**PREPARATION OF β-CYCLODEXTRIN COMPLEXES OF DICLOFENAC TO ENHANCE DISSOLUTION RATE**

**AIM**

To determine the influence of complexation on solubility and dissolution of a drug using β-cyclodextrins.

**REQUIREMENTS**

Drug (diclofenac), β-cyclodextrins and dissolution apparatus.

**PRINCIPLE**

Complexations of drugs with cyclodextrins have been used to enhance aqueous solubility and drug stability. The ring of cyclodextrin has a hydrophilic exterior and lipophilic core form non-covalent inclusion complexes resulting in increased aqueous solubility and chemical stability.

**PROCEDURE**

**Standard graph of drug**

100mg of drug is dissolved in sufficient quantity of methanol in 100 ml volumetric flask the volume was made up to the mark with phosphate buffer of 7.4pH.1ml of sample from above solution was pipetted out and suitable dilutions are made and absorbances are measured at 277.2nm.

**Preparation of Drug: β-cyclodextrin complexes**

* The drug and the polymer β-cyclodextrin were prepared in different ratios (1:5, 1:10, 1:15).
* The drug and the β cyclodextrin were taken in a china dish and to this little bit of methanol was added and triturated to form a paste.
* The above solid mass obtained after evaporation of methanol was passed through sieve no. # 60.

**Solubility study**

Excess amount of complex mixtures were transferred into a conical flask. 10 ml of water was added to it and placed in shaker for 24 hrs. The contents of conical flask were filtered and absorbances were taken and solubility was calculated.

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| --- | --- | --- | --- |
| Drug: polymer | 1:5 | 1:10 | 1:15 |
| Absorbance | 0.692 | 0.350 | 0.193 |
| Concentration | 10.6 | 5.07 | 2.52 |

***Invitro* Dissolution studies**

The dissolution studies were performed for three different ratios of drug and polymer i.e; 1:5, 1:10 & 1:15. 100mg samples of drug: β-cyclodextrins were taken in the dissolution apparatus and dissolution test was performed with the given requirements like,

Method – USP Type-II (Paddle)

Medium – Phosphate buffer of pH 7.4

R.P.M – 50

Temperature – 370c ± 0.20c.

Then, the samples were drawn at intervals of 5, 10, 20, 30, 40, 50, 60 minutes. The samples were analyzed at the 277.2nm by using UV spectrophotometer and the first order rate constants of the respective dissolution profiles of complexes were calculated.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time(min)** | **% Amount released** | | | **% ARR** | | | **Log % ARR** | | |
| **F1** | **F2** | **F3** | **F1** | **F2** | **F3** | **F1** | **F2** | **F3** |
| 0 | 0 | 0 | 0 | 100 | 100 | 100 | 2 | 2 | 2 |
| 5 | 87.3 | 88.3 | 72.34 | 12.7 | 11.7 | 27.66 | 1.103 | 1.068 | 1.441 |
| 10 | 87.9 | 88.9 | 85.32 | 12.1 | 11.1 | 14.68 | 1.082 | 1.045 | 1.166 |
| 20 | 89.5 | 90.5 | 86.46 | 10.5 | 9.5 | 13.54 | 1.021 | 0.977 | 1.131 |
| 30 | 90 | 91.21 | 88.21 | 10 | 8.79 | 11.79 | 1 | 0.943 | 1.071 |
| 40 | 91.21 | 92.21 | 89.62 | 8.79 | 7.79 | 10.38 | 0.943 | 0.891 | 1.016 |
| 50 | 92.62 | 93.62 | 91.41 | 7.38 | 6.38 | 8.59 | 0.868 | 0.804 | 0.933 |
| 60 | 94.42 | 95.42 | 93.21 | 5.58 | 4058 | 6.79 | 0.746 | 0.660 | 0.831 |

**REPORT**