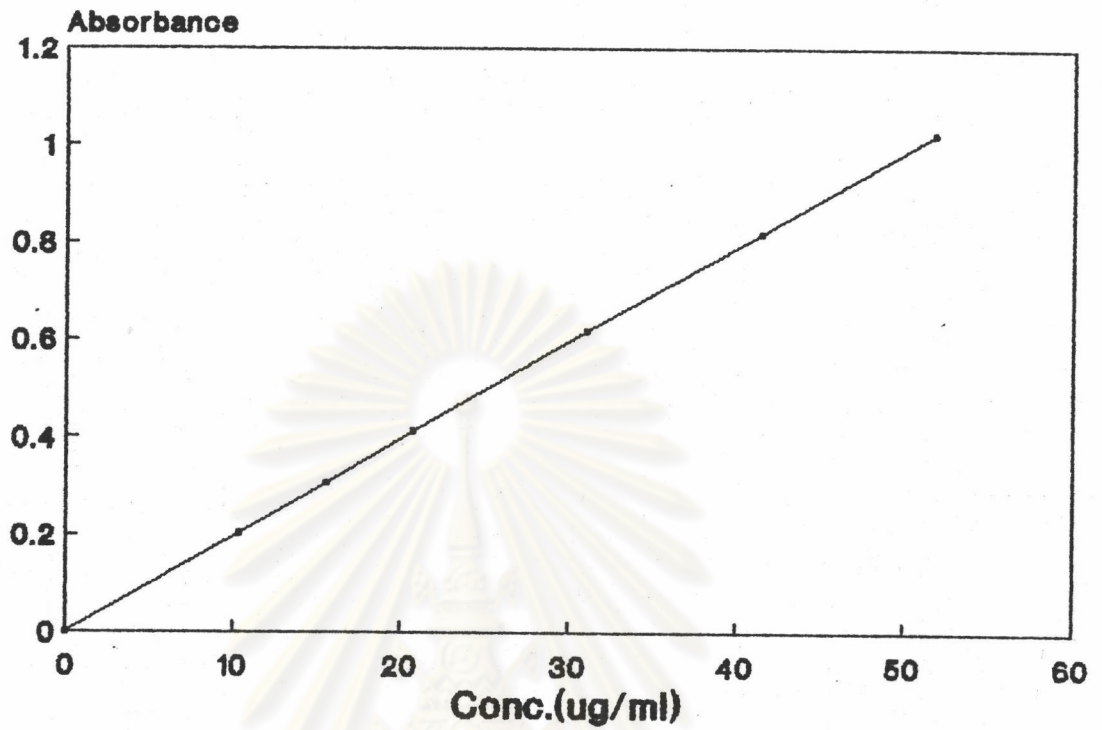


Figure 75 Standard curve of indomethacin in phosphate buffer of pH 7.2 : DIW (1:4) at 318 nm.

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 3

Calibration Data of Indomethacin in Phosphate Buffer of pH 7.0:Methanol (1:1).

| Conc.(ug/ml) | Absorbance* |
|--------------|-------------|
| 10.52        | 0.201       |
| 21.04        | 0.404       |
| 31.56        | 0.606       |
| 42.08        | 0.815       |
| 52.60        | 1.022       |

\* = Average from three determinations.

## Regression Output:

|                     |              |
|---------------------|--------------|
| Constant            | -0.0057      |
| Std Err of Y Est    | 0.0024547761 |
| R Squared           | 0.999957055  |
| No. of Observations | 5            |
| Degrees of Freedom  | 3            |
| X Coefficient(s)    | 0.0195025349 |
| Std Err of Coef.    | 0.0000737898 |

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## APPENDIX 4

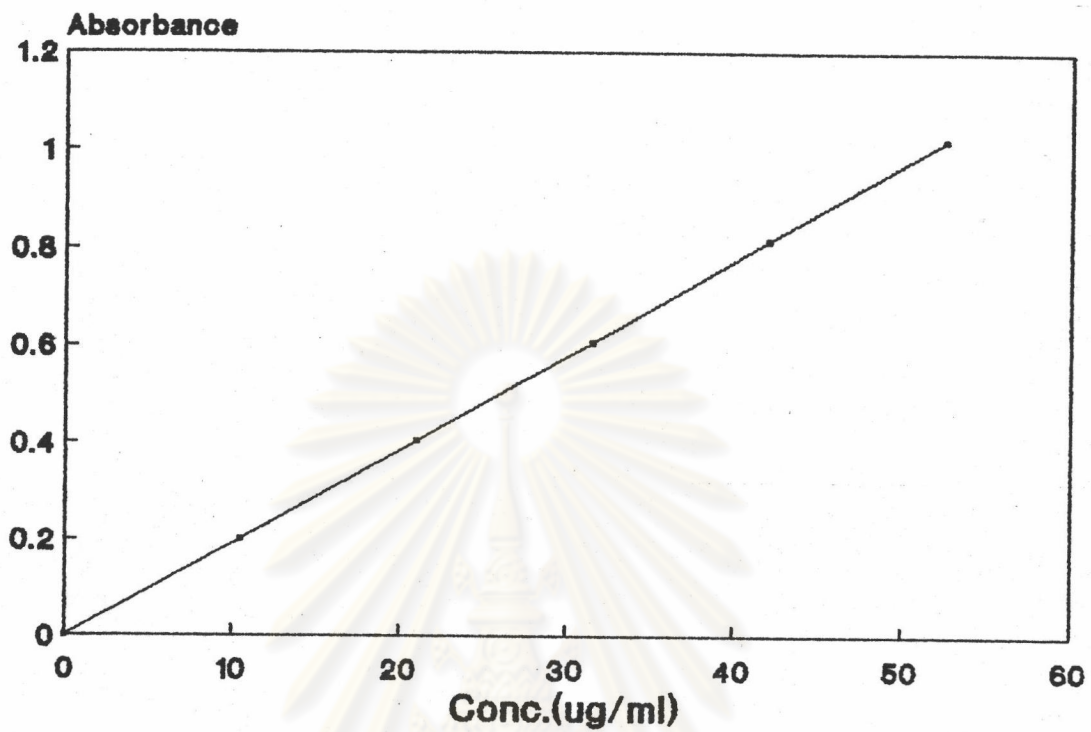


Figure 76 Standard curve of indomethacin in phosphate buffer of pH 7.0 : methanol (1:1) at 318 nm.

ศูนย์วิทยทรัพยากร  
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## APPENDIX 5



The percentage content of indomethacin in various preparations.

| METHOD | CDS   | RATIOS | ZCONTENT |        |        | AVG    | SD   | ZCV  |
|--------|-------|--------|----------|--------|--------|--------|------|------|
| GM     | ALPHA | 1:0.5  | 96.72    | 99.62  | 95.30  | 97.21  | 1.80 | 1.85 |
|        |       | 1:1    | 97.35    | 99.50  | 97.54  | 98.13  | 0.97 | 0.99 |
|        |       | 1:2    | 98.56    | 98.91  | 98.11  | 98.53  | 0.33 | 0.33 |
|        |       | 1:3    | 99.85    | 98.25  | 98.07  | 98.72  | 0.80 | 0.81 |
|        | BETA  | 1:0.5  | 97.63    | 97.19  | 97.10  | 97.31  | 0.23 | 0.24 |
|        |       | 1:1    | 96.81    | 96.20  | 97.02  | 96.68  | 0.35 | 0.36 |
|        |       | 1:2    | 101.08   | 99.82  | 98.93  | 99.94  | 0.88 | 0.88 |
|        |       | 1:3    | 98.64    | 98.48  | 97.57  | 98.23  | 0.47 | 0.48 |
|        |       | 1:6    | 99.77    | 100.71 | 100.21 | 100.23 | 0.38 | 0.38 |
|        |       | 1:10   | 96.17    | 97.25  | 96.57  | 96.66  | 0.45 | 0.46 |
|        | GAMMA | 1:0.5  | 99.12    | 96.18  | 99.18  | 98.16  | 1.40 | 1.43 |
|        |       | 1:1    | 98.80    | 98.01  | 98.12  | 98.31  | 0.35 | 0.36 |
| 1:2    |       | 99.42  | 99.63    | 100.25 | 99.77  | 0.35   | 0.35 |      |
| 1:3    |       | 97.31  | 98.05    | 97.31  | 97.56  | 0.35   | 0.36 |      |
| DIMEB  | 1:0.5 | 100.21 | 100.90   | 100.50 | 100.54 | 0.28   | 0.28 |      |
|        | 1:1   | 100.71 | 100.62   | 100.96 | 100.76 | 0.14   | 0.14 |      |
|        | 1:2   | 99.20  | 99.93    | 99.23  | 99.45  | 0.34   | 0.34 |      |
|        | 1:3   | 99.86  | 100.43   | 101.79 | 100.69 | 0.81   | 0.80 |      |
| KM     | ALPHA | 1:0.5  | 102.85   | 101.53 | 101.77 | 102.05 | 0.57 | 0.56 |
|        |       | 1:1    | 99.10    | 98.89  | 98.47  | 98.82  | 0.26 | 0.27 |
|        |       | 1:2    | 96.79    | 96.65  | 96.56  | 96.67  | 0.09 | 0.10 |
|        |       | 1:3    | 96.81    | 97.32  | 96.75  | 96.96  | 0.26 | 0.26 |
|        | BETA  | 1:0.5  | 99.46    | 100.14 | 100.09 | 99.90  | 0.31 | 0.31 |
|        |       | 1:1    | 98.54    | 100.14 | 100.86 | 99.85  | 0.97 | 0.97 |
|        |       | 1:2    | 96.62    | 97.27  | 97.23  | 97.04  | 0.30 | 0.31 |
|        |       | 1:3    | 103.59   | 102.25 | 97.19  | 101.01 | 2.76 | 2.73 |
|        |       | 1:6    | 99.59    | 99.32  | 99.62  | 99.51  | 0.13 | 0.14 |
|        |       | 1:10   | 97.23    | 97.46  | 97.25  | 97.31  | 0.10 | 0.11 |
|        | GAMMA | 1:0.5  | 97.78    | 97.13  | 97.87  | 97.59  | 0.33 | 0.34 |
|        |       | 1:1    | 98.62    | 97.10  | 97.97  | 97.90  | 0.62 | 0.64 |
| 1:2    |       | 98.21  | 98.71    | 98.55  | 98.49  | 0.21   | 0.21 |      |
| 1:3    |       | 98.03  | 99.77    | 98.92  | 98.91  | 0.71   | 0.72 |      |
| DIMEB  | 1:0.5 | 102.22 | 99.63    | 99.91  | 100.59 | 1.16   | 1.15 |      |
|        | 1:1   | 97.49  | 98.30    | 97.75  | 97.85  | 0.34   | 0.35 |      |
|        | 1:2   | 99.46  | 98.41    | 99.37  | 99.08  | 0.48   | 0.48 |      |
|        | 1:3   | 99.45  | 100.08   | 100.59 | 100.04 | 0.47   | 0.47 |      |

## APPENDIX 5 (continued)

The percentage content of indomethacin in various preparations.

| METHOD | CDS   | RATIOS | ZCONTENT |       | AVG   | SD    | ZCV  |      |
|--------|-------|--------|----------|-------|-------|-------|------|------|
| SD     | ALPHA | 1:1    | 97.72    | 97.68 | 97.62 | 97.67 | 0.04 | 0.04 |
|        |       | 1:2    | 97.12    | 98.09 | 97.01 | 97.41 | 0.49 | 0.50 |
|        |       | 1:3    | 97.36    | 97.06 | 97.65 | 97.36 | 0.24 | 0.25 |
|        | BETA  | 1:1    | 97.11    | 97.02 | 97.05 | 97.06 | 0.04 | 0.04 |
|        |       | 1:2    | 97.06    | 96.55 | 97.19 | 96.93 | 0.28 | 0.28 |
|        |       | 1:3    | 96.00    | 96.77 | 96.70 | 96.49 | 0.35 | 0.36 |
|        | GAMMA | 1:1    | 97.35    | 96.80 | 97.71 | 97.29 | 0.37 | 0.38 |
|        |       | 1:2    | 97.50    | 97.24 | 96.46 | 97.07 | 0.44 | 0.46 |
|        |       | 1:3    | 97.12    | 97.21 | 96.87 | 97.07 | 0.14 | 0.15 |
| DIMEB  | 1:1   | 97.76  | 98.16    | 98.53 | 98.15 | 0.31  | 0.32 |      |
|        | 1:2   | 96.12  | 97.74    | 96.66 | 96.84 | 0.67  | 0.70 |      |
|        | 1:3   | 101.06 | 99.33    | 99.04 | 99.81 | 0.89  | 0.89 |      |

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## APPENDIX 6

Dissolution data of indomethacin from pure drug, grounded drug, kneaded drug and treated drug in phosphate buffer of pH 7.2:deionized water(1:4).

| Type of drug | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV   |
|--------------|------------|------------------|-------|-------|-------|-------|-------|-------|------|-------|
|              |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |       |
| IDM          | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|              | 2          | 2.95             | 3.72  | 4.59  | 4.72  | 6.30  | 3.14  | 4.24  | 1.14 | 26.83 |
|              | 4          | 9.79             | 10.50 | 13.32 | 13.48 | 12.30 | 11.98 | 11.90 | 1.36 | 11.43 |
|              | 6          | 17.69            | 18.63 | 23.54 | 26.81 | 18.48 | 22.79 | 21.32 | 3.31 | 15.53 |
|              | 8          | 24.52            | 26.45 | 33.31 | 35.72 | 23.55 | 33.67 | 29.54 | 4.83 | 16.36 |
|              | 12         | 36.32            | 37.06 | 45.74 | 52.36 | 34.16 | 50.65 | 42.72 | 7.20 | 16.86 |
|              | 16         | 46.74            | 46.19 | 55.13 | 64.74 | 44.85 | 63.48 | 53.52 | 8.19 | 15.31 |
|              | 20         | 55.66            | 54.20 | 63.42 | 73.30 | 52.85 | 72.87 | 62.05 | 8.49 | 13.68 |
|              | 25         | 64.64            | 61.78 | 71.11 | 79.50 | 62.35 | 80.40 | 69.96 | 7.69 | 10.99 |
|              | 30         | 71.55            | 68.58 | 76.77 | 84.53 | 69.59 | 85.48 | 76.08 | 6.82 | 8.97  |
|              | 35         | 76.94            | 73.77 | 81.55 | 87.79 | 75.56 | 88.68 | 80.71 | 5.82 | 7.21  |
|              | 40         | 81.01            | 78.40 | 85.45 | 90.01 | 80.26 | 90.87 | 84.33 | 4.81 | 5.71  |
|              | 50         | 86.68            | 84.24 | 89.77 | 92.69 | 87.76 | 93.37 | 89.08 | 3.24 | 3.63  |
| 60           | 90.15      | 88.09            | 92.16 | 94.19 | 91.81 | 94.85 | 91.87 | 2.29  | 2.49 |       |
| GD           | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|              | 2          | 6.27             | 5.71  | 5.16  | 4.05  | 3.35  | 3.26  | 4.64  | 1.15 | 24.89 |
|              | 4          | 19.82            | 19.76 | 18.51 | 12.47 | 11.17 | 10.45 | 15.36 | 4.06 | 26.46 |
|              | 6          | 34.36            | 37.15 | 33.49 | 22.88 | 21.19 | 19.52 | 28.10 | 7.06 | 25.11 |
|              | 8          | 44.75            | 48.86 | 47.65 | 33.00 | 30.69 | 29.96 | 39.15 | 8.08 | 20.64 |
|              | 12         | 60.67            | 64.61 | 64.37 | 46.96 | 44.74 | 42.22 | 53.93 | 9.48 | 17.57 |
|              | 16         | 72.91            | 74.66 | 76.25 | 58.57 | 56.05 | 51.67 | 65.02 | 9.84 | 15.14 |
|              | 20         | 80.67            | 81.52 | 83.10 | 67.95 | 65.49 | 58.66 | 72.90 | 9.32 | 12.78 |
|              | 25         | 86.20            | 85.87 | 87.51 | 76.18 | 73.52 | 66.38 | 79.28 | 7.83 | 9.88  |
|              | 30         | 89.64            | 88.41 | 90.40 | 82.27 | 79.36 | 72.76 | 83.81 | 6.36 | 7.59  |
|              | 35         | 90.98            | 89.83 | 91.92 | 86.32 | 84.17 | 78.03 | 86.88 | 4.77 | 5.50  |
|              | 40         | 92.17            | 90.69 | 92.82 | 89.44 | 87.25 | 81.77 | 89.02 | 3.72 | 4.18  |
|              | 50         | 93.22            | 91.69 | 93.72 | 92.93 | 90.24 | 86.14 | 91.32 | 2.58 | 2.83  |
| 60           | 93.66      | 92.42            | 94.31 | 94.62 | 91.89 | 89.23 | 92.69 | 1.82  | 1.97 |       |
| KD           | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|              | 2          | 5.99             | 5.84  | 7.83  | 4.66  | 5.10  | 6.35  | 5.96  | 1.01 | 16.91 |
|              | 4          | 9.95             | 9.53  | 12.35 | 7.76  | 9.03  | 10.20 | 9.80  | 1.39 | 14.13 |
|              | 6          | 14.06            | 13.75 | 17.25 | 10.89 | 12.84 | 14.20 | 13.83 | 1.89 | 13.70 |
|              | 8          | 18.19            | 17.75 | 21.94 | 14.18 | 16.67 | 18.36 | 17.85 | 2.31 | 12.94 |
|              | 12         | 25.57            | 24.67 | 30.34 | 20.26 | 23.56 | 25.70 | 25.02 | 3.00 | 11.98 |
|              | 16         | 33.22            | 31.89 | 37.41 | 27.15 | 31.07 | 32.96 | 32.28 | 3.04 | 9.43  |
|              | 20         | 40.34            | 38.53 | 43.85 | 33.17 | 39.06 | 40.26 | 39.20 | 3.19 | 8.13  |
|              | 25         | 48.09            | 45.83 | 50.89 | 40.29 | 48.54 | 48.93 | 47.10 | 3.38 | 7.19  |
|              | 30         | 55.18            | 52.56 | 57.41 | 47.01 | 56.21 | 56.47 | 54.14 | 3.53 | 6.53  |
|              | 35         | 61.25            | 58.45 | 62.48 | 53.30 | 62.78 | 62.74 | 60.17 | 3.42 | 5.68  |
|              | 40         | 66.40            | 63.49 | 67.35 | 59.17 | 68.52 | 68.53 | 65.58 | 3.33 | 5.08  |
|              | 50         | 74.68            | 71.83 | 75.01 | 68.00 | 77.19 | 76.85 | 73.93 | 3.17 | 4.29  |
| 60           | 80.98      | 78.35            | 81.22 | 74.89 | 83.74 | 82.99 | 80.36 | 2.98  | 3.71 |       |



## APPENDIX 6 (continued)

Dissolution data of indomethacin from pure drug, grounded drug, kneaded drug and treated drug in phosphate buffer of pH 7.2:deionized water(1:4).

| Type of drug | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV  |
|--------------|------------|------------------|-------|-------|-------|-------|-------|-------|------|------|
|              |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |      |
| TD           | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|              | 2          | 12.89            | 13.40 | 11.95 | 11.90 | 10.72 | 12.11 | 12.16 | 0.84 | 6.92 |
|              | 4          | 20.36            | 19.75 | 19.16 | 18.56 | 17.31 | 19.24 | 19.07 | 0.96 | 5.04 |
|              | 6          | 26.44            | 25.35 | 25.17 | 24.08 | 22.76 | 25.54 | 24.89 | 1.18 | 4.72 |
|              | 8          | 31.58            | 30.17 | 30.65 | 29.12 | 27.35 | 31.01 | 29.98 | 1.40 | 4.67 |
|              | 12         | 40.03            | 38.57 | 39.95 | 37.74 | 35.83 | 40.47 | 38.76 | 1.61 | 4.16 |
|              | 16         | 48.04            | 45.89 | 48.75 | 45.88 | 43.47 | 48.97 | 46.84 | 1.95 | 4.16 |
|              | 20         | 54.78            | 52.62 | 55.65 | 53.30 | 50.57 | 56.05 | 53.83 | 1.89 | 3.52 |
|              | 25         | 62.04            | 59.23 | 63.43 | 60.36 | 57.12 | 63.47 | 60.94 | 2.30 | 3.77 |
|              | 30         | 67.78            | 64.92 | 69.86 | 66.68 | 63.42 | 69.91 | 67.09 | 2.40 | 3.57 |
|              | 35         | 72.70            | 69.84 | 74.79 | 72.25 | 69.02 | 74.92 | 72.25 | 2.24 | 3.10 |
|              | 40         | 76.80            | 74.15 | 79.05 | 76.66 | 73.91 | 79.08 | 76.61 | 2.06 | 2.69 |
|              | 50         | 82.99            | 80.41 | 85.15 | 83.21 | 85.94 | 84.88 | 83.76 | 1.83 | 2.18 |
| 60           | 87.76      | 85.26            | 89.34 | 88.22 | 85.91 | 88.80 | 87.55 | 1.48  | 1.69 |      |

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



## APPENDIX 7

Dissolution data of indomethacin from indomethacin-alpha-CD grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |        |        |       |       |       | avg.  | SD   | ZCV   |
|--------|------------|------------------|--------|--------|-------|-------|-------|-------|------|-------|
|        |            | #1               | #2     | #3     | #4    | #5    | #6    |       |      |       |
| 1:0.5  | 0          | 0.00             | 0.00   | 0.00   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 9.08             | 9.96   | 13.25  | 11.22 | 11.70 | 9.99  | 10.87 | 1.37 | 12.62 |
|        | 4          | 24.11            | 22.03  | 32.48  | 27.40 | 24.30 | 25.55 | 25.98 | 3.33 | 12.81 |
|        | 6          | 36.81            | 33.28  | 49.32  | 43.85 | 37.60 | 43.17 | 40.67 | 5.32 | 13.09 |
|        | 8          | 48.65            | 43.40  | 63.01  | 57.05 | 49.88 | 54.14 | 52.69 | 6.30 | 11.96 |
|        | 12         | 67.45            | 58.84  | 79.14  | 74.33 | 66.70 | 68.19 | 69.11 | 6.36 | 9.20  |
|        | 16         | 79.76            | 70.63  | 87.79  | 84.07 | 77.80 | 77.52 | 79.59 | 5.40 | 6.78  |
|        | 20         | 87.02            | 78.45  | 93.06  | 90.36 | 85.01 | 83.90 | 86.30 | 4.69 | 5.43  |
|        | 25         | 92.31            | 85.87  | 96.37  | 93.98 | 90.64 | 88.81 | 91.33 | 3.42 | 3.74  |
|        | 30         | 95.61            | 90.93  | 98.08  | 96.18 | 94.33 | 92.54 | 94.61 | 2.36 | 2.50  |
|        | 35         | 97.57            | 94.07  | 99.25  | 97.44 | 96.55 | 94.79 | 96.61 | 1.75 | 1.81  |
|        | 40         | 98.33            | 95.72  | 99.89  | 98.23 | 97.92 | 96.46 | 97.76 | 1.35 | 1.38  |
|        | 50         | 99.23            | 97.68  | 100.34 | 98.53 | 99.16 | 97.97 | 98.82 | 0.88 | 0.90  |
| 60     | 99.46      | 98.61            | 100.62 | 98.84  | 99.54 | 99.35 | 99.40 | 0.64  | 0.64 |       |
| 1:1    | 0          | 0.00             | 0.00   | 0.00   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 22.12            | 20.08  | 16.60  | 11.51 | 10.33 | 12.16 | 15.47 | 4.47 | 28.88 |
|        | 4          | 41.93            | 48.62  | 38.66  | 24.01 | 26.50 | 28.40 | 34.69 | 8.97 | 25.86 |
|        | 6          | 57.66            | 62.91  | 54.84  | 37.42 | 42.63 | 43.01 | 49.75 | 9.22 | 18.53 |
|        | 8          | 67.80            | 67.98  | 67.11  | 48.58 | 55.95 | 55.69 | 60.52 | 7.52 | 12.42 |
|        | 12         | 81.16            | 79.45  | 80.38  | 62.15 | 71.50 | 70.63 | 74.21 | 6.82 | 9.20  |
|        | 16         | 87.69            | 89.75  | 86.78  | 72.08 | 79.95 | 79.89 | 82.69 | 6.05 | 7.31  |
|        | 20         | 91.27            | 95.77  | 90.44  | 78.77 | 85.53 | 85.31 | 87.85 | 5.41 | 6.15  |
|        | 25         | 94.26            | 97.79  | 93.81  | 84.11 | 89.77 | 89.19 | 91.49 | 4.39 | 4.79  |
|        | 30         | 95.17            | 97.64  | 94.42  | 88.11 | 92.04 | 91.50 | 93.15 | 3.03 | 3.26  |
|        | 35         | 95.93            | 97.65  | 94.87  | 90.48 | 93.55 | 92.95 | 94.24 | 2.28 | 2.42  |
|        | 40         | 96.24            | 100.44 | 95.48  | 92.16 | 94.30 | 93.69 | 95.39 | 2.61 | 2.73  |
|        | 50         | 96.10            | 102.94 | 95.31  | 93.99 | 95.21 | 94.43 | 96.33 | 3.03 | 3.15  |
| 60     | 97.16      | 103.44           | 95.14  | 95.00  | 95.81 | 94.88 | 96.90 | 3.02  | 3.12 |       |
| 1:2    | 0          | 0.00             | 0.00   | 0.00   | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 19.04            | 16.77  | 15.26  | 17.08 | 16.30 | 13.70 | 16.36 | 1.64 | 10.04 |
|        | 4          | 38.62            | 37.43  | 33.92  | 33.26 | 36.38 | 32.72 | 35.39 | 2.21 | 6.25  |
|        | 6          | 55.09            | 54.09  | 52.27  | 50.51 | 54.05 | 50.26 | 52.71 | 1.84 | 3.50  |
|        | 8          | 65.80            | 65.64  | 65.92  | 62.62 | 65.89 | 62.92 | 64.80 | 1.44 | 2.22  |
|        | 12         | 78.58            | 78.80  | 80.09  | 76.60 | 78.24 | 77.13 | 78.24 | 1.14 | 1.46  |
|        | 16         | 86.04            | 86.07  | 87.64  | 84.72 | 85.61 | 84.97 | 85.84 | 0.95 | 1.10  |
|        | 20         | 90.62            | 90.92  | 91.86  | 89.57 | 90.34 | 89.64 | 90.49 | 0.78 | 0.87  |
|        | 25         | 93.99            | 93.97  | 94.95  | 93.06 | 93.76 | 93.30 | 93.84 | 0.60 | 0.64  |
|        | 30         | 95.83            | 95.80  | 96.29  | 94.91 | 95.86 | 95.23 | 95.65 | 0.45 | 0.47  |
|        | 35         | 96.91            | 96.73  | 97.06  | 96.08 | 97.07 | 96.57 | 96.74 | 0.34 | 0.36  |
|        | 40         | 97.37            | 97.65  | 97.82  | 96.83 | 97.84 | 97.34 | 97.48 | 0.35 | 0.36  |
|        | 50         | 97.99            | 97.96  | 98.15  | 97.58 | 98.61 | 97.96 | 98.04 | 0.31 | 0.31  |
| 60     | 98.30      | 98.12            | 98.04  | 97.78  | 98.94 | 98.43 | 98.27 | 0.36  | 0.37 |       |

## APPENDIX 7 (continued)

Dissolution data of indomethacin from indomethacin-alpha-CD grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV   |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|-------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |       |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 17.39            | 26.01 | 22.34 | 26.61 | 26.59 | 24.45 | 23.90 | 3.27 | 13.67 |
|        | 4          | 41.68            | 53.48 | 47.23 | 50.00 | 50.70 | 50.59 | 48.94 | 3.72 | 7.61  |
|        | 6          | 63.13            | 69.11 | 65.98 | 65.05 | 64.30 | 66.20 | 65.63 | 1.87 | 2.84  |
|        | 8          | 76.63            | 79.51 | 76.87 | 74.12 | 72.66 | 76.05 | 75.97 | 2.17 | 2.85  |
|        | 12         | 88.37            | 88.48 | 87.52 | 83.11 | 81.98 | 85.11 | 85.76 | 2.55 | 2.97  |
|        | 16         | 93.07            | 92.77 | 92.24 | 88.51 | 88.00 | 90.52 | 90.85 | 2.01 | 2.21  |
|        | 20         | 95.81            | 95.01 | 94.53 | 91.97 | 91.93 | 93.68 | 93.82 | 1.47 | 1.56  |
|        | 25         | 97.28            | 96.37 | 95.91 | 94.54 | 94.51 | 95.72 | 95.72 | 0.98 | 1.02  |
|        | 30         | 97.91            | 96.99 | 96.68 | 96.06 | 96.04 | 96.76 | 96.74 | 0.63 | 0.65  |
|        | 35         | 98.26            | 97.31 | 97.15 | 97.13 | 97.11 | 97.38 | 97.39 | 0.40 | 0.41  |
|        | 40         | 98.45            | 97.48 | 97.15 | 97.59 | 97.57 | 97.72 | 97.66 | 0.39 | 0.40  |
|        | 50         | 98.51            | 97.65 | 97.31 | 98.06 | 98.19 | 98.05 | 97.96 | 0.39 | 0.39  |
| 60     | 98.56      | 97.52            | 97.30 | 98.37 | 98.35 | 98.24 | 98.06 | 0.47  | 0.48 |       |

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 8

Dissolution data of indomethacin from indomethacin-beta-CD grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |        |       |        |       |       | avg.  | SD   | ZCV   |
|--------|------------|------------------|--------|-------|--------|-------|-------|-------|------|-------|
|        |            | #1               | #2     | #3    | #4     | #5    | #6    |       |      |       |
| 1:0.5  | 0          | 0.00             | 0.00   | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 7.35             | 5.05   | 7.33  | 6.32   | 6.34  | 6.42  | 6.47  | 0.77 | 11.90 |
|        | 4          | 16.74            | 18.13  | 22.37 | 18.62  | 16.76 | 14.94 | 17.93 | 2.31 | 12.87 |
|        | 6          | 26.99            | 31.78  | 37.96 | 31.15  | 29.91 | 25.49 | 30.55 | 3.99 | 13.06 |
|        | 8          | 36.68            | 45.36  | 50.94 | 43.48  | 44.88 | 35.20 | 42.76 | 5.37 | 12.55 |
|        | 12         | 51.97            | 60.79  | 68.54 | 59.31  | 60.90 | 53.00 | 59.09 | 5.53 | 9.35  |
|        | 16         | 64.04            | 72.15  | 79.44 | 73.19  | 71.35 | 67.59 | 71.29 | 4.78 | 6.71  |
|        | 20         | 73.33            | 80.67  | 85.57 | 81.57  | 80.78 | 79.24 | 80.19 | 3.64 | 4.54  |
|        | 25         | 81.41            | 87.48  | 89.76 | 87.56  | 86.97 | 87.94 | 86.85 | 2.59 | 2.98  |
|        | 30         | 87.17            | 91.76  | 92.01 | 91.26  | 90.83 | 92.45 | 90.91 | 1.75 | 1.93  |
|        | 35         | 91.38            | 94.12  | 93.21 | 93.76  | 93.15 | 95.17 | 93.47 | 1.15 | 1.23  |
|        | 40         | 94.19            | 95.53  | 94.11 | 94.91  | 94.38 | 96.24 | 94.89 | 0.77 | 0.82  |
|        | 50         | 96.85            | 96.47  | 94.41 | 96.06  | 95.14 | 97.31 | 96.04 | 0.99 | 1.04  |
|        | 60         | 98.11            | 96.76  | 94.55 | 96.81  | 95.43 | 97.78 | 96.57 | 1.24 | 1.29  |
| 1:1    | 0          | 0.00             | 0.00   | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 9.34             | 12.43  | 9.12  | 7.16   | 8.42  | 6.87  | 8.89  | 1.83 | 20.57 |
|        | 4          | 20.55            | 23.07  | 23.76 | 16.47  | 17.23 | 16.76 | 19.64 | 2.99 | 15.24 |
|        | 6          | 32.14            | 34.54  | 38.51 | 33.26  | 31.34 | 27.76 | 32.92 | 3.26 | 9.90  |
|        | 8          | 44.27            | 45.18  | 50.74 | 49.55  | 43.31 | 38.70 | 45.29 | 4.01 | 8.84  |
|        | 12         | 61.89            | 61.32  | 64.90 | 68.25  | 60.60 | 53.91 | 61.81 | 4.38 | 7.09  |
|        | 16         | 73.76            | 72.44  | 76.54 | 79.36  | 72.64 | 65.81 | 73.42 | 4.17 | 5.69  |
|        | 20         | 82.13            | 81.81  | 84.10 | 86.83  | 81.74 | 74.77 | 81.90 | 3.65 | 4.46  |
|        | 25         | 89.17            | 89.14  | 89.72 | 92.49  | 88.42 | 82.61 | 88.59 | 2.97 | 3.35  |
|        | 30         | 93.93            | 93.79  | 92.60 | 95.57  | 92.53 | 87.87 | 92.71 | 2.39 | 2.58  |
|        | 35         | 95.78            | 96.36  | 95.04 | 97.11  | 95.48 | 91.72 | 95.25 | 1.71 | 1.79  |
|        | 40         | 97.01            | 98.49  | 95.66 | 98.35  | 97.01 | 94.54 | 96.84 | 1.40 | 1.45  |
|        | 50         | 98.25            | 100.32 | 97.03 | 99.14  | 98.55 | 97.38 | 98.44 | 1.09 | 1.11  |
|        | 60         | 98.41            | 100.36 | 96.57 | 99.46  | 99.05 | 98.65 | 98.75 | 1.16 | 1.17  |
| 1:2    | 0          | 0.00             | 0.00   | 0.00  | 0.00   | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 11.42            | 8.38   | 7.67  | 10.49  | 11.64 | 10.17 | 9.96  | 1.47 | 14.78 |
|        | 4          | 23.02            | 20.71  | 23.26 | 21.57  | 23.16 | 25.25 | 22.83 | 1.43 | 6.26  |
|        | 6          | 36.06            | 32.69  | 40.60 | 33.14  | 34.91 | 40.28 | 36.28 | 3.15 | 8.67  |
|        | 8          | 50.70            | 44.31  | 55.06 | 43.66  | 45.11 | 53.57 | 48.74 | 4.58 | 9.39  |
|        | 12         | 68.01            | 60.97  | 70.81 | 59.61  | 60.67 | 68.94 | 64.84 | 4.52 | 6.97  |
|        | 16         | 77.71            | 72.62  | 80.69 | 72.14  | 73.69 | 78.44 | 75.88 | 3.23 | 4.25  |
|        | 20         | 83.68            | 80.84  | 86.45 | 81.22  | 82.53 | 84.93 | 83.27 | 1.99 | 2.39  |
|        | 25         | 88.16            | 87.07  | 90.15 | 88.24  | 89.38 | 89.77 | 88.79 | 1.07 | 1.20  |
|        | 30         | 90.86            | 90.85  | 92.23 | 92.62  | 93.33 | 92.80 | 92.12 | 0.95 | 1.03  |
|        | 35         | 92.51            | 93.19  | 93.27 | 95.48  | 95.84 | 94.63 | 94.15 | 1.24 | 1.32  |
|        | 40         | 93.55            | 94.38  | 94.32 | 97.50  | 97.49 | 95.85 | 95.52 | 1.56 | 1.63  |
|        | 50         | 94.45            | 96.15  | 94.77 | 99.40  | 99.14 | 96.92 | 96.80 | 1.93 | 1.99  |
|        | 60         | 94.90            | 96.32  | 95.37 | 100.31 | 99.92 | 97.53 | 97.39 | 2.10 | 2.15  |



## APPENDIX 8 (continued)

Dissolution data of indomethacin from indomethacin-beta-CD grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |        |        |        |        |        | avg.  | SD   | ZCV   |
|--------|------------|------------------|--------|--------|--------|--------|--------|-------|------|-------|
|        |            | #1               | #2     | #3     | #4     | #5     | #6     |       |      |       |
| 1:3    | 0          | 0                | 0      | 0.00   | 0.00   | 0.00   | 0.00   | 0.00  | 0.00 | 0.00  |
|        | 2          | 12.43            | 14.26  | 12.70  | 16.59  | 17.63  | 14.50  | 14.69 | 1.89 | 12.90 |
|        | 4          | 28.52            | 28.10  | 30.91  | 32.25  | 35.31  | 31.18  | 31.04 | 2.41 | 7.75  |
|        | 6          | 42.90            | 41.42  | 47.56  | 46.29  | 50.81  | 46.40  | 45.90 | 3.06 | 6.68  |
|        | 8          | 55.56            | 52.66  | 61.28  | 56.87  | 61.01  | 58.75  | 57.69 | 3.04 | 5.27  |
|        | 12         | 69.36            | 68.60  | 76.30  | 71.07  | 74.82  | 74.87  | 72.50 | 2.96 | 4.08  |
|        | 16         | 79.18            | 77.86  | 85.79  | 81.24  | 82.86  | 84.43  | 81.89 | 2.79 | 3.40  |
|        | 20         | 85.13            | 83.77  | 91.07  | 88.33  | 88.95  | 90.36  | 87.94 | 2.65 | 3.01  |
|        | 25         | 90.07            | 88.95  | 94.86  | 93.18  | 93.23  | 94.64  | 92.49 | 2.22 | 2.41  |
|        | 30         | 93.37            | 92.46  | 97.31  | 95.93  | 95.99  | 96.81  | 95.31 | 1.78 | 1.87  |
|        | 35         | 95.78            | 94.91  | 98.54  | 97.68  | 97.69  | 98.57  | 97.20 | 1.38 | 1.42  |
|        | 40         | 97.45            | 96.45  | 99.33  | 98.88  | 98.78  | 99.48  | 98.39 | 1.09 | 1.11  |
|        | 50         | 99.13            | 98.30  | 99.96  | 99.94  | 99.87  | 100.54 | 99.62 | 0.72 | 0.72  |
| 60     | 99.76      | 98.92            | 100.29 | 100.43 | 100.34 | 101.03 | 100.13 | 0.66  | 0.65 |       |
| 1:6    | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00  | 0.00 | 0.00  |
|        | 2          | 22.39            | 22.48  | 22.95  | 21.41  | 21.67  | 22.03  | 22.16 | 0.51 | 2.32  |
|        | 4          | 42.79            | 43.27  | 44.32  | 38.55  | 40.51  | 42.17  | 41.94 | 1.91 | 4.54  |
|        | 6          | 55.58            | 57.22  | 56.60  | 50.80  | 52.76  | 54.35  | 54.55 | 2.22 | 4.08  |
|        | 8          | 64.44            | 65.62  | 64.70  | 59.09  | 61.14  | 63.26  | 63.04 | 2.26 | 3.58  |
|        | 12         | 75.29            | 77.34  | 75.28  | 69.92  | 72.06  | 74.66  | 74.09 | 2.42 | 3.27  |
|        | 16         | 83.08            | 83.93  | 81.99  | 78.33  | 79.55  | 82.17  | 81.51 | 1.96 | 2.40  |
|        | 20         | 87.49            | 88.19  | 86.17  | 84.30  | 84.89  | 87.29  | 86.39 | 1.41 | 1.63  |
|        | 25         | 91.48            | 91.44  | 89.46  | 89.37  | 89.24  | 91.51  | 90.42 | 1.07 | 1.18  |
|        | 30         | 94.01            | 93.07  | 91.70  | 92.91  | 92.00  | 94.40  | 93.01 | 0.97 | 1.04  |
|        | 35         | 95.66            | 94.11  | 93.05  | 95.22  | 94.06  | 96.22  | 94.72 | 1.08 | 1.14  |
|        | 40         | 96.71            | 94.86  | 93.94  | 96.61  | 95.39  | 97.60  | 95.85 | 1.24 | 1.29  |
|        | 50         | 97.77            | 95.46  | 94.99  | 98.16  | 96.72  | 98.98  | 97.02 | 1.43 | 1.48  |
| 60     | 98.09      | 95.92            | 95.59  | 99.56  | 97.48  | 99.76  | 97.73  | 1.61  | 1.65 |       |
| 1:10   | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00  | 0.00 | 0.00  |
|        | 2          | 50.19            | 45.04  | 50.08  | 43.39  | 47.84  | 45.50  | 47.01 | 2.57 | 5.46  |
|        | 4          | 68.13            | 66.34  | 69.48  | 62.16  | 63.57  | 64.97  | 65.77 | 2.52 | 3.84  |
|        | 6          | 75.50            | 76.02  | 78.07  | 71.27  | 72.86  | 74.22  | 74.66 | 2.20 | 2.95  |
|        | 8          | 81.34            | 81.70  | 82.96  | 76.55  | 78.17  | 80.43  | 80.19 | 2.19 | 2.73  |
|        | 12         | 88.79            | 88.66  | 89.61  | 83.27  | 84.90  | 87.29  | 87.09 | 2.28 | 2.62  |
|        | 16         | 92.67            | 92.68  | 93.32  | 88.00  | 89.19  | 91.11  | 91.16 | 1.96 | 2.15  |
|        | 20         | 95.00            | 95.17  | 96.89  | 91.06  | 92.11  | 93.40  | 93.94 | 1.97 | 2.10  |
|        | 25         | 96.87            | 97.19  | 97.52  | 93.98  | 94.41  | 94.93  | 95.82 | 1.42 | 1.48  |
|        | 30         | 97.81            | 97.97  | 98.61  | 95.82  | 95.95  | 95.85  | 97.00 | 1.15 | 1.19  |
|        | 35         | 98.59            | 98.60  | 99.24  | 96.90  | 96.88  | 96.46  | 97.78 | 1.06 | 1.09  |
|        | 40         | 98.90            | 99.07  | 99.71  | 97.67  | 97.49  | 96.76  | 98.27 | 1.03 | 1.05  |
|        | 50         | 98.58            | 99.06  | 99.87  | 98.29  | 97.95  | 96.91  | 98.44 | 0.92 | 0.93  |
| 60     | 98.57      | 98.90            | 100.81 | 98.59  | 98.25  | 97.21  | 98.72  | 1.08  | 1.09 |       |



## APPENDIX 9

Dissolution data of indomethacin from indomethacin-gamma-CD grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD    | ZCV   |       |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |       |       |       |
| 1:0.5  | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  |       |
|        | 2          | 11.47            | 11.08 | 10.48 | 8.92  | 9.41  | 10.64 | 10.33 | 0.89  | 8.65  |       |
|        | 4          | 31.25            | 26.88 | 27.56 | 26.73 | 26.21 | 30.03 | 28.11 | 1.86  | 6.63  |       |
|        | 6          | 48.65            | 42.17 | 40.90 | 40.79 | 41.38 | 46.69 | 43.43 | 3.08  | 7.10  |       |
|        | 8          | 62.27            | 54.33 | 55.12 | 51.22 | 53.39 | 60.16 | 56.08 | 3.87  | 6.90  |       |
|        | 12         | 79.89            | 69.69 | 71.02 | 69.01 | 70.23 | 76.16 | 72.67 | 3.98  | 5.48  |       |
|        | 16         | 86.34            | 79.99 | 81.69 | 80.63 | 80.81 | 85.53 | 82.50 | 2.49  | 3.02  |       |
|        | 20         | 91.60            | 87.35 | 87.90 | 87.74 | 87.09 | 90.52 | 88.70 | 1.72  | 1.94  |       |
|        | 25         | 94.70            | 91.88 | 92.44 | 92.75 | 91.40 | 93.98 | 92.86 | 1.15  | 1.24  |       |
|        | 30         | 96.25            | 94.03 | 94.97 | 94.92 | 93.62 | 95.59 | 94.90 | 0.88  | 0.93  |       |
|        | 35         | 97.18            | 95.84 | 96.15 | 96.25 | 94.72 | 95.92 | 96.01 | 0.72  | 0.75  |       |
|        | 40         | 97.65            | 96.46 | 96.88 | 96.87 | 95.33 | 96.39 | 96.59 | 0.70  | 0.72  |       |
|        | 50         | 98.27            | 97.19 | 97.38 | 97.34 | 95.81 | 96.86 | 97.14 | 0.73  | 0.75  |       |
|        | 60         | 98.42            | 97.69 | 97.66 | 97.39 | 96.17 | 97.04 | 97.39 | 0.69  | 0.71  |       |
|        | 1:1        | 0                | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  |
|        |            | 2                | 16.50 | 14.18 | 14.08 | 10.71 | 12.04 | 9.60  | 12.85 | 2.32  | 18.08 |
| 4      |            | 35.05            | 30.39 | 35.22 | 24.29 | 30.10 | 31.80 | 31.14 | 3.67  | 11.79 |       |
| 6      |            | 49.47            | 45.71 | 51.46 | 40.07 | 48.87 | 50.20 | 47.63 | 3.81  | 8.00  |       |
| 8      |            | 59.86            | 59.29 | 65.22 | 52.19 | 61.63 | 62.96 | 60.19 | 4.08  | 6.78  |       |
| 12     |            | 74.44            | 74.24 | 79.68 | 69.50 | 75.37 | 76.41 | 74.94 | 3.03  | 4.05  |       |
| 16     |            | 84.43            | 82.92 | 87.22 | 79.71 | 83.21 | 83.59 | 83.51 | 2.22  | 2.65  |       |
| 20     |            | 89.67            | 87.85 | 90.99 | 85.94 | 87.80 | 87.62 | 88.31 | 1.61  | 1.83  |       |
| 25     |            | 93.09            | 91.53 | 94.33 | 90.40 | 91.22 | 90.31 | 91.81 | 1.45  | 1.58  |       |
| 30     |            | 94.82            | 92.97 | 95.85 | 92.94 | 93.16 | 92.11 | 93.64 | 1.28  | 1.37  |       |
| 35     |            | 95.72            | 94.27 | 96.01 | 94.59 | 94.21 | 93.16 | 94.66 | 0.96  | 1.02  |       |
| 40     |            | 96.47            | 94.74 | 96.32 | 95.50 | 94.96 | 93.60 | 95.26 | 0.98  | 1.03  |       |
| 50     |            | 97.65            | 95.20 | 96.78 | 96.26 | 95.56 | 94.04 | 95.92 | 1.16  | 1.21  |       |
| 60     |            | 97.42            | 96.08 | 96.78 | 96.87 | 96.02 | 94.49 | 96.27 | 0.93  | 0.97  |       |

จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 9 (continued)

Dissolution data of indomethacin from indomethacin-gamma-CD grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV   |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|-------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |       |
| 1:2    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 21.09            | 17.56 | 20.76 | 21.58 | 23.74 | 20.49 | 20.87 | 1.82 | 8.73  |
|        | 4          | 45.12            | 41.78 | 47.97 | 49.36 | 48.33 | 49.43 | 47.00 | 2.74 | 5.83  |
|        | 6          | 63.30            | 59.26 | 66.04 | 64.65 | 64.69 | 66.67 | 64.10 | 2.42 | 3.77  |
|        | 8          | 74.69            | 71.03 | 76.83 | 73.77 | 73.65 | 76.49 | 74.41 | 1.94 | 2.61  |
|        | 12         | 85.85            | 82.12 | 86.21 | 83.12 | 82.82 | 85.20 | 84.22 | 1.59 | 1.89  |
|        | 16         | 90.62            | 88.20 | 90.32 | 87.93 | 87.92 | 89.28 | 89.05 | 1.11 | 1.24  |
|        | 20         | 92.71            | 91.47 | 92.39 | 90.80 | 91.15 | 91.36 | 91.65 | 0.68 | 0.74  |
|        | 25         | 93.91            | 93.56 | 93.28 | 92.76 | 93.50 | 92.63 | 93.27 | 0.45 | 0.48  |
|        | 30         | 94.67            | 94.61 | 93.89 | 94.12 | 94.55 | 93.39 | 94.20 | 0.46 | 0.49  |
|        | 35         | 95.12            | 95.22 | 94.19 | 95.03 | 95.30 | 93.82 | 94.78 | 0.56 | 0.60  |
|        | 40         | 95.28            | 95.68 | 94.35 | 95.48 | 95.91 | 94.08 | 95.13 | 0.68 | 0.71  |
|        | 50         | 95.28            | 95.99 | 94.20 | 95.93 | 96.22 | 94.17 | 95.30 | 0.84 | 0.88  |
| 60     | 95.43      | 96.14            | 94.50 | 96.08 | 96.68 | 94.43 | 95.54 | 0.84  | 0.88 |       |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 25.09            | 19.24 | 21.19 | 28.52 | 34.21 | 30.54 | 26.47 | 5.21 | 19.68 |
|        | 4          | 55.58            | 44.85 | 54.19 | 52.12 | 55.75 | 58.21 | 53.45 | 4.26 | 7.96  |
|        | 6          | 73.52            | 66.33 | 73.68 | 66.92 | 69.79 | 73.77 | 70.67 | 3.17 | 4.49  |
|        | 8          | 83.03            | 79.82 | 83.11 | 75.89 | 78.45 | 82.49 | 80.46 | 2.68 | 3.33  |
|        | 12         | 91.97            | 90.17 | 91.22 | 84.48 | 87.02 | 90.11 | 89.16 | 2.60 | 2.91  |
|        | 16         | 95.99            | 94.45 | 94.75 | 89.08 | 91.56 | 93.88 | 93.28 | 2.30 | 2.47  |
|        | 20         | 98.02            | 96.60 | 96.29 | 91.11 | 94.20 | 95.65 | 95.31 | 2.20 | 2.31  |
|        | 25         | 98.81            | 97.84 | 97.22 | 92.85 | 95.91 | 96.70 | 96.56 | 1.89 | 1.95  |
|        | 30         | 99.29            | 98.32 | 97.85 | 93.59 | 96.66 | 97.33 | 97.17 | 1.79 | 1.85  |
|        | 35         | 99.46            | 98.49 | 97.70 | 93.90 | 97.14 | 97.37 | 97.34 | 1.72 | 1.77  |
|        | 40         | 99.62            | 98.65 | 98.01 | 94.21 | 97.35 | 97.55 | 97.57 | 1.68 | 1.72  |
|        | 50         | 99.63            | 98.81 | 98.02 | 94.37 | 97.42 | 97.74 | 97.66 | 1.64 | 1.68  |
| 60     | 99.63      | 98.82            | 98.32 | 94.53 | 97.62 | 97.77 | 97.78 | 1.60  | 1.64 |       |

จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 10

Dissolution data of indomethacin from indomethacin-DIMEB grounded mixtures  
in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |        |        |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|--------|--------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4     | #5     | #6    |       |      |      |
| 1:0.5  | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 43.95            | 44.84 | 42.49 | 41.91  | 45.34  | 41.88 | 43.40 | 1.39 | 3.19 |
|        | 4          | 64.69            | 64.10 | 64.22 | 62.80  | 62.75  | 62.87 | 63.57 | 0.79 | 1.24 |
|        | 6          | 75.72            | 74.53 | 75.96 | 73.33  | 73.11  | 75.06 | 74.62 | 1.09 | 1.47 |
|        | 8          | 82.19            | 80.99 | 82.42 | 80.08  | 79.32  | 81.92 | 81.15 | 1.14 | 1.40 |
|        | 12         | 88.41            | 86.75 | 89.06 | 86.88  | 86.15  | 88.95 | 87.70 | 1.15 | 1.31 |
|        | 16         | 91.97            | 90.30 | 92.33 | 90.91  | 89.68  | 92.65 | 91.30 | 1.09 | 1.19 |
|        | 20         | 93.76            | 92.23 | 94.12 | 93.16  | 92.08  | 94.60 | 93.33 | 0.93 | 1.00 |
|        | 25         | 95.11            | 93.87 | 95.02 | 94.91  | 93.63  | 96.16 | 94.79 | 0.84 | 0.89 |
|        | 30         | 96.02            | 94.92 | 95.63 | 96.04  | 94.80  | 96.92 | 95.72 | 0.72 | 0.75 |
|        | 35         | 96.34            | 95.23 | 95.80 | 96.39  | 95.69  | 97.40 | 96.14 | 0.69 | 0.71 |
|        | 40         | 96.65            | 95.83 | 95.96 | 97.00  | 96.20  | 97.61 | 96.54 | 0.62 | 0.64 |
|        | 50         | 96.66            | 96.14 | 96.11 | 97.23  | 96.71  | 97.95 | 96.80 | 0.64 | 0.66 |
| 60     | 96.67      | 96.14            | 95.97 | 97.33 | 97.03  | 97.89  | 96.84 | 0.67  | 0.69 |      |
| 1:1    | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 50.19            | 53.10 | 49.53 | 53.46  | 55.60  | 51.88 | 52.29 | 2.05 | 3.92 |
|        | 4          | 66.36            | 67.28 | 67.58 | 68.21  | 73.01  | 69.85 | 68.72 | 2.20 | 3.20 |
|        | 6          | 75.13            | 75.65 | 78.09 | 77.11  | 82.62  | 79.52 | 78.02 | 2.52 | 3.24 |
|        | 8          | 80.63            | 80.99 | 84.14 | 82.46  | 88.80  | 85.10 | 83.69 | 2.78 | 3.33 |
|        | 12         | 87.27            | 87.20 | 90.22 | 88.81  | 95.83  | 91.02 | 90.06 | 2.94 | 3.26 |
|        | 16         | 91.59            | 91.19 | 93.36 | 92.57  | 100.21 | 93.92 | 93.81 | 3.01 | 3.21 |
|        | 20         | 94.13            | 93.67 | 95.10 | 94.42  | 102.74 | 95.45 | 95.92 | 3.11 | 3.24 |
|        | 25         | 95.98            | 95.70 | 96.28 | 96.13  | 104.74 | 96.52 | 97.56 | 3.22 | 3.30 |
|        | 30         | 97.02            | 96.43 | 96.76 | 96.75  | 105.95 | 96.99 | 98.32 | 3.42 | 3.48 |
|        | 35         | 97.63            | 97.28 | 97.23 | 97.51  | 106.90 | 97.45 | 99.00 | 3.53 | 3.57 |
|        | 40         | 98.11            | 97.66 | 97.56 | 97.43  | 107.31 | 97.61 | 99.28 | 3.60 | 3.62 |
|        | 50         | 98.45            | 98.04 | 97.75 | 97.91  | 107.71 | 97.92 | 99.63 | 3.62 | 3.63 |
| 60     | 98.65      | 98.30            | 98.08 | 97.83 | 108.12 | 98.07  | 99.84 | 3.71  | 3.72 |      |

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## APPENDIX 10 (continued)

Dissolution data of indomethacin from indomethacin-DIMEB grounded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |      |
| 1:2    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 56.72            | 57.41 | 57.49 | 48.87 | 52.71 | 50.06 | 53.88 | 3.53 | 6.55 |
|        | 4          | 73.75            | 74.31 | 73.30 | 68.57 | 72.78 | 69.63 | 72.05 | 2.16 | 3.00 |
|        | 6          | 82.33            | 82.46 | 82.34 | 78.33 | 81.76 | 79.78 | 81.17 | 1.57 | 1.93 |
|        | 8          | 86.39            | 87.80 | 87.61 | 84.64 | 86.85 | 85.86 | 86.53 | 1.08 | 1.24 |
|        | 12         | 92.61            | 92.58 | 92.77 | 90.84 | 92.58 | 91.84 | 92.20 | 0.68 | 0.74 |
|        | 16         | 95.35            | 95.29 | 95.51 | 94.33 | 95.46 | 95.14 | 95.18 | 0.40 | 0.42 |
|        | 20         | 96.12            | 96.66 | 96.90 | 96.62 | 97.15 | 96.90 | 96.72 | 0.32 | 0.33 |
|        | 25         | 97.81            | 97.58 | 97.52 | 98.01 | 98.08 | 97.95 | 97.83 | 0.21 | 0.21 |
|        | 30         | 98.44            | 98.21 | 97.99 | 98.79 | 98.70 | 98.58 | 98.45 | 0.28 | 0.28 |
|        | 35         | 98.76            | 98.38 | 98.31 | 99.27 | 98.88 | 98.64 | 98.71 | 0.32 | 0.32 |
|        | 40         | 98.92            | 98.85 | 98.78 | 99.44 | 99.05 | 98.98 | 99.00 | 0.21 | 0.21 |
|        | 50         | 99.09            | 99.02 | 98.79 | 99.76 | 99.21 | 99.17 | 99.17 | 0.29 | 0.30 |
|        | 60         | 99.25            | 99.19 | 98.95 | 99.77 | 99.38 | 99.22 | 99.29 | 0.25 | 0.25 |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 53.33            | 54.21 | 54.58 | 48.43 | 48.76 | 49.42 | 51.45 | 2.63 | 5.11 |
|        | 4          | 71.09            | 72.02 | 72.92 | 65.60 | 64.96 | 66.91 | 68.91 | 3.19 | 4.63 |
|        | 6          | 80.71            | 80.51 | 81.23 | 75.06 | 74.07 | 76.61 | 78.03 | 2.89 | 3.71 |
|        | 8          | 84.85            | 85.40 | 85.97 | 81.08 | 79.88 | 82.59 | 83.30 | 2.28 | 2.73 |
|        | 12         | 91.11            | 91.17 | 90.89 | 87.00 | 86.69 | 88.75 | 89.27 | 1.90 | 2.13 |
|        | 16         | 93.95            | 93.03 | 93.22 | 90.67 | 90.73 | 92.37 | 92.33 | 1.24 | 1.34 |
|        | 20         | 92.91            | 94.20 | 94.41 | 93.01 | 93.18 | 94.33 | 93.67 | 0.65 | 0.69 |
|        | 25         | 96.06            | 95.22 | 95.16 | 94.55 | 94.85 | 95.55 | 95.23 | 0.48 | 0.51 |
|        | 30         | 95.78            | 95.83 | 95.91 | 95.57 | 95.73 | 96.47 | 95.88 | 0.28 | 0.29 |
|        | 35         | 96.84            | 96.02 | 95.94 | 96.04 | 96.47 | 96.93 | 96.37 | 0.40 | 0.41 |
|        | 40         | 97.00            | 96.07 | 95.97 | 96.51 | 96.82 | 97.24 | 96.60 | 0.47 | 0.48 |
|        | 50         | 97.01            | 96.11 | 96.43 | 96.85 | 96.76 | 97.55 | 96.78 | 0.45 | 0.47 |
|        | 60         | 97.31            | 96.29 | 96.60 | 97.05 | 97.36 | 97.70 | 97.05 | 0.48 | 0.50 |
| 60     | 97.31      | 96.29            | 96.60 | 97.05 | 97.36 | 97.70 | 97.05 | 0.48  | 0.50 |      |



## APPENDIX 11

Dissolution data of indomethacin from indomethacin- $\alpha$ -CD kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |        |        |       | avg.  | SD   | ZCV   |
|--------|------------|------------------|-------|-------|--------|--------|-------|-------|------|-------|
|        |            | #1               | #2    | #3    | #4     | #5     | #6    |       |      |       |
| 1:0.5  | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 23.97            | 22.65 | 25.91 | 24.48  | 26.74  | 24.98 | 24.79 | 1.32 | 5.31  |
|        | 4          | 38.77            | 36.21 | 41.65 | 38.13  | 39.21  | 41.07 | 39.17 | 1.81 | 4.63  |
|        | 6          | 48.59            | 45.64 | 52.49 | 47.93  | 48.13  | 53.14 | 49.32 | 2.65 | 5.37  |
|        | 8          | 55.79            | 52.58 | 60.35 | 54.98  | 53.76  | 61.31 | 56.46 | 3.26 | 5.77  |
|        | 12         | 65.42            | 59.55 | 69.78 | 63.35  | 61.38  | 72.18 | 65.28 | 4.47 | 6.84  |
|        | 16         | 72.58            | 65.51 | 76.49 | 71.63  | 67.79  | 78.55 | 72.09 | 4.53 | 6.29  |
|        | 20         | 79.03            | 70.61 | 80.88 | 78.41  | 72.98  | 83.34 | 77.54 | 4.41 | 5.69  |
|        | 25         | 84.47            | 76.49 | 84.61 | 85.38  | 78.34  | 86.83 | 82.69 | 3.84 | 4.65  |
|        | 30         | 87.56            | 81.51 | 86.82 | 89.45  | 82.62  | 89.31 | 86.21 | 3.09 | 3.58  |
|        | 35         | 89.32            | 84.90 | 88.49 | 91.85  | 85.39  | 90.92 | 88.48 | 2.59 | 2.93  |
|        | 40         | 90.94            | 87.85 | 89.47 | 93.42  | 87.61  | 91.94 | 90.20 | 2.11 | 2.34  |
|        | 50         | 92.71            | 91.27 | 90.32 | 94.43  | 89.98  | 92.67 | 91.90 | 1.54 | 1.68  |
| 60     | 93.60      | 92.91            | 91.03 | 95.03 | 91.25  | 93.26  | 92.84 | 1.38  | 1.48 |       |
| 1:1    | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00 | 0.00  |
|        | 2          | 17.46            | 27.57 | 25.80 | 23.15  | 25.90  | 23.29 | 23.86 | 3.25 | 13.63 |
|        | 4          | 28.90            | 43.21 | 48.54 | 35.41  | 40.71  | 40.71 | 39.58 | 6.16 | 15.56 |
|        | 6          | 42.73            | 51.25 | 63.55 | 45.35  | 50.32  | 50.67 | 50.65 | 6.55 | 12.94 |
|        | 8          | 52.30            | 56.65 | 72.61 | 52.02  | 58.13  | 58.44 | 58.36 | 6.87 | 11.77 |
|        | 12         | 63.96            | 64.46 | 82.02 | 58.42  | 71.28  | 68.39 | 68.09 | 7.40 | 10.86 |
|        | 16         | 72.51            | 70.53 | 87.25 | 64.37  | 82.02  | 76.14 | 75.47 | 7.51 | 9.95  |
|        | 20         | 80.53            | 75.01 | 90.40 | 74.19  | 90.50  | 82.61 | 82.20 | 6.52 | 7.93  |
|        | 25         | 86.27            | 79.06 | 92.65 | 83.59  | 95.91  | 88.86 | 87.72 | 5.58 | 6.36  |
|        | 30         | 89.74            | 81.95 | 94.15 | 91.30  | 98.71  | 93.55 | 91.57 | 5.12 | 5.60  |
|        | 35         | 91.76            | 83.82 | 94.91 | 95.71  | 99.66  | 96.41 | 93.71 | 5.00 | 5.33  |
|        | 40         | 93.08            | 85.54 | 95.82 | 97.76  | 100.14 | 97.69 | 95.00 | 4.75 | 4.99  |
|        | 50         | 94.69            | 88.46 | 96.42 | 99.02  | 100.31 | 98.31 | 96.20 | 3.90 | 4.06  |
| 60     | 95.29      | 91.55            | 96.88 | 99.33 | 100.48 | 98.54  | 97.01 | 2.96  | 3.05 |       |

จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 11 (continued)

Dissolution data of indomethacin from indomethacin-alpha-CD kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |      |
| 1:2    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 25.65            | 27.39 | 27.12 | 27.35 | 25.66 | 24.96 | 26.36 | 0.96 | 3.66 |
|        | 4          | 45.37            | 46.88 | 48.70 | 48.52 | 47.58 | 46.11 | 47.19 | 1.21 | 2.56 |
|        | 6          | 60.36            | 59.91 | 63.19 | 63.04 | 61.47 | 60.17 | 61.36 | 1.33 | 2.17 |
|        | 8          | 69.39            | 68.49 | 73.36 | 72.60 | 70.67 | 70.14 | 70.78 | 1.71 | 2.42 |
|        | 12         | 79.85            | 79.91 | 84.70 | 83.34 | 81.32 | 80.47 | 81.60 | 1.82 | 2.23 |
|        | 16         | 85.82            | 86.72 | 90.13 | 89.56 | 87.41 | 86.53 | 87.70 | 1.60 | 1.82 |
|        | 20         | 90.32            | 91.08 | 93.55 | 92.83 | 91.06 | 90.08 | 91.49 | 1.27 | 1.39 |
|        | 25         | 93.79            | 93.87 | 95.89 | 95.17 | 94.12 | 92.31 | 94.19 | 1.13 | 1.20 |
|        | 30         | 96.21            | 95.21 | 97.14 | 96.41 | 95.81 | 93.66 | 95.74 | 1.10 | 1.15 |
|        | 35         | 97.28            | 96.25 | 97.76 | 97.19 | 97.04 | 94.26 | 96.63 | 1.15 | 1.19 |
|        | 40         | 98.05            | 96.87 | 98.23 | 97.49 | 97.81 | 94.56 | 97.17 | 1.25 | 1.28 |
|        | 50         | 98.52            | 97.77 | 98.37 | 97.95 | 98.28 | 95.01 | 97.65 | 1.21 | 1.24 |
| 60     | 98.69      | 98.24            | 98.52 | 98.56 | 98.59 | 95.16 | 97.96 | 1.26  | 1.29 |      |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 40.55            | 42.14 | 45.29 | 45.71 | 40.41 | 38.84 | 42.15 | 2.55 | 6.05 |
|        | 4          | 64.86            | 64.31 | 67.74 | 66.72 | 63.40 | 62.33 | 64.89 | 1.85 | 2.85 |
|        | 6          | 75.78            | 74.29 | 77.73 | 76.99 | 75.42 | 73.40 | 75.60 | 1.48 | 1.95 |
|        | 8          | 81.23            | 79.56 | 83.47 | 83.39 | 81.64 | 79.51 | 81.47 | 1.60 | 1.96 |
|        | 12         | 86.72            | 85.02 | 89.56 | 89.69 | 87.89 | 85.81 | 87.45 | 1.77 | 2.02 |
|        | 16         | 90.05            | 88.35 | 92.61 | 92.99 | 91.41 | 89.33 | 90.79 | 1.69 | 1.86 |
|        | 20         | 92.24            | 90.61 | 94.44 | 94.96 | 93.55 | 90.95 | 92.79 | 1.65 | 1.78 |
|        | 25         | 94.29            | 93.05 | 95.66 | 96.48 | 94.92 | 92.42 | 94.47 | 1.41 | 1.49 |
|        | 30         | 95.63            | 93.80 | 96.28 | 97.10 | 96.00 | 93.16 | 95.33 | 1.39 | 1.46 |
|        | 35         | 96.38            | 95.02 | 96.74 | 97.41 | 96.76 | 93.46 | 95.96 | 1.33 | 1.39 |
|        | 40         | 96.85            | 96.08 | 97.04 | 97.58 | 97.07 | 93.76 | 96.40 | 1.26 | 1.31 |
|        | 50         | 97.31            | 96.99 | 97.34 | 97.89 | 97.83 | 94.05 | 96.90 | 1.31 | 1.35 |
| 60     | 97.78      | 97.60            | 97.49 | 98.05 | 97.98 | 94.20 | 97.18 | 1.35  | 1.39 |      |

จุฬาลงกรณ์มหาวิทยาลัย



## APPENDIX 12

Dissolution data of indomethacin from indomethacin-beta-CD kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | Z drug dissolved |        |        |        |        |       | avg.   | SD   | ZCV   |
|--------|------------|------------------|--------|--------|--------|--------|-------|--------|------|-------|
|        |            | #1               | #2     | #3     | #4     | #5     | #6    |        |      |       |
| 1:0.5  | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   | 0.00 | 0.00  |
|        | 2          | 8.93             | 9.05   | 10.06  | 8.18   | 9.05   | 10.45 | 9.28   | 0.76 | 8.13  |
|        | 4          | 16.39            | 15.58  | 19.62  | 16.14  | 17.70  | 17.69 | 17.19  | 1.34 | 7.78  |
|        | 6          | 24.13            | 23.88  | 27.81  | 23.73  | 25.34  | 25.13 | 25.00  | 1.39 | 5.57  |
|        | 8          | 32.26            | 30.19  | 36.44  | 32.02  | 32.76  | 33.20 | 32.81  | 1.88 | 5.72  |
|        | 12         | 43.06            | 41.12  | 47.99  | 44.10  | 44.93  | 44.10 | 44.22  | 2.07 | 4.68  |
|        | 16         | 53.14            | 51.17  | 58.19  | 54.62  | 51.94  | 54.35 | 53.90  | 2.27 | 4.22  |
|        | 20         | 61.46            | 60.02  | 66.76  | 63.55  | 63.43  | 62.46 | 62.95  | 2.09 | 3.32  |
|        | 25         | 69.61            | 68.14  | 74.35  | 71.22  | 71.90  | 70.19 | 70.90  | 1.95 | 2.75  |
|        | 30         | 75.76            | 74.58  | 79.90  | 77.40  | 78.01  | 76.06 | 76.95  | 1.73 | 2.24  |
|        | 35         | 80.69            | 79.48  | 84.06  | 82.19  | 82.82  | 80.80 | 81.67  | 1.52 | 1.86  |
|        | 40         | 84.40            | 83.31  | 87.59  | 85.91  | 86.44  | 84.55 | 85.37  | 1.43 | 1.67  |
|        | 50         | 89.61            | 88.42  | 91.54  | 90.86  | 91.29  | 89.33 | 90.18  | 1.13 | 1.25  |
|        | 60         | 92.81            | 91.82  | 94.33  | 93.86  | 94.29  | 92.69 | 93.30  | 0.93 | 0.99  |
| 1:1    | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   | 0.00 | 0.00  |
|        | 2          | 16.39            | 18.58  | 16.78  | 17.68  | 16.70  | 15.93 | 17.01  | 0.88 | 5.16  |
|        | 4          | 32.41            | 36.00  | 31.34  | 32.38  | 32.57  | 32.89 | 32.93  | 1.45 | 4.41  |
|        | 6          | 46.24            | 49.06  | 44.87  | 45.21  | 45.72  | 47.75 | 46.48  | 1.48 | 3.18  |
|        | 8          | 58.59            | 59.72  | 55.94  | 56.29  | 57.47  | 59.39 | 57.90  | 1.45 | 2.51  |
|        | 12         | 73.31            | 73.55  | 69.63  | 69.73  | 72.57  | 72.90 | 71.95  | 1.63 | 2.27  |
|        | 16         | 82.68            | 82.06  | 79.30  | 80.82  | 82.86  | 82.64 | 81.73  | 1.28 | 1.56  |
|        | 20         | 88.52            | 87.54  | 85.77  | 87.58  | 88.90  | 88.43 | 87.79  | 1.03 | 1.17  |
|        | 25         | 92.97            | 91.97  | 90.30  | 92.25  | 93.20  | 92.45 | 92.19  | 0.94 | 1.02  |
|        | 30         | 95.15            | 94.57  | 93.58  | 94.68  | 95.58  | 94.57 | 94.69  | 0.61 | 0.65  |
|        | 35         | 96.62            | 95.95  | 94.61  | 95.74  | 96.94  | 95.87 | 95.96  | 0.74 | 0.77  |
|        | 40         | 97.52            | 96.88  | 95.64  | 96.35  | 97.71  | 96.35 | 96.74  | 0.72 | 0.74  |
|        | 50         | 98.14            | 97.49  | 95.96  | 96.82  | 98.33  | 96.55 | 97.22  | 0.85 | 0.88  |
|        | 60         | 98.48            | 97.80  | 96.29  | 96.97  | 98.66  | 96.74 | 97.49  | 0.89 | 0.91  |
| 1:2    | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   | 0.00 | 0.00  |
|        | 2          | 39.60            | 45.86  | 37.80  | 52.90  | 56.85  | 52.30 | 47.55  | 7.06 | 14.84 |
|        | 4          | 72.05            | 75.87  | 70.41  | 71.59  | 74.20  | 72.54 | 72.78  | 1.79 | 2.46  |
|        | 6          | 84.33            | 86.07  | 83.82  | 78.07  | 80.16  | 80.92 | 82.23  | 2.74 | 3.33  |
|        | 8          | 90.09            | 91.32  | 89.76  | 81.67  | 84.06  | 85.71 | 87.10  | 3.53 | 4.05  |
|        | 12         | 95.13            | 96.46  | 95.28  | 86.67  | 89.09  | 91.13 | 92.29  | 3.59 | 3.89  |
|        | 16         | 97.44            | 98.65  | 97.45  | 91.09  | 92.62  | 94.16 | 95.23  | 2.79 | 2.93  |
|        | 20         | 98.38            | 99.92  | 98.85  | 93.84  | 95.04  | 95.98 | 97.00  | 2.19 | 2.25  |
|        | 25         | 99.32            | 100.40 | 99.49  | 96.14  | 96.92  | 97.36 | 98.27  | 1.55 | 1.57  |
|        | 30         | 99.34            | 100.58 | 99.67  | 97.68  | 98.10  | 98.29 | 98.94  | 1.01 | 1.02  |
|        | 35         | 99.36            | 100.75 | 99.84  | 98.61  | 99.01  | 98.76 | 99.39  | 0.73 | 0.73  |
|        | 40         | 99.38            | 100.76 | 100.01 | 99.23  | 99.35  | 99.39 | 99.69  | 0.54 | 0.54  |
|        | 50         | 99.39            | 100.61 | 100.02 | 99.86  | 99.84  | 99.86 | 99.93  | 0.36 | 0.36  |
|        | 60         | 99.70            | 100.93 | 100.03 | 100.02 | 100.04 | 99.88 | 100.10 | 0.39 | 0.39  |

## APPENDIX 12 (continued)

Dissolution data of indomethacin from indomethacin-beta-CD kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |        | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|-------|-------|--------|-------|------|------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6     |       |      |      |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00 | 0.00 |
|        | 2          | 60.52            | 62.12 | 66.09 | 66.72 | 63.90 | 65.50  | 64.14 | 2.22 | 3.46 |
|        | 4          | 82.51            | 83.46 | 84.79 | 79.12 | 77.63 | 77.19  | 80.78 | 2.94 | 3.64 |
|        | 6          | 89.27            | 89.29 | 90.10 | 82.95 | 81.20 | 81.21  | 85.67 | 3.93 | 4.59 |
|        | 8          | 92.07            | 92.36 | 92.77 | 85.80 | 83.47 | 84.08  | 88.43 | 4.04 | 4.57 |
|        | 12         | 94.75            | 94.87 | 95.31 | 89.53 | 86.81 | 87.99  | 91.54 | 3.53 | 3.85 |
|        | 16         | 95.81            | 95.64 | 95.93 | 92.28 | 89.77 | 91.19  | 93.43 | 2.47 | 2.64 |
|        | 20         | 96.28            | 96.26 | 96.40 | 94.31 | 92.08 | 93.24  | 94.76 | 1.68 | 1.77 |
|        | 25         | 96.60            | 96.44 | 96.72 | 95.78 | 93.73 | 95.01  | 95.72 | 1.06 | 1.11 |
|        | 30         | 96.78            | 96.61 | 96.75 | 96.97 | 94.87 | 95.91  | 96.32 | 0.73 | 0.76 |
|        | 35         | 96.65            | 96.93 | 96.92 | 97.73 | 95.74 | 96.82  | 96.80 | 0.59 | 0.61 |
|        | 40         | 96.67            | 96.81 | 96.93 | 98.21 | 96.47 | 97.57  | 97.11 | 0.60 | 0.61 |
|        | 50         | 96.98            | 96.83 | 96.95 | 98.82 | 97.21 | 98.19  | 97.50 | 0.74 | 0.76 |
|        | 60         | 96.70            | 96.70 | 96.96 | 99.01 | 97.69 | 98.51  | 97.59 | 0.90 | 0.92 |
| 1:6    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00 | 0.00 |
|        | 2          | 74.81            | 73.64 | 73.51 | 69.36 | 71.52 | 69.03  | 71.98 | 2.20 | 3.05 |
|        | 4          | 84.28            | 83.31 | 82.64 | 81.20 | 81.46 | 81.35  | 82.37 | 1.14 | 1.39 |
|        | 6          | 88.03            | 86.57 | 86.06 | 84.59 | 85.06 | 85.32  | 85.94 | 1.14 | 1.32 |
|        | 8          | 90.13            | 88.50 | 88.60 | 86.57 | 87.14 | 87.88  | 88.14 | 1.14 | 1.30 |
|        | 12         | 92.84            | 90.58 | 91.00 | 89.84 | 89.85 | 91.02  | 90.86 | 1.01 | 1.11 |
|        | 16         | 94.66            | 92.23 | 92.65 | 91.85 | 91.81 | 92.90  | 92.68 | 0.97 | 1.05 |
|        | 20         | 95.88            | 93.57 | 94.00 | 93.44 | 93.32 | 94.22  | 94.07 | 0.87 | 0.92 |
|        | 25         | 96.50            | 95.08 | 94.91 | 94.75 | 94.53 | 95.11  | 95.15 | 0.64 | 0.67 |
|        | 30         | 96.96            | 95.53 | 95.21 | 95.36 | 95.14 | 95.86  | 95.68 | 0.62 | 0.65 |
|        | 35         | 97.12            | 95.99 | 95.52 | 95.96 | 95.74 | 96.33  | 96.11 | 0.52 | 0.54 |
|        | 40         | 97.28            | 96.14 | 95.82 | 96.28 | 96.34 | 96.79  | 96.44 | 0.47 | 0.49 |
|        | 50         | 97.59            | 96.75 | 95.96 | 96.74 | 96.64 | 97.11  | 96.80 | 0.49 | 0.51 |
|        | 60         | 97.59            | 96.90 | 96.10 | 97.06 | 97.09 | 97.43  | 97.03 | 0.47 | 0.49 |
| 1:10   | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00  | 0.00 | 0.00 |
|        | 2          | 76.50            | 81.65 | 76.67 | 77.02 | 76.22 | 76.05  | 77.35 | 1.95 | 2.52 |
|        | 4          | 88.17            | 89.78 | 88.17 | 85.88 | 85.12 | 86.92  | 87.34 | 1.56 | 1.78 |
|        | 6          | 91.24            | 92.23 | 91.23 | 88.46 | 87.55 | 90.29  | 90.17 | 1.65 | 1.83 |
|        | 8          | 93.23            | 94.08 | 93.22 | 89.81 | 89.06 | 92.43  | 91.97 | 1.87 | 2.03 |
|        | 12         | 95.24            | 95.78 | 95.22 | 92.26 | 91.36 | 95.20  | 94.17 | 1.71 | 1.81 |
|        | 16         | 96.48            | 96.71 | 96.62 | 94.09 | 93.50 | 96.59  | 95.67 | 1.33 | 1.39 |
|        | 20         | 97.26            | 97.49 | 97.09 | 95.94 | 95.20 | 97.68  | 96.77 | 0.90 | 0.93 |
|        | 25         | 97.73            | 97.50 | 97.56 | 97.02 | 96.59 | 98.31  | 97.45 | 0.54 | 0.56 |
|        | 30         | 98.19            | 98.12 | 97.71 | 98.10 | 97.36 | 98.94  | 98.07 | 0.48 | 0.49 |
|        | 35         | 98.35            | 98.27 | 98.02 | 98.57 | 98.13 | 99.41  | 98.46 | 0.46 | 0.47 |
|        | 40         | 98.66            | 98.43 | 98.33 | 99.19 | 98.60 | 99.73  | 98.82 | 0.49 | 0.49 |
|        | 50         | 98.97            | 98.73 | 98.33 | 99.66 | 99.37 | 99.89  | 99.16 | 0.54 | 0.54 |
|        | 60         | 98.81            | 98.73 | 98.47 | 99.97 | 99.68 | 100.05 | 99.28 | 0.63 | 0.64 |



## APPENDIX 13

Dissolution data of indomethacin from indomethacin-gamma-CD kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |      |
| 1:0.5  | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 28.32            | 30.24 | 30.12 | 31.29 | 32.83 | 30.93 | 30.62 | 1.36 | 4.45 |
|        | 4          | 46.91            | 50.21 | 49.89 | 49.90 | 51.23 | 50.84 | 49.83 | 1.39 | 2.79 |
|        | 6          | 59.98            | 62.05 | 63.98 | 61.67 | 64.10 | 63.97 | 62.63 | 1.53 | 2.44 |
|        | 8          | 69.42            | 71.02 | 72.77 | 70.74 | 72.65 | 72.92 | 71.59 | 1.29 | 1.81 |
|        | 12         | 80.37            | 81.45 | 83.18 | 81.41 | 82.22 | 83.69 | 82.05 | 1.12 | 1.37 |
|        | 16         | 87.36            | 88.21 | 89.54 | 87.20 | 88.27 | 89.53 | 88.35 | 0.93 | 1.05 |
|        | 20         | 91.80            | 92.20 | 93.39 | 91.63 | 92.29 | 93.35 | 92.44 | 0.69 | 0.75 |
|        | 25         | 95.14            | 95.14 | 95.98 | 94.70 | 95.09 | 96.01 | 95.34 | 0.48 | 0.51 |
|        | 30         | 96.89            | 96.68 | 97.45 | 96.40 | 96.81 | 97.22 | 96.91 | 0.34 | 0.35 |
|        | 35         | 97.83            | 97.61 | 98.21 | 97.32 | 97.84 | 98.13 | 97.83 | 0.30 | 0.31 |
|        | 40         | 98.62            | 98.24 | 98.56 | 97.94 | 98.46 | 98.61 | 98.40 | 0.24 | 0.25 |
|        | 50         | 98.92            | 98.70 | 98.89 | 98.41 | 99.09 | 98.94 | 98.83 | 0.22 | 0.22 |
| 60     | 99.06      | 99.01            | 99.37 | 98.72 | 99.57 | 99.27 | 99.17 | 0.27  | 0.28 |      |
| 1:1    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 60.36            | 60.36 | 61.14 | 59.68 | 65.13 | 60.23 | 61.15 | 1.83 | 2.99 |
|        | 4          | 81.50            | 82.35 | 82.00 | 77.06 | 77.68 | 77.35 | 79.66 | 2.31 | 2.91 |
|        | 6          | 89.05            | 88.81 | 89.19 | 85.27 | 84.47 | 83.82 | 86.77 | 2.29 | 2.64 |
|        | 8          | 92.38            | 92.05 | 92.21 | 87.69 | 87.21 | 86.99 | 89.76 | 2.47 | 2.75 |
|        | 12         | 95.05            | 94.73 | 94.44 | 90.83 | 90.55 | 90.32 | 92.65 | 2.10 | 2.26 |
|        | 16         | 95.81            | 96.08 | 95.33 | 92.28 | 92.17 | 91.79 | 93.91 | 1.85 | 1.97 |
|        | 20         | 96.56            | 96.56 | 95.67 | 93.02 | 92.91 | 92.67 | 94.57 | 1.73 | 1.83 |
|        | 25         | 96.36            | 96.59 | 95.75 | 93.62 | 93.21 | 93.27 | 94.80 | 1.46 | 1.54 |
|        | 30         | 96.43            | 96.76 | 95.95 | 93.65 | 93.52 | 93.57 | 94.98 | 1.42 | 1.50 |
|        | 35         | 96.49            | 96.78 | 96.16 | 93.81 | 93.82 | 93.73 | 95.13 | 1.36 | 1.43 |
|        | 40         | 96.69            | 96.65 | 95.68 | 93.83 | 93.97 | 93.89 | 95.12 | 1.27 | 1.33 |
|        | 50         | 96.47            | 96.96 | 95.87 | 93.99 | 94.13 | 94.04 | 95.24 | 1.23 | 1.29 |
| 60     | 96.52      | 96.83            | 95.93 | 94.15 | 94.13 | 94.33 | 95.31 | 1.14  | 1.20 |      |

จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 13 (continued)

Dissolution data of indomethacin from indomethacin-gamma-CD kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |        |        |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|--------|--------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4     | #5     | #6    |       |      |      |
| 1:2    | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 71.21            | 73.87 | 73.83 | 69.74  | 70.77  | 68.49 | 71.32 | 1.98 | 2.78 |
|        | 4          | 86.79            | 86.54 | 86.00 | 83.84  | 84.52  | 83.27 | 85.16 | 1.35 | 1.59 |
|        | 6          | 90.99            | 90.50 | 90.10 | 88.89  | 89.71  | 88.44 | 89.77 | 0.88 | 0.98 |
|        | 8          | 93.41            | 92.79 | 92.39 | 91.88  | 92.62  | 91.41 | 92.41 | 0.64 | 0.69 |
|        | 12         | 95.53            | 95.09 | 94.53 | 94.88  | 96.00  | 94.69 | 95.12 | 0.51 | 0.53 |
|        | 16         | 96.60            | 96.18 | 96.07 | 96.69  | 97.86  | 96.50 | 96.65 | 0.59 | 0.61 |
|        | 20         | 97.23            | 96.80 | 96.07 | 97.62  | 98.80  | 97.27 | 97.30 | 0.83 | 0.85 |
|        | 25         | 97.70            | 97.11 | 96.69 | 98.25  | 99.29  | 98.05 | 97.85 | 0.83 | 0.85 |
|        | 30         | 97.87            | 97.42 | 96.69 | 98.58  | 99.77  | 98.38 | 98.12 | 0.96 | 0.98 |
|        | 35         | 98.34            | 97.58 | 96.85 | 98.75  | 99.94  | 98.70 | 98.36 | 0.97 | 0.99 |
|        | 40         | 98.21            | 98.35 | 96.84 | 99.08  | 100.41 | 98.88 | 98.63 | 1.07 | 1.09 |
|        | 50         | 98.22            | 97.58 | 96.99 | 99.10  | 100.42 | 99.05 | 98.56 | 1.12 | 1.14 |
| 60     | 98.22      | 97.72            | 97.28 | 99.26 | 100.59 | 99.22  | 98.72 | 1.11  | 1.12 |      |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 72.47            | 71.08 | 71.81 | 65.21  | 65.67  | 66.84 | 68.85 | 3.01 | 4.37 |
|        | 4          | 86.98            | 85.36 | 85.65 | 77.78  | 78.67  | 80.44 | 82.48 | 3.64 | 4.41 |
|        | 6          | 91.22            | 89.15 | 90.42 | 81.83  | 83.33  | 85.35 | 86.88 | 3.58 | 4.12 |
|        | 8          | 93.34            | 91.27 | 92.21 | 84.37  | 86.02  | 88.48 | 89.28 | 3.28 | 3.67 |
|        | 12         | 95.48            | 93.40 | 94.47 | 87.53  | 89.39  | 92.08 | 92.06 | 2.80 | 3.04 |
|        | 16         | 96.41            | 94.47 | 95.38 | 89.64  | 91.84  | 94.35 | 93.68 | 2.28 | 2.43 |
|        | 20         | 97.18            | 94.92 | 95.85 | 91.30  | 94.04  | 95.86 | 94.86 | 1.86 | 1.96 |
|        | 25         | 97.35            | 95.07 | 96.47 | 92.96  | 95.58  | 96.93 | 95.73 | 1.46 | 1.52 |
|        | 30         | 97.51            | 95.53 | 96.48 | 94.32  | 96.46  | 97.70 | 96.34 | 1.16 | 1.20 |
|        | 35         | 98.28            | 95.52 | 96.79 | 95.69  | 97.34  | 98.17 | 96.97 | 1.09 | 1.12 |
|        | 40         | 97.68            | 95.51 | 96.95 | 96.60  | 97.83  | 98.49 | 97.18 | 0.96 | 0.99 |
|        | 50         | 97.84            | 96.11 | 97.11 | 97.67  | 98.17  | 98.81 | 97.62 | 0.85 | 0.87 |
| 60     | 97.99      | 96.24            | 97.11 | 98.43 | 98.38  | 99.12  | 97.88 | 0.95  | 0.97 |      |

จุฬาลงกรณ์มหาวิทยาลัย



## APPENDIX 14

Dissolution data of indomethacin from indomethacin-DIMEB kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |        |       |        | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|--------|-------|--------|-------|------|------|
|        |            | #1               | #2    | #3    | #4     | #5    | #6     |       |      |      |
| 1:0.5  | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00  | 0.00   | 0.00  | 0.00 | 0.00 |
|        | 2          | 48.23            | 52.13 | 53.82 | 46.83  | 48.99 | 57.86  | 51.31 | 3.76 | 7.33 |
|        | 4          | 71.27            | 72.82 | 74.24 | 66.17  | 71.44 | 77.80  | 72.29 | 3.50 | 4.85 |
|        | 6          | 81.66            | 82.48 | 83.78 | 75.09  | 81.88 | 87.95  | 82.14 | 3.80 | 4.62 |
|        | 8          | 87.11            | 87.49 | 88.93 | 79.31  | 86.67 | 93.14  | 87.11 | 4.10 | 4.70 |
|        | 12         | 91.74            | 92.03 | 93.14 | 83.18  | 90.90 | 97.66  | 91.44 | 4.29 | 4.69 |
|        | 16         | 93.90            | 94.12 | 95.28 | 85.52  | 93.10 | 100.11 | 93.67 | 4.30 | 4.59 |
|        | 20         | 94.86            | 95.48 | 96.59 | 87.10  | 94.15 | 101.74 | 94.99 | 4.31 | 4.53 |
|        | 25         | 95.60            | 96.34 | 97.21 | 88.43  | 95.49 | 103.23 | 96.05 | 4.31 | 4.49 |
|        | 30         | 95.97            | 96.83 | 97.70 | 89.39  | 96.24 | 104.31 | 96.74 | 4.34 | 4.49 |
|        | 35         | 96.34            | 97.08 | 98.04 | 89.96  | 96.86 | 105.25 | 97.25 | 4.45 | 4.58 |
|        | 40         | 96.35            | 97.20 | 98.10 | 90.40  | 97.18 | 105.50 | 97.45 | 4.40 | 4.52 |
|        | 50         | 96.60            | 97.43 | 98.16 | 90.45  | 97.35 | 105.75 | 97.62 | 4.45 | 4.56 |
|        | 60         | 96.72            | 97.55 | 98.22 | 91.14  | 98.10 | 106.68 | 98.07 | 4.55 | 4.64 |
| 1:1    | 0          | 0.00             | 0.00  | 0.00  | 0.00   | 0.00  | 0.00   | 0.00  | 0.00 | 0.00 |
|        | 2          | 61.99            | 65.64 | 60.59 | 57.89  | 61.88 | 61.60  | 61.60 | 2.29 | 3.71 |
|        | 4          | 83.35            | 84.68 | 83.49 | 77.69  | 79.73 | 81.60  | 81.76 | 2.41 | 2.94 |
|        | 6          | 90.34            | 91.49 | 90.69 | 84.85  | 86.72 | 88.84  | 88.82 | 2.35 | 2.64 |
|        | 8          | 93.62            | 94.36 | 93.41 | 88.93  | 90.31 | 93.04  | 92.28 | 1.96 | 2.13 |
|        | 12         | 96.48            | 96.97 | 95.58 | 93.03  | 94.13 | 96.74  | 95.49 | 1.45 | 1.52 |
|        | 16         | 97.26            | 98.03 | 96.63 | 95.07  | 96.03 | 99.09  | 97.02 | 1.31 | 1.35 |
|        | 20         | 97.59            | 98.52 | 97.25 | 96.46  | 97.09 | 100.25 | 97.86 | 1.23 | 1.26 |
|        | 25         | 98.07            | 98.87 | 97.45 | 97.74  | 98.14 | 101.24 | 98.59 | 1.26 | 1.28 |
|        | 30         | 97.80            | 98.93 | 97.51 | 98.36  | 98.55 | 101.89 | 98.84 | 1.44 | 1.46 |
|        | 35         | 97.97            | 98.99 | 97.56 | 98.99  | 98.96 | 102.19 | 99.11 | 1.49 | 1.50 |
|        | 40         | 97.99            | 99.05 | 97.90 | 99.48  | 98.94 | 102.32 | 99.28 | 1.47 | 1.48 |
|        | 50         | 98.30            | 99.24 | 98.23 | 99.85  | 99.13 | 102.45 | 99.53 | 1.42 | 1.42 |
|        | 60         | 98.47            | 99.43 | 98.27 | 100.08 | 99.32 | 102.92 | 99.75 | 1.54 | 1.54 |

จุฬาลงกรณ์มหาวิทยาลัย



## APPENDIX 14 (continued)

Dissolution data of indomethacin from indomethacin-DIMEB kneaded mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |      |
| 1:2    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 68.04            | 66.15 | 66.55 | 63.95 | 68.37 | 64.81 | 66.31 | 1.59 | 2.40 |
|        | 4          | 80.97            | 80.76 | 83.36 | 79.17 | 78.89 | 80.52 | 80.61 | 1.46 | 1.81 |
|        | 6          | 86.37            | 86.21 | 89.01 | 85.64 | 84.37 | 86.80 | 86.40 | 1.40 | 1.62 |
|        | 8          | 89.68            | 89.10 | 92.00 | 89.41 | 87.67 | 90.25 | 89.69 | 1.30 | 1.45 |
|        | 12         | 92.85            | 92.14 | 94.86 | 93.05 | 91.91 | 93.87 | 93.11 | 1.01 | 1.08 |
|        | 16         | 94.82            | 94.18 | 96.23 | 95.33 | 93.94 | 95.84 | 95.06 | 0.83 | 0.87 |
|        | 20         | 96.05            | 95.08 | 96.55 | 96.56 | 95.59 | 96.92 | 96.12 | 0.63 | 0.65 |
|        | 25         | 96.67            | 95.69 | 96.72 | 97.49 | 96.60 | 97.69 | 96.81 | 0.65 | 0.67 |
|        | 30         | 97.28            | 96.45 | 97.04 | 98.11 | 97.35 | 98.01 | 97.37 | 0.57 | 0.58 |
|        | 35         | 97.44            | 96.48 | 96.75 | 98.43 | 97.84 | 98.64 | 97.60 | 0.80 | 0.82 |
|        | 40         | 97.60            | 95.65 | 96.91 | 98.90 | 98.46 | 99.11 | 97.77 | 1.21 | 1.24 |
|        | 50         | 98.21            | 96.97 | 96.92 | 99.06 | 98.68 | 99.28 | 98.19 | 0.94 | 0.96 |
|        | 60         | 97.91            | 96.85 | 96.77 | 99.22 | 98.77 | 99.14 | 98.11 | 1.01 | 1.03 |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 65.04            | 64.59 | 67.23 | 66.97 | 66.73 | 69.55 | 66.69 | 1.62 | 2.43 |
|        | 4          | 81.46            | 81.37 | 80.05 | 80.03 | 80.74 | 82.05 | 80.95 | 0.75 | 0.92 |
|        | 6          | 86.93            | 87.70 | 86.09 | 85.75 | 86.74 | 88.39 | 86.93 | 0.90 | 1.03 |
|        | 8          | 91.09            | 90.73 | 89.04 | 89.43 | 89.96 | 92.17 | 90.41 | 1.06 | 1.17 |
|        | 12         | 94.38            | 93.79 | 92.30 | 93.58 | 93.36 | 95.82 | 93.87 | 1.07 | 1.14 |
|        | 16         | 95.59            | 95.41 | 94.10 | 95.68 | 95.00 | 97.52 | 95.55 | 1.03 | 1.07 |
|        | 20         | 96.36            | 96.17 | 95.00 | 96.59 | 95.61 | 98.45 | 96.37 | 1.07 | 1.11 |
|        | 25         | 97.87            | 96.50 | 95.91 | 97.21 | 96.23 | 98.93 | 97.11 | 1.04 | 1.07 |
|        | 30         | 97.16            | 96.69 | 96.08 | 97.54 | 96.69 | 99.26 | 97.24 | 1.01 | 1.04 |
|        | 35         | 97.03            | 97.01 | 96.39 | 97.86 | 97.16 | 99.43 | 97.48 | 0.97 | 1.00 |
|        | 40         | 97.49            | 96.75 | 96.40 | 98.03 | 97.18 | 99.60 | 97.58 | 1.04 | 1.07 |
|        | 50         | 97.20            | 96.93 | 96.71 | 98.50 | 97.65 | 99.92 | 97.82 | 1.11 | 1.13 |
|        | 60         | 97.51            | 97.53 | 97.01 | 98.37 | 98.25 | 99.78 | 98.08 | 0.89 | 0.91 |

จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX 15

Dissolution data of indomethacin from indomethacin-alpha-CD solvent mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV  |
|--------|------------|------------------|-------|-------|-------|-------|-------|-------|------|------|
|        |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |      |
| 1:1    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 11.92            | 11.61 | 11.40 | 11.81 | 11.49 | 9.66  | 11.32 | 0.76 | 6.75 |
|        | 4          | 21.36            | 20.01 | 20.29 | 22.10 | 19.47 | 19.73 | 20.50 | 0.93 | 4.56 |
|        | 6          | 30.30            | 27.54 | 28.04 | 32.15 | 27.51 | 29.47 | 29.17 | 1.68 | 5.76 |
|        | 8          | 38.46            | 34.50 | 36.44 | 40.87 | 35.03 | 38.86 | 37.36 | 2.24 | 6.01 |
|        | 12         | 52.27            | 46.90 | 51.02 | 55.06 | 48.11 | 54.68 | 51.34 | 3.06 | 5.96 |
|        | 16         | 62.95            | 57.69 | 62.56 | 67.18 | 58.60 | 67.35 | 62.72 | 3.74 | 5.96 |
|        | 20         | 71.74            | 66.39 | 72.08 | 75.51 | 67.59 | 77.26 | 71.76 | 3.89 | 5.42 |
|        | 25         | 80.03            | 74.83 | 80.46 | 84.05 | 76.93 | 86.02 | 80.39 | 3.83 | 4.77 |
|        | 30         | 86.00            | 81.18 | 87.11 | 88.93 | 83.50 | 91.59 | 86.39 | 3.41 | 3.94 |
|        | 35         | 90.33            | 86.48 | 91.71 | 92.29 | 88.56 | 94.62 | 90.67 | 2.63 | 2.90 |
|        | 40         | 93.14            | 89.81 | 94.39 | 94.74 | 91.68 | 96.31 | 93.35 | 2.13 | 2.28 |
|        | 50         | 96.40            | 94.24 | 95.74 | 96.90 | 95.37 | 97.06 | 95.95 | 0.97 | 1.01 |
|        | 60         | 97.29            | 96.23 | 96.80 | 97.67 | 96.83 | 97.28 | 97.02 | 0.46 | 0.47 |
| 1:2    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 15.18            | 15.40 | 18.10 | 15.23 | 14.38 | 16.82 | 15.85 | 1.24 | 7.82 |
|        | 4          | 27.47            | 27.04 | 31.87 | 27.53 | 24.18 | 29.88 | 28.00 | 2.40 | 8.57 |
|        | 6          | 38.91            | 38.16 | 45.58 | 38.43 | 34.05 | 42.14 | 39.55 | 3.58 | 9.06 |
|        | 8          | 48.89            | 48.13 | 57.47 | 48.50 | 42.87 | 53.31 | 49.86 | 4.56 | 9.14 |
|        | 12         | 65.57            | 63.49 | 75.90 | 64.30 | 57.95 | 70.57 | 66.30 | 5.67 | 8.55 |
|        | 16         | 78.04            | 76.66 | 86.82 | 77.22 | 72.17 | 82.81 | 78.95 | 4.69 | 5.94 |
|        | 20         | 86.88            | 86.13 | 92.82 | 86.21 | 82.99 | 90.26 | 87.55 | 3.17 | 3.62 |
|        | 25         | 92.85            | 92.31 | 95.92 | 92.72 | 91.01 | 95.26 | 93.34 | 1.71 | 1.83 |
|        | 30         | 95.92            | 94.88 | 96.98 | 95.55 | 94.79 | 97.06 | 95.86 | 0.90 | 0.94 |
|        | 35         | 97.31            | 96.25 | 97.02 | 96.92 | 96.83 | 97.83 | 97.03 | 0.48 | 0.49 |
|        | 40         | 97.78            | 96.57 | 97.05 | 97.24 | 97.46 | 98.02 | 97.35 | 0.48 | 0.49 |
|        | 50         | 97.79            | 96.43 | 97.37 | 97.27 | 97.76 | 98.05 | 97.44 | 0.53 | 0.54 |
|        | 60         | 98.10            | 96.58 | 97.55 | 97.73 | 97.90 | 98.23 | 97.68 | 0.54 | 0.55 |
| 1:3    | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00 |
|        | 2          | 21.91            | 19.23 | 20.12 | 18.01 | 21.56 | 24.22 | 20.84 | 2.01 | 9.63 |
|        | 4          | 37.79            | 32.59 | 36.19 | 32.91 | 35.90 | 41.03 | 36.07 | 2.88 | 7.98 |
|        | 6          | 51.94            | 44.85 | 50.01 | 46.47 | 48.98 | 55.41 | 49.61 | 3.47 | 6.99 |
|        | 8          | 63.44            | 56.00 | 62.00 | 58.06 | 60.50 | 66.88 | 61.15 | 3.54 | 5.79 |
|        | 12         | 79.60            | 72.87 | 78.64 | 74.97 | 76.89 | 82.78 | 77.62 | 3.21 | 4.13 |
|        | 16         | 89.75            | 84.65 | 89.04 | 86.10 | 87.10 | 91.43 | 88.01 | 2.29 | 2.60 |
|        | 20         | 94.92            | 91.45 | 94.20 | 92.39 | 93.05 | 95.48 | 93.58 | 1.42 | 1.51 |
|        | 25         | 97.52            | 95.16 | 96.88 | 95.69 | 96.49 | 96.85 | 96.43 | 0.79 | 0.82 |
|        | 30         | 97.69            | 96.67 | 97.51 | 96.95 | 97.56 | 97.47 | 97.31 | 0.37 | 0.38 |
|        | 35         | 97.86            | 96.85 | 97.84 | 97.09 | 97.89 | 97.65 | 97.53 | 0.41 | 0.42 |
|        | 40         | 97.88            | 96.87 | 97.87 | 97.40 | 98.07 | 97.67 | 97.63 | 0.40 | 0.41 |
|        | 50         | 97.89            | 97.04 | 97.90 | 97.38 | 98.09 | 97.54 | 97.64 | 0.36 | 0.37 |
|        | 60         | 98.05            | 97.06 | 97.78 | 97.36 | 97.97 | 97.70 | 97.65 | 0.34 | 0.35 |



## APPENDIX 16

Dissolution data of indomethacin from indomethacin-beta-CD solvent mixtures in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |        |        |        |        | avg.   | SD   | ZCV  |
|--------|------------|------------------|-------|--------|--------|--------|--------|--------|------|------|
|        |            | #1               | #2    | #3     | #4     | #5     | #6     |        |      |      |
| 1:1    | 0          | 0.00             | 0.00  | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00 |
|        | 2          | 10.40            | 10.87 | 11.86  | 10.79  | 10.98  | 9.77   | 10.78  | 0.63 | 5.86 |
|        | 4          | 18.51            | 19.43 | 21.58  | 19.63  | 19.20  | 18.03  | 19.40  | 1.12 | 5.77 |
|        | 6          | 26.68            | 27.90 | 32.13  | 27.67  | 27.02  | 26.34  | 27.96  | 1.94 | 6.94 |
|        | 8          | 34.47            | 35.19 | 41.97  | 35.91  | 34.13  | 34.41  | 36.01  | 2.73 | 7.58 |
|        | 12         | 47.77            | 48.24 | 59.65  | 50.56  | 46.81  | 48.90  | 50.32  | 4.33 | 8.60 |
|        | 16         | 60.01            | 60.14 | 73.56  | 63.75  | 58.66  | 61.51  | 62.94  | 5.00 | 7.95 |
|        | 20         | 70.60            | 70.58 | 83.06  | 74.49  | 68.43  | 71.17  | 73.05  | 4.82 | 6.59 |
|        | 25         | 80.69            | 79.84 | 90.43  | 84.58  | 78.41  | 81.65  | 82.60  | 3.98 | 4.82 |
|        | 30         | 87.10            | 86.85 | 93.98  | 89.80  | 85.38  | 89.31  | 88.74  | 2.78 | 3.13 |
|        | 35         | 91.83            | 91.12 | 95.83  | 93.49  | 90.24  | 93.99  | 92.75  | 1.89 | 2.03 |
|        | 40         | 94.29            | 93.87 | 97.06  | 95.22  | 93.75  | 96.72  | 95.15  | 1.32 | 1.39 |
|        | 50         | 96.62            | 96.63 | 97.06  | 96.82  | 97.12  | 99.01  | 97.21  | 0.83 | 0.85 |
| 60     | 97.24      | 97.10            | 97.53 | 97.16  | 97.90  | 99.50  | 97.74  | 0.83   | 0.85 |      |
| 1:2    | 0          | 0.00             | 0.00  | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00 |
|        | 2          | 21.15            | 20.28 | 20.16  | 18.52  | 19.11  | 18.70  | 19.65  | 0.95 | 4.81 |
|        | 4          | 35.50            | 33.31 | 35.48  | 31.56  | 32.45  | 32.45  | 33.46  | 1.52 | 4.55 |
|        | 6          | 48.42            | 44.96 | 48.45  | 43.77  | 43.72  | 45.10  | 45.74  | 1.98 | 4.33 |
|        | 8          | 58.98            | 54.63 | 61.51  | 54.06  | 53.39  | 57.38  | 56.66  | 2.92 | 5.15 |
|        | 12         | 74.66            | 70.53 | 78.94  | 71.03  | 68.79  | 75.97  | 73.32  | 3.51 | 4.79 |
|        | 16         | 85.08            | 82.71 | 90.82  | 83.50  | 79.23  | 88.16  | 84.92  | 3.75 | 4.42 |
|        | 20         | 92.21            | 90.58 | 95.86  | 91.74  | 87.74  | 94.96  | 92.18  | 2.70 | 2.93 |
|        | 25         | 96.94            | 95.86 | 98.63  | 97.41  | 94.92  | 98.68  | 97.07  | 1.37 | 1.41 |
|        | 30         | 99.09            | 98.39 | 99.12  | 99.74  | 98.30  | 99.92  | 99.09  | 0.61 | 0.61 |
|        | 35         | 99.88            | 99.32 | 99.60  | 100.69 | 100.16 | 100.41 | 100.01 | 0.47 | 0.47 |
|        | 40         | 100.22           | 99.81 | 99.63  | 100.72 | 100.80 | 100.46 | 100.27 | 0.44 | 0.44 |
|        | 50         | 100.24           | 99.86 | 99.80  | 100.90 | 100.99 | 100.36 | 100.36 | 0.46 | 0.46 |
| 60     | 100.42     | 100.05           | 99.81 | 101.08 | 101.17 | 100.40 | 100.49 | 0.49   | 0.49 |      |
| 1:3    | 0          | 0.00             | 0.00  | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00 |
|        | 2          | 27.19            | 27.42 | 28.66  | 29.85  | 30.10  | 29.24  | 28.74  | 1.12 | 3.88 |
|        | 4          | 50.09            | 46.81 | 50.22  | 50.92  | 50.59  | 51.99  | 50.10  | 1.60 | 3.19 |
|        | 6          | 63.36            | 61.13 | 66.74  | 66.87  | 65.94  | 67.80  | 65.30  | 2.32 | 3.56 |
|        | 8          | 75.92            | 72.77 | 78.96  | 78.46  | 77.40  | 79.29  | 77.13  | 2.25 | 2.92 |
|        | 12         | 89.36            | 86.44 | 90.33  | 90.29  | 89.42  | 91.01  | 89.47  | 1.47 | 1.65 |
|        | 16         | 95.31            | 93.35 | 95.00  | 94.86  | 94.48  | 95.24  | 94.71  | 0.66 | 0.70 |
|        | 20         | 97.19            | 95.92 | 95.62  | 96.12  | 96.05  | 96.33  | 96.20  | 0.49 | 0.51 |
|        | 25         | 97.66            | 96.38 | 96.24  | 96.42  | 96.35  | 97.27  | 96.72  | 0.54 | 0.56 |
|        | 30         | 97.66            | 96.35 | 96.23  | 96.24  | 96.50  | 96.95  | 96.66  | 0.51 | 0.53 |
|        | 35         | 97.97            | 96.64 | 96.22  | 96.38  | 96.31  | 96.78  | 96.72  | 0.59 | 0.61 |
|        | 40         | 97.96            | 96.76 | 96.36  | 96.36  | 96.45  | 96.77  | 96.78  | 0.56 | 0.58 |
|        | 50         | 97.95            | 96.56 | 96.50  | 96.33  | 96.74  | 96.90  | 96.83  | 0.53 | 0.55 |
| 60     | 98.09      | 97.00            | 96.00 | 96.77  | 96.70  | 97.04  | 96.93  | 0.62   | 0.64 |      |



## APPENDIX 17

Dissolution data of indomethacin from indomethacin-gamma-CD solvent mixtures  
in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |       |        |       |       |        | avg.  | SD   | ZCV   |
|--------|------------|------------------|-------|--------|-------|-------|--------|-------|------|-------|
|        |            | #1               | #2    | #3     | #4    | #5    | #6     |       |      |       |
| 1:1    | 0          | 0.00             | 0.00  | 0.00   | 0.00  | 0.00  | 0.00   | 0.00  | 0.00 | 0.00  |
|        | 2          | 17.65            | 18.41 | 19.21  | 19.33 | 19.37 | 19.90  | 18.98 | 0.74 | 3.89  |
|        | 4          | 30.46            | 30.34 | 31.31  | 32.26 | 32.13 | 31.50  | 31.33 | 0.74 | 2.35  |
|        | 6          | 41.83            | 41.24 | 42.69  | 43.07 | 42.99 | 42.41  | 42.37 | 0.65 | 1.54  |
|        | 8          | 50.37            | 49.97 | 52.70  | 52.33 | 52.09 | 51.52  | 51.50 | 1.01 | 1.96  |
|        | 12         | 64.31            | 64.50 | 68.05  | 66.50 | 66.89 | 65.81  | 66.01 | 1.32 | 1.99  |
|        | 16         | 74.83            | 74.66 | 77.12  | 76.21 | 77.06 | 76.48  | 76.06 | 0.98 | 1.29  |
|        | 20         | 81.44            | 82.49 | 84.64  | 83.47 | 84.11 | 83.95  | 83.35 | 1.08 | 1.30  |
|        | 25         | 88.09            | 89.09 | 90.94  | 89.32 | 89.98 | 89.30  | 89.45 | 0.87 | 0.97  |
|        | 30         | 92.02            | 93.02 | 94.40  | 92.98 | 94.06 | 92.98  | 93.25 | 0.78 | 0.84  |
|        | 35         | 94.61            | 95.54 | 96.61  | 95.06 | 96.19 | 94.67  | 95.44 | 0.75 | 0.78  |
|        | 40         | 95.98            | 96.79 | 97.86  | 96.25 | 97.26 | 95.59  | 96.62 | 0.77 | 0.80  |
|        | 50         | 96.90            | 97.88 | 98.49  | 97.16 | 98.03 | 96.51  | 97.49 | 0.69 | 0.71  |
| 60     | 97.36      | 97.71            | 98.47 | 97.78  | 98.20 | 96.81 | 97.72  | 0.54  | 0.56 |       |
| 1:2    | 0          | 0.00             | 0.00  | 0.00   | 0.00  | 0.00  | 0.00   | 0.00  | 0.00 | 0.00  |
|        | 2          | 36.04            | 37.52 | 39.66  | 39.72 | 38.39 | 38.33  | 38.28 | 1.26 | 3.30  |
|        | 4          | 54.35            | 54.84 | 57.51  | 57.16 | 55.16 | 58.32  | 56.22 | 1.50 | 2.67  |
|        | 6          | 67.43            | 68.04 | 70.28  | 69.85 | 67.79 | 71.12  | 69.09 | 1.39 | 2.02  |
|        | 8          | 76.41            | 76.95 | 79.46  | 78.67 | 76.59 | 79.93  | 78.00 | 1.41 | 1.81  |
|        | 12         | 87.12            | 87.73 | 89.61  | 89.07 | 87.31 | 89.81  | 88.44 | 1.09 | 1.24  |
|        | 16         | 93.05            | 93.44 | 94.79  | 94.67 | 93.50 | 94.82  | 94.04 | 0.73 | 0.78  |
|        | 20         | 97.50            | 96.46 | 97.24  | 97.41 | 95.98 | 97.14  | 96.96 | 0.55 | 0.57  |
|        | 25         | 97.63            | 97.84 | 98.48  | 98.65 | 97.46 | 98.45  | 98.09 | 0.46 | 0.47  |
|        | 30         | 98.10            | 98.32 | 98.81  | 98.98 | 98.26 | 98.74  | 98.53 | 0.32 | 0.33  |
|        | 35         | 98.56            | 98.50 | 98.98  | 99.31 | 98.37 | 99.20  | 98.82 | 0.36 | 0.37  |
|        | 40         | 98.68            | 98.67 | 99.15  | 99.33 | 98.49 | 99.32  | 98.94 | 0.34 | 0.34  |
|        | 50         | 98.47            | 98.84 | 99.17  | 99.35 | 98.60 | 99.10  | 98.92 | 0.31 | 0.32  |
| 60     | 98.58      | 98.85            | 99.33 | 99.36  | 98.53 | 99.21 | 98.98  | 0.34  | 0.34 |       |
| 1:3    | 0          | 0.00             | 0.00  | 0.00   | 0.00  | 0.00  | 0.00   | 0.00  | 0.00 | 0.00  |
|        | 2          | 49.43            | 42.96 | 51.45  | 51.09 | 64.74 | 55.05  | 52.46 | 6.58 | 12.55 |
|        | 4          | 70.85            | 64.93 | 75.05  | 72.12 | 77.82 | 76.43  | 72.87 | 4.27 | 5.86  |
|        | 6          | 82.77            | 75.28 | 87.65  | 84.98 | 84.81 | 90.89  | 84.40 | 4.81 | 5.70  |
|        | 8          | 90.02            | 83.52 | 95.14  | 92.19 | 91.54 | 96.09  | 91.42 | 4.09 | 4.48  |
|        | 12         | 97.48            | 93.83 | 100.48 | 99.59 | 95.52 | 100.99 | 97.98 | 2.63 | 2.68  |
|        | 16         | 98.77            | 98.31 | 100.66 | 99.63 | 96.44 | 100.99 | 99.13 | 1.53 | 1.55  |
|        | 20         | 98.43            | 98.64 | 99.90  | 99.37 | 96.62 | 99.67  | 98.77 | 1.10 | 1.11  |
|        | 25         | 97.92            | 98.04 | 99.13  | 98.81 | 96.21 | 98.67  | 98.13 | 0.96 | 0.97  |
|        | 30         | 97.73            | 97.74 | 98.35  | 97.93 | 95.80 | 97.66  | 97.54 | 0.81 | 0.83  |
|        | 35         | 97.37            | 97.13 | 97.88  | 97.80 | 95.82 | 97.30  | 97.21 | 0.68 | 0.70  |
|        | 40         | 97.00            | 96.81 | 97.86  | 97.36 | 95.69 | 96.93  | 96.94 | 0.66 | 0.68  |
|        | 50         | 97.12            | 96.65 | 97.69  | 97.21 | 95.85 | 96.88  | 96.90 | 0.57 | 0.59  |
| 60     | 96.91      | 96.63            | 97.67 | 97.36  | 95.86 | 96.66 | 96.85  | 0.58  | 0.60 |       |

## APPENDIX 18

Dissolution data of indomethacin from indomethacin-DIMEB solvent mixtures  
in phosphate buffer of pH 7.2:deionized water(1:4).

| Ratios | Time(min.) | % drug dissolved |        |        | avg.   | SD   | ZCV  |
|--------|------------|------------------|--------|--------|--------|------|------|
|        |            | #1               | #2     | #3     |        |      |      |
| 1:1    | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00 | 0.00 |
|        | 2          | 32.87            | 35.72  | 29.92  | 32.84  | 2.37 | 7.21 |
|        | 4          | 52.72            | 53.07  | 47.95  | 51.25  | 2.33 | 4.55 |
|        | 6          | 61.04            | 61.54  | 57.41  | 60.00  | 1.84 | 3.07 |
|        | 8          | 65.58            | 65.43  | 63.15  | 64.72  | 1.11 | 1.72 |
|        | 12         | 68.62            | 71.36  | 68.21  | 69.40  | 1.40 | 2.02 |
|        | 16         | 71.06            | 74.88  | 70.68  | 72.21  | 1.89 | 2.62 |
|        | 20         | 72.75            | 77.54  | 72.45  | 74.24  | 2.33 | 3.14 |
|        | 25         | 74.60            | 79.92  | 73.49  | 76.01  | 2.81 | 3.69 |
|        | 30         | 76.15            | 81.89  | 74.55  | 77.53  | 3.15 | 4.06 |
|        | 35         | 77.56            | 84.15  | 75.17  | 78.96  | 3.80 | 4.81 |
|        | 40         | 78.97            | 85.70  | 75.79  | 80.15  | 4.13 | 5.15 |
|        | 50         | 80.69            | 88.71  | 76.41  | 81.94  | 5.10 | 6.22 |
| 60     | 82.12      | 90.28            | 77.33  | 83.24  | 5.35   | 6.42 |      |
| 1:2    | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00 | 0.00 |
|        | 2          | 79.61            | 81.81  | 80.84  | 80.75  | 0.90 | 1.11 |
|        | 4          | 91.35            | 95.00  | 95.02  | 93.79  | 1.73 | 1.84 |
|        | 6          | 95.49            | 97.85  | 98.01  | 97.11  | 1.15 | 1.18 |
|        | 8          | 96.89            | 98.65  | 98.65  | 98.06  | 0.83 | 0.85 |
|        | 12         | 97.98            | 99.45  | 99.61  | 99.02  | 0.73 | 0.74 |
|        | 16         | 98.62            | 99.78  | 99.79  | 99.40  | 0.55 | 0.55 |
|        | 20         | 98.95            | 99.64  | 99.96  | 99.52  | 0.42 | 0.42 |
|        | 25         | 99.43            | 99.96  | 100.13 | 99.84  | 0.30 | 0.30 |
|        | 30         | 99.60            | 99.97  | 100.15 | 99.90  | 0.22 | 0.23 |
|        | 35         | 99.77            | 100.28 | 100.31 | 100.12 | 0.25 | 0.25 |
|        | 40         | 99.79            | 100.75 | 100.47 | 100.34 | 0.41 | 0.40 |
|        | 50         | 99.95            | 100.28 | 100.31 | 100.18 | 0.16 | 0.16 |
| 60     | 99.96      | 100.43           | 100.46 | 100.28 | 0.23   | 0.23 |      |
| 1:3    | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00 | 0.00 |
|        | 2          | 92.25            | 76.73  | 79.50  | 82.82  | 6.76 | 8.16 |
|        | 4          | 98.75            | 90.37  | 90.89  | 93.33  | 3.83 | 4.11 |
|        | 6          | 99.40            | 93.54  | 94.02  | 95.65  | 2.66 | 2.78 |
|        | 8          | 100.06           | 95.06  | 95.73  | 96.95  | 2.22 | 2.29 |
|        | 12         | 99.64            | 96.28  | 96.35  | 97.43  | 1.57 | 1.61 |
|        | 16         | 100.29           | 97.21  | 96.80  | 98.10  | 1.56 | 1.59 |
|        | 20         | 99.86            | 97.54  | 97.06  | 98.15  | 1.22 | 1.25 |
|        | 25         | 100.50           | 97.56  | 97.14  | 98.40  | 1.50 | 1.52 |
|        | 30         | 100.07           | 97.73  | 97.04  | 98.28  | 1.30 | 1.32 |
|        | 35         | 100.17           | 97.60  | 97.29  | 98.35  | 1.29 | 1.31 |
|        | 40         | 100.26           | 97.76  | 97.18  | 98.40  | 1.34 | 1.36 |
|        | 50         | 100.36           | 98.07  | 97.42  | 98.61  | 1.26 | 1.28 |
| 60     | 100.44     | 98.07            | 97.30  | 98.61  | 1.34   | 1.35 |      |



## APPENDIX 19

Physical properties of the prepared indomethacin capsules.

| Physical properties Capsules  | #1  | #2     | #3     | #4     | #5     | #6     | #7     | #8     | #9    | #10    | avg.   | SD    | ZCV  |      |
|-------------------------------|-----|--------|--------|--------|--------|--------|--------|--------|-------|--------|--------|-------|------|------|
| Content uniformity            | IDM | 97.17  | 101.07 | 98.65  | 99.47  | 99.91  | 100.16 | 98.00  | 98.65 | 100.49 | 101.06 | 99.46 | 1.25 | 1.26 |
|                               | GD  | 98.40  | 98.96  | 100.93 | 99.28  | 100.84 | 98.77  | 98.50  | 97.65 | 98.26  | 98.13  | 98.97 | 1.05 | 1.06 |
|                               | KD  | 102.65 | 101.56 | 99.76  | 100.11 | 100.18 | 103.55 | 103.11 | 98.82 | 93.16  | 94.75  | 99.77 | 3.27 | 3.28 |
|                               | TD  | 97.20  | 98.12  | 96.20  | 101.52 | 101.89 | 103.48 | 99.92  | 99.34 | 99.56  | 96.54  | 99.38 | 2.29 | 2.31 |
|                               | GM  | 98.97  | 99.00  | 97.78  | 100.33 | 96.46  | 97.02  | 98.23  | 99.45 | 100.00 | 98.99  | 98.62 | 1.18 | 1.20 |
|                               | KM  | 97.51  | 98.77  | 101.75 | 102.86 | 103.86 | 96.83  | 96.07  | 97.19 | 95.31  | 103.28 | 99.34 | 3.09 | 3.11 |
|                               | SM  | 97.07  | 98.92  | 98.31  | 98.02  | 97.29  | 97.67  | 98.64  | 99.79 | 100.03 | 98.56  | 98.43 | 0.93 | 0.94 |
| Weight variation(mg)          | IDM | 289.1  | 301.7  | 289.9  | 290.3  | 298.0  | 289.3  | 298.6  | 290.2 | 300.0  | 304.1  | 295.1 | 5.59 | 1.90 |
|                               | GD  | 299.3  | 298.1  | 285.7  | 292.6  | 301.7  | 289.4  | 301.7  | 300.0 | 291.5  | 287.2  | 294.7 | 5.82 | 1.97 |
|                               | KD  | 288.4  | 286.3  | 300.7  | 295.0  | 298.3  | 297.5  | 292.0  | 300.5 | 300.4  | 294.3  | 295.3 | 4.86 | 1.65 |
|                               | TD  | 300.7  | 281.7  | 288.5  | 294.1  | 282.1  | 294.6  | 292.2  | 297.6 | 296.1  | 291.7  | 291.9 | 5.93 | 2.03 |
|                               | GM  | 290.6  | 296.5  | 288.8  | 283.9  | 289.8  | 285.6  | 290.2  | 292.4 | 296.8  | 284.3  | 289.9 | 4.30 | 1.48 |
|                               | KM  | 291.1  | 300.1  | 290.5  | 293.6  | 299.6  | 299.1  | 294.0  | 300.3 | 289.7  | 286.0  | 294.4 | 4.86 | 1.65 |
|                               | SM  | 300.8  | 311.3  | 313.4  | 311.7  | 301.0  | 304.7  | 307.0  | 302.4 | 299.5  | 294.6  | 304.6 | 5.80 | 1.90 |
| Disintegration time<br>(min.) | IDM | 2.23   | 1.90   | 1.90   | 2.00   | 2.37   | 2.37   | -      | -     | -      | -      | 2.13  | 0.20 | 9.55 |
|                               | GD  | 2.37   | 2.37   | 2.50   | 2.50   | 2.60   | 2.60   | -      | -     | -      | -      | 2.49  | 0.09 | 3.78 |
|                               | KD  | 2.37   | 2.37   | 2.62   | 2.62   | 2.62   | 2.62   | -      | -     | -      | -      | 2.54  | 0.12 | 4.65 |
|                               | TD  | 1.92   | 2.10   | 2.18   | 2.18   | 2.30   | 2.30   | -      | -     | -      | -      | 2.16  | 0.13 | 6.00 |
|                               | GM  | 3.00   | 2.90   | 2.73   | 2.73   | 2.73   | 2.73   | -      | -     | -      | -      | 2.80  | 0.11 | 3.84 |
|                               | KM  | 2.20   | 2.20   | 2.40   | 2.40   | 2.62   | 2.62   | -      | -     | -      | -      | 2.41  | 0.17 | 7.13 |
|                               | SM  | 3.21   | 3.33   | 2.53   | 3.55   | 3.36   | 3.29   | -      | -     | -      | -      | 3.21  | 0.32 | 9.97 |

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## APPENDIX 20

Dissolution data of indomethacin from the prepared indomethacin capsules.

| Type of capsule | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV   |
|-----------------|------------|------------------|-------|-------|-------|-------|-------|-------|------|-------|
|                 |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |       |
| IDM             | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|                 | 2          | 1.12             | 0.36  | 0.36  | 0.36  | 2.48  | 1.57  | 1.04  | 0.79 | 76.03 |
|                 | 4          | 9.77             | 9.62  | 7.79  | 9.92  | 10.08 | 11.14 | 9.72  | 0.99 | 10.21 |
|                 | 6          | 22.28            | 25.30 | 21.95 | 23.18 | 22.89 | 24.56 | 23.36 | 1.20 | 5.13  |
|                 | 8          | 31.98            | 35.03 | 31.96 | 32.14 | 32.91 | 34.13 | 33.02 | 1.17 | 3.56  |
|                 | 12         | 44.78            | 47.85 | 44.76 | 45.55 | 45.26 | 45.89 | 45.68 | 1.05 | 2.30  |
|                 | 16         | 54.03            | 57.12 | 54.47 | 56.31 | 54.51 | 54.84 | 55.21 | 1.11 | 2.02  |
|                 | 20         | 61.21            | 64.78 | 61.65 | 63.81 | 62.15 | 61.72 | 62.55 | 1.29 | 2.06  |
|                 | 25         | 68.29            | 74.76 | 68.58 | 71.51 | 69.08 | 68.34 | 70.09 | 2.36 | 3.37  |
|                 | 30         | 74.04            | 77.22 | 74.03 | 76.84 | 73.93 | 73.49 | 74.92 | 1.50 | 2.00  |
|                 | 35         | 78.47            | 81.66 | 78.46 | 81.28 | 78.05 | 77.76 | 79.28 | 1.57 | 1.98  |
|                 | 40         | 81.71            | 85.22 | 81.85 | 84.53 | 81.13 | 80.99 | 82.57 | 1.67 | 2.02  |
|                 | 50         | 86.63            | 89.87 | 86.16 | 89.17 | 85.45 | 85.46 | 87.12 | 1.75 | 2.01  |
| 60              | 90.07      | 93.17            | 89.29 | 92.32 | 88.72 | 88.89 | 90.41 | 1.72  | 1.91 |       |
| GD              | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|                 | 2          | 3.54             | 3.09  | 4.15  | 1.27  | 2.03  | 4.76  | 3.14  | 1.19 | 38.01 |
|                 | 4          | 25.72            | 17.98 | 21.47 | 15.54 | 15.54 | 20.72 | 19.49 | 3.60 | 18.46 |
|                 | 6          | 47.28            | 41.91 | 43.92 | 37.94 | 40.07 | 45.89 | 42.83 | 3.23 | 7.54  |
|                 | 8          | 58.21            | 54.93 | 56.50 | 52.91 | 52.93 | 58.18 | 55.61 | 2.20 | 3.96  |
|                 | 12         | 70.12            | 67.28 | 70.07 | 67.06 | 66.48 | 71.61 | 68.77 | 1.91 | 2.78  |
|                 | 16         | 76.50            | 74.10 | 77.20 | 74.03 | 73.59 | 78.60 | 75.67 | 1.88 | 2.48  |
|                 | 20         | 81.40            | 78.98 | 81.96 | 78.76 | 78.77 | 83.06 | 80.49 | 1.72 | 2.14  |
|                 | 25         | 85.57            | 83.29 | 86.59 | 83.07 | 83.54 | 87.85 | 84.98 | 1.82 | 2.14  |
|                 | 30         | 89.47            | 86.71 | 90.03 | 86.19 | 87.11 | 91.15 | 88.44 | 1.86 | 2.10  |
|                 | 35         | 91.71            | 89.09 | 92.43 | 88.56 | 90.41 | 93.56 | 90.96 | 1.78 | 1.96  |
|                 | 40         | 93.36            | 90.88 | 94.24 | 90.19 | 91.59 | 95.07 | 92.56 | 1.78 | 1.93  |
|                 | 50         | 95.47            | 93.13 | 96.51 | 92.14 | 94.00 | 97.34 | 94.76 | 1.84 | 1.94  |
| 60              | 96.99      | 94.78            | 97.73 | 93.78 | 95.35 | 98.72 | 96.23 | 1.73  | 1.79 |       |
| KD              | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|                 | 2          | 5.52             | 6.12  | 6.12  | 5.21  | 6.43  | 5.97  | 5.90  | 0.41 | 6.93  |
|                 | 4          | 14.20            | 15.11 | 12.38 | 11.01 | 14.51 | 11.47 | 13.12 | 1.57 | 11.96 |
|                 | 6          | 24.46            | 25.23 | 23.69 | 22.46 | 24.62 | 22.17 | 23.77 | 1.13 | 4.73  |
|                 | 8          | 30.69            | 31.16 | 30.22 | 29.14 | 30.85 | 28.84 | 30.15 | 0.87 | 2.89  |
|                 | 12         | 39.69            | 39.86 | 39.83 | 37.82 | 39.25 | 37.37 | 38.97 | 1.00 | 2.56  |
|                 | 16         | 47.08            | 46.80 | 46.91 | 45.05 | 46.18 | 44.14 | 46.03 | 1.08 | 2.35  |
|                 | 20         | 52.85            | 53.02 | 53.44 | 50.81 | 52.35 | 50.20 | 52.11 | 1.20 | 2.29  |
|                 | 25         | 59.26            | 59.59 | 60.16 | 57.06 | 58.81 | 56.29 | 58.53 | 1.39 | 2.38  |
|                 | 30         | 64.81            | 64.98 | 65.71 | 62.28 | 64.04 | 61.51 | 63.89 | 1.51 | 2.36  |
|                 | 35         | 69.32            | 69.65 | 70.99 | 66.63 | 68.40 | 66.16 | 68.53 | 1.69 | 2.47  |
|                 | 40         | 73.26            | 73.74 | 74.94 | 70.40 | 72.18 | 70.07 | 72.43 | 1.75 | 2.42  |
|                 | 50         | 78.89            | 79.52 | 81.49 | 76.16 | 77.96 | 75.98 | 78.33 | 1.92 | 2.45  |
| 60              | 83.19      | 84.28            | 86.72 | 80.59 | 82.40 | 81.02 | 83.03 | 2.06  | 2.48 |       |

## APPENDIX 20 (continued)

Dissolution data of indomethacin from the prepared indomethacin capsules.

| Type of capsule | Time(min.) | % drug dissolved |        |        |        |        |        | avg.   | SD   | ZCV   |
|-----------------|------------|------------------|--------|--------|--------|--------|--------|--------|------|-------|
|                 |            | #1               | #2     | #3     | #4     | #5     | #6     |        |      |       |
| TD              | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00  |
|                 | 2          | 2.03             | 1.88   | 1.88   | 1.12   | 1.42   | 1.12   | 1.57   | 0.37 | 23.63 |
|                 | 4          | 13.72            | 14.78  | 18.27  | 11.29  | 11.59  | 12.50  | 13.69  | 2.37 | 17.32 |
|                 | 6          | 28.53            | 28.23  | 32.35  | 28.66  | 25.32  | 27.15  | 28.37  | 2.11 | 7.44  |
|                 | 8          | 37.06            | 36.31  | 40.61  | 38.25  | 35.35  | 36.43  | 37.34  | 1.70 | 4.56  |
|                 | 12         | 48.53            | 46.86  | 51.64  | 50.49  | 46.66  | 48.35  | 48.76  | 1.80 | 3.70  |
|                 | 16         | 57.50            | 55.82  | 61.09  | 60.38  | 55.01  | 56.71  | 57.75  | 2.25 | 3.90  |
|                 | 20         | 64.10            | 63.01  | 67.71  | 67.76  | 61.59  | 64.67  | 64.81  | 2.28 | 3.52  |
|                 | 25         | 70.13            | 69.34  | 74.37  | 75.18  | 67.91  | 71.62  | 71.42  | 2.62 | 3.67  |
|                 | 30         | 74.98            | 74.19  | 79.71  | 80.98  | 72.75  | 76.79  | 76.57  | 2.95 | 3.85  |
|                 | 35         | 78.96            | 78.46  | 83.86  | 85.14  | 76.41  | 80.92  | 80.63  | 3.06 | 3.80  |
|                 | 40         | 81.29            | 80.64  | 86.68  | 88.42  | 79.03  | 84.18  | 83.37  | 3.36 | 4.03  |
|                 | 50         | 84.84            | 84.19  | 90.42  | 93.54  | 82.87  | 87.75  | 87.27  | 3.75 | 4.29  |
| 60              | 86.90      | 86.40            | 92.67  | 95.20  | 84.61  | 90.28  | 89.34  | 3.73   | 4.17 |       |
| GMDM 1:0.5      | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00  |
|                 | 2          | 1.45             | 1.90   | 1.62   | 1.47   | 1.61   | 1.65   | 1.62   | 0.15 | 9.08  |
|                 | 4          | 17.73            | 14.51  | 12.89  | 17.84  | 14.20  | 11.87  | 14.84  | 2.25 | 15.19 |
|                 | 6          | 47.28            | 49.78  | 40.03  | 51.93  | 48.76  | 47.35  | 47.52  | 3.70 | 7.79  |
|                 | 8          | 63.40            | 66.25  | 61.73  | 67.53  | 66.01  | 63.94  | 64.81  | 1.96 | 3.03  |
|                 | 12         | 76.83            | 79.13  | 75.74  | 79.61  | 78.71  | 77.75  | 77.96  | 1.35 | 1.73  |
|                 | 16         | 83.69            | 85.64  | 82.65  | 85.80  | 84.66  | 84.49  | 84.49  | 1.09 | 1.29  |
|                 | 20         | 87.96            | 89.73  | 86.95  | 90.14  | 88.63  | 88.87  | 88.71  | 1.06 | 1.20  |
|                 | 25         | 92.10            | 93.24  | 91.11  | 93.55  | 92.63  | 92.48  | 92.52  | 0.79 | 0.86  |
|                 | 30         | 94.09            | 95.69  | 93.43  | 96.20  | 94.47  | 94.67  | 94.76  | 0.94 | 0.99  |
|                 | 35         | 96.09            | 97.38  | 95.12  | 97.61  | 96.48  | 96.40  | 96.51  | 0.82 | 0.85  |
|                 | 40         | 97.48            | 98.62  | 96.67  | 99.02  | 97.71  | 97.66  | 97.86  | 0.77 | 0.79  |
|                 | 50         | 98.41            | 100.17 | 98.23  | 100.28 | 99.58  | 98.76  | 99.24  | 0.82 | 0.82  |
| 60              | 99.81      | 100.80           | 99.32  | 100.76 | 100.36 | 99.38  | 100.07 | 0.61   | 0.61 |       |
| KNDM 1:0.5      | 0          | 0.00             | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00 | 0.00  |
|                 | 2          | 4.65             | 4.09   | 4.15   | 1.57   | 7.34   | 5.82   | 4.60   | 1.76 | 38.26 |
|                 | 4          | 25.07            | 21.98  | 18.14  | 17.06  | 26.05  | 26.57  | 22.48  | 3.76 | 16.71 |
|                 | 6          | 48.54            | 46.50  | 42.07  | 42.50  | 48.22  | 49.17  | 46.17  | 2.86 | 6.20  |
|                 | 8          | 63.12            | 62.02  | 60.10  | 59.93  | 63.10  | 63.98  | 62.04  | 1.54 | 2.49  |
|                 | 12         | 79.02            | 78.42  | 78.25  | 77.01  | 79.29  | 79.82  | 78.64  | 0.90 | 1.14  |
|                 | 16         | 87.36            | 86.39  | 88.17  | 86.62  | 87.25  | 87.97  | 87.29  | 0.65 | 0.74  |
|                 | 20         | 92.07            | 91.15  | 93.45  | 91.89  | 92.07  | 93.22  | 92.31  | 0.79 | 0.86  |
|                 | 25         | 95.89            | 95.01  | 98.16  | 95.98  | 95.85  | 96.95  | 96.31  | 1.00 | 1.04  |
|                 | 30         | 98.51            | 97.80  | 101.07 | 99.03  | 98.29  | 98.66  | 98.89  | 1.04 | 1.05  |
|                 | 35         | 100.21           | 99.36  | 103.09 | 100.28 | 100.14 | 100.55 | 100.60 | 1.17 | 1.16  |
|                 | 40         | 101.32           | 100.31 | 104.36 | 101.23 | 100.94 | 101.81 | 101.66 | 1.29 | 1.27  |
|                 | 50         | 103.03           | 102.03 | 105.78 | 102.48 | 102.34 | 103.39 | 103.18 | 1.25 | 1.21  |
| 60              | 103.69     | 102.52           | 106.45 | 102.98 | 103.29 | 103.74 | 103.78 | 1.27   | 1.22 |       |



## APPENDIX 20 (continued)

Dissolution data of indomethacin from the prepared indomethacin capsules.

| Type of capsule | Time(min.) | % drug dissolved |       |       |       |       |       | avg.  | SD   | ZCV   |
|-----------------|------------|------------------|-------|-------|-------|-------|-------|-------|------|-------|
|                 |            | #1               | #2    | #3    | #4    | #5    | #6    |       |      |       |
| CODM 1:2        | 0          | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00  |
|                 | 2          | 3.54             | 7.03  | 8.40  | 6.12  | 0.21  | 3.24  | 4.76  | 2.73 | 57.42 |
|                 | 4          | 38.16            | 39.39 | 44.10 | 38.78 | 27.97 | 29.49 | 36.32 | 5.71 | 15.73 |
|                 | 6          | 73.67            | 77.31 | 76.42 | 75.69 | 75.59 | 74.30 | 75.50 | 1.22 | 1.62  |
|                 | 8          | 89.13            | 90.01 | 85.77 | 89.01 | 82.84 | 86.21 | 87.16 | 2.48 | 2.85  |
|                 | 12         | 92.84            | 93.69 | 90.62 | 93.03 | 93.18 | 93.40 | 92.79 | 1.01 | 1.09  |
|                 | 16         | 93.89            | 94.89 | 92.66 | 94.39 | 94.21 | 93.77 | 93.97 | 0.69 | 0.73  |
|                 | 20         | 94.80            | 95.95 | 93.91 | 95.46 | 95.61 | 94.30 | 95.01 | 0.73 | 0.77  |
|                 | 25         | 95.42            | 96.58 | 94.41 | 96.23 | 95.65 | 94.43 | 95.45 | 0.82 | 0.86  |
|                 | 30         | 96.19            | 97.05 | 94.61 | 96.55 | 95.75 | 95.41 | 95.93 | 0.79 | 0.82  |
|                 | 35         | 96.51            | 97.38 | 95.36 | 96.57 | 96.65 | 96.15 | 96.44 | 0.61 | 0.63  |
|                 | 40         | 96.97            | 97.71 | 95.96 | 96.59 | 97.10 | 96.74 | 96.85 | 0.53 | 0.55  |
|                 | 50         | 97.14            | 97.74 | 96.02 | 96.76 | 97.30 | 97.62 | 97.10 | 0.58 | 0.60  |
| 60              | 97.16      | 97.77            | 96.62 | 96.62 | 97.75 | 98.06 | 97.33 | 0.57  | 0.58 |       |

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