**Standard calibration curve of Ibuprofen at 264 nm**

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| **Concentration(µg/ml)** | **Absorbance** |
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**Accelerated stability studies**

**Ibuprofen Decomposition stored at 400C**

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| --- | --- | --- | --- | --- | --- | --- |
| **Time**  **(Min)** | **Absorbance** | **DF** | **Ibuprofen concentration or Decomposed (mg/ml)** | **Ibuprofen % remain Undecomposed** | **Ibuprofen remain Undecomposed** | **Log % Ibuprofen remain Undecomposed** |
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**Determination of the Shelf life of Ibuprofen solution using accelerated stability studies.**

**Aim:**

To determine the shelf life of Ibuprofen using accelerated Stability studies.

**Requirements:**

Ibuprofen, ethanol, sodium hydroxide (O.IN), glass wares, dryer.

**Theory:**

Most of the drugs purchased from the retail shop contain expire date on the label of pack. The expiration date is an assurance given by the manufacture. that, if the product is taken before the Expiry the specifications presented on the label regarding "identity, strength, quality and purity. The drug control department ensures through regulatory controls that every product released into that market should be is an Evaluated the to fix the expiry date.

The technical term for expiry term is shelf life by convention, shelf life is defined as the time required for a drug to reduce conc. to 90% of the labellsed concentration. The evaluation of shelf life is essential because the stability of a drug in dosage forms can be influenced by nomal environment conditions. Drugs such as by the esters (like aspirin, procaine) and amides (chloramphenicol), undergo. hydrolytic reactions. during storage under control normal conditions. similarly. drug such as ascorbic acid, promethazine undergo oxidation reaction. As a result the drug may not be exhibit the desired effect and may show reduced biological response.

Studies that enable for to prediction of shelf life for each influence of temperature on degradation. in general the rate (or) a reaction increases with the rise in temp. Arrhenius established a quantitative relationship blw temp and rate of reaction.

U = Ae-Ka/RT.

where;

K = specific rate constant

A = frequency factor (or) Arrhenius factor..

**Ibuprofen Decomposition stored at 500C**

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| --- | --- | --- | --- | --- | --- | --- |
| **Time**  **(Min)** | **Absorbance** | **DF** | **Ibuprofen concentration or Decomposed (mg/ml)** | **Ibuprofen % remain Undecomposed** | **Ibuprofen remain Undecomposed** | **Log % Ibuprofen remain Undecomposed** |
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Ea = energy of activation, kJ/mol.k

T = absolute temperature, K.

"A" is the measure of frequency of collision that can be excepted b/w the reacting molecule in reaction. “Ea” the is minimum energy required by the molecule so the molecule undergo mollecular collisions & give useful products

logk = log A - Ea/20303 RT.

A/c to this equation, a plot can be drawn by taking log K on y-aris and reciprocal temperature (1/7) on X-axes. The slope gives the energy of activation..

Ea = slopex 2.303XR.

where; R= 8.319. J/mole. k

Ibuprofen follows pseudo- first order kinetics.

**Procedure:**

1. **Preparation of standard Ibuprofen solution and Construction of standard**

**Calibration curve of at 264nm**

**Ibuprofen 264 nm:**

100mg of Ibuprofen was dissolved 100ml of 0.1N NaoH solution in 100ml water) in volumetric flask to get a concentration of 1mg/ml 10ml of the resulting solution was taken suitably diluted to 100ml with 0.1N NaoH solution on to produce 100 ug/ml.

from 100 µg/ml solution a series of concentration were prepared with 0.1N NaoH solution and absorbance was analysed at 264 nm using UV-vis spectrophotometer against 0.1N NaoH solution as blank..

A graph was plotted against concentrations on X-axis alas and absorbance on Y-axis to get a standard calibration curve.

**Accelerated stability studies**

100mg of Ibuprofen was accurately weighed and transferred into 250ml conical flask.

About 2ml of alcohol was added to dissolve the Ibuprofen and made upto 100ml with 0.1 NaOH.

**Ibuprofen Decomposition stored at 600C**

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| --- | --- | --- | --- | --- | --- | --- |
| **Time**  **(Min)** | **Absorbance** | **DF** | **Ibuprofen concentration or Decomposed (mg/ml)** | **Ibuprofen % remain Undecomposed** | **Ibuprofen remain Undecomposed** | **Log % Ibuprofen remain Undecomposed** |
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**Arrhenius plot**

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| --- | --- | --- | --- | --- | --- |
| **Temperature(OC)** | **Temp(*K*)** | **1/T** | **Slope** | **K = Slope ×2.303** | **Log K** |
| **40** |  |  |  |  |  |
| **50** |  |  |  |  |  |
| **60** |  |  |  |  |  |

The conical flask was corked and kept in water bath at 40°C.

Immediately after placing water bath, 1ml of sample mixture was taken and made the volume to 10ml with 0.1n NaoH solution which represents zero time interval.

At regular intervals of 10,20,30,40, 50 and 60 minis 1ml of samples are withdrawn from the container made the volume to 10ml with 0.1n NaoH solution.

The absorbance was measured at 264nm using spectrophotometer against 0.1N NaoH solution as blank under suitable dilutions.

A graph and was plotted by taking time on -axis, 10mg percent Ibuprofen undecomposed on y-axis. Tthe sample procedure was repeated at 50° and 60°

The slopes of these graphs were calculated, and Arrhenius plots were drawn by plotting logarithm of rate constants (k) on y-axis against reciprocal of absolute temperature on x-axis.

**Report:**