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UV. VISIBLE SPECTROMETRIC ESTIMATION OF PURE ASPIRIN AND MARKETED FORMULATION

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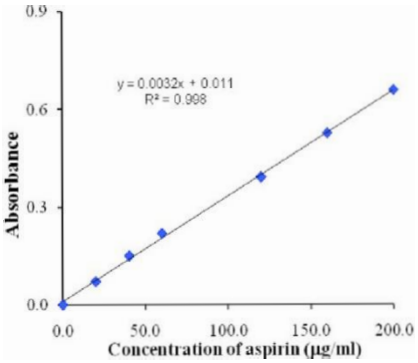
Abstract: Spectroscopy is the branch of science dealing with the study of interaction of electromagnetic radiation with matter. The most important consequence of such interaction is that energy is absorbed or emitted by the matter in discrete amounts called quanta. The absorption or emission processes are known throughout the electromagnetic spectrum ranging from the gamma region (nuclear resonance absorption) to the radio region (nuclear magnetic resonance) when the measurement of radiation frequency is done experimentally, it gives a value for the change of energy involved and from this one may draw the conclusion about the set of possible discrete energy levels of the matter. Analysis is considered to determine identity, strength, quality & purity of the drug samples, synthetic intermediates and the final drug product, in pharmaceutical industry. Hence analysis plays an important role right from the testing of raw material, the in process control of every step to the final analysis of each batch of finished drug products. Therefore, analytical methods developed using sophisticated instruments such as spectrophotometer have wide applications in assuring the quality and quantity of raw materials and finished products.

Key words: Aspirin, salicylic acid, UV. Visible spectroscopy

1.Introduction:-

Analytical chemistry may be defined as 'the science and art of determining the composition of materials in term of the elements or compounds contained in them historically the development of analytical methods has followed closely the introduction of new measuring instruments'. The first quantitative analyses were gravimetric, made possible by the invention of precise balance. In closing decades of the nineteenth century, the invention of the spectroscope brought with it an analytical approach that proved to be extremely fruitful.

Type of Analytical Methods:



A. Qualitative Methods:- It refers identify of the product i.e., it yields useful clues from which the molecular or automatic species, the structural features, or the functional groups in the samples can be deduced.

B. Quantitative Method: It refers purity of the product, i.e. the results are in the form of numerical data corresponding to the concentration of analytes. In both the analysis, the required information is obtained by measuring a physical property that is characterically related to the component of interest (the analytes). The most important aspect of analysis is quantitative chemical analysis. In the present age, the physical, chemical and biological analysis, involve computerized techniques to facilitate better results.

Chemical Analysis

Quantitative Analysis | **Qualitative Analysis**

Traditional or Classical Methods | **Instrumental Methods**

Titrimetric Methods	**Gravimetric Methods**	**Based on Separation**	**Based on Measurement of Signals**
-Acidimetric And Alkalimetry		-Gas Chromato-graphy	- Uv/visble Spectroscopy
-Redox Titration		-Liquid Chromato-graphy	- I.R.Spectroscopy - Emission Spectroscopy - ESR Spectroscopy
-Precipitation Titration		-Ionexchange Chromatography	- X-ray Diffraction Spectroscopy
-Complexometric Titration		-Size Exclusion Chromatography	- X-ray Fluorescence Spectroscopy

-Mass Spectroscopy

- NMR Spectroscop

1.2 SPECTROSCOPY:

Spectroscopy is the branch of science dealing with the study of interaction of electromagnetic radiation with matter. The most important consequence of such interaction is that energy is absorbed or emitted by the matter in discrete amounts called quanta. The absorption or emission processes are known throughout the electromagnetic spectrum ranging from the gamma region (nuclear resonance absorption) to the radio region (nuclear magnetic resonance) when the measurement of radiation frequency is done experimentally, it gives a value for the change of energy involved and from this one may draw the conclusion about the set of possible discrete energy levels of the matter.

Optimum Conditions For Spectrophotometric:

In developing an analytical method based on UV-Visible Spectrophotometry, it is essential to select the optimum instrumental conditions to ensure accuracy and precision in spectrophotometric measurements. The factors, which need to be considered, are;

1. Sample conditions; Solvent, concentration, and Path length.
2. Instrumental parameters; Wavelength, Slit width and Scan speed.

2.DRUG PROFILE

Aspirin

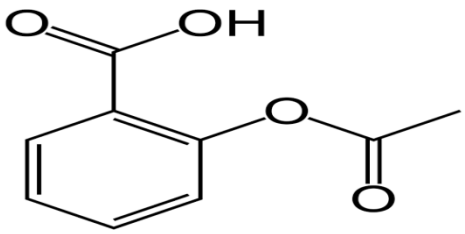


Table 1 Properties of Aspirin

Chemical name	2-Acetoxybenzoic acid
Mol. Formula	$C_9H_8O_4$
Mol. Wt	180.158 g/mol
Physical appearance	Solid
Solubility	Soluble in ethanol, ethyl ether, and Chloroform
Category	Non-steroidal anti-inflametory drug (NSAIDS)

Wavelength	270 nm
Pka	3.5

2.1 Mechanism of action

He proved that aspirin and other non-steroid anti-inflammatory drugs (NSAIDs) inhibit the activity of the enzyme now called cyclooxygenase (COX) which leads to the formation of prostaglandins (PGs) that cause inflammation, swelling, pain and fever.30].

2. Uses:- Aspirin is used to reduce fever and relieve mild to moderate pain from conditions such as muscle aches, toothaches, common cold, and headaches. [30]

2.4 Adverse Effect

- Abdominal or stomach pain, cramping, or burning.
- Black, tarry stools.
- Bloody or cloudy urine.
- Change in consciousness.
- Chest pain or discomfort.
- Constipation.
- Convulsions, severe or continuing.
- Decreased frequency or amount of urine

3.MATERIAL AND METHOD

3.1 Experiment

3.1.1 Sample material

a) Chemical

b) Apparatus

c) Equipment's

3.1.2 Selection of wavelength

3.1.3 Selection of concentration

3.1.4 Preparation of standard

3.1.5 Preparation of calibration

3.1.1 Sample material

All tablet formulation from different manufacturer is purchased from local market Mandleshwar.

Labeled Claim Aspirin

Table No. 1: Sample Information

S.No	Brand Name	Name of Manufacturer	Batch No.
1.	Ecospirin 325mg	USV PVT.LTD	04009161

a) Chemicals

1. All Required Chemical Purchased SUNCHEM INDIA.
2. Distilled water purchased from local market Mandleshwar.
3. Whatman No. 41 Filter paper was used for experimental work.

b) Apparatus

Volumetric flasks-100 ml., 1000 ml. beakers, measuring cylinders, pipettes, Motor pistol

c) Equipment's

1. Single beam UV-Visible spectrophotometer.
2. Electronic weighing balance Model No.AW-220 & BX-620 S, UV Spectroscopy 1800 Shimadzu

3.1.2 Selection of wavelength:

Wavelength for Aspirin at 270 mm.

3.1.3 Selection of concentration

Reading for different concentration of Aspirin 1-10 of 0 to 20 µg/mL

3.1.4 Preparation of Standard Solution

1. Accurately Weigh Aspirin 0.100 gm was transferred to a 100ml volumetric flask.

2. Dissolve ibuprofen in 50 ml with 0.1 N sodium hydroxide and made up the volume up to the mark with 0.1 N sodium hydroxide.

3. From this Prepare stock solution pipette out the 1 ml in a 100 ml. eleaned volumetric flask and volume make up to the mark with the help of 0.1 N sodium hydroxide

4. Resulting solution to 10 mL of 0.1 N Sodrum hydroxide solution scan in ultraviolet range UV Spectrophotometer in the 200 to 400 nm.

3.1.5 Analysis of Marketed Tablet Formulation:

1. Accurately weighed the 20 tablets of Aspirin and fine powdered,

2. The powder equivalent to 100mg of Aspirin was transferred to 100ml volumetric flask and 20ml 0.1 N sodium hydroxide is added and sonicated for 15 minutes to dissolve the Aspirin in it and made the volume to mark with same

3. The solution was filtered through Whatman filter paper No. 40. 10ml of this solution was diluted with 0.1 N sodium and determined the absorbance at 221mm against the 0.1 N sodium hydroxide diluted with same as blank.

4. The concentration of ibuprofen present in marketed tablet formulation were determined, Table 2

Table 2: Result of Analysis of Aspirin in Tablet

Formulation	Label claim(mg)	Amount Found
Aspirin	10 mg	9.160 gm

n = 1

4.RESULT AND DISCUSSION

The UV scan of standard solution between 200-400 mm showed the absorption maxima at 270nm. No effect of dilution was observed on the maxima, which confirmed the maxima at 270 nm. The statistical analysis of data obtained for the calibration curve of Aspirin in pure solution indicated a high level of precision for the proposed method, as evidenced by low value of coefficient of variation. The coefficient of correlation was highly significant. The linearity range was observed between 2-20 mcg/ml. The plot clearly showed a straight line passing through origin (y= 0.0111x+0.0147). The method was found to be simple, accurate, precise. economical and robust.

The Aspirin (PHE 10) purchased from market and characterized of different parameters as summarized in Table 9. All the tablets passed weight variation test as the percentage weight variation was within the pharmacopoeia limits. Hardness and friability of marketed tablet were within acceptable limits. Hardness of the tablets was 5.1 to 5.7 kg/cm 2. The friability was found to be less than 1.0% and hence the tablets with lower friability and good hardness may not break during handling on machines and shipping. The in-vitro Disintegration time is very important for estimation of drug absorption. The in-vitro disintegration time was found in the range of 9.31 to 10.19 min. The in vitro dissolution study was performed in phosphate buffer (pH 7.2) since this approach is recommended in the USP. The dissolution study of the marketed formulation of

Aspirin tablets (10 mg) showed complete drug release within 50 minutes. The percentage drug release of marketed tablet shows the better drug release between 95.1 to 97.2%, The organoleptic properties of Aspirin was found to be colour (white), Odour (slight), Taste (tastless), Size (1.2 cm), Shape (round shape), Texture (hard)

Table No. 9: Result of Assay

Sample	At	As	Cs	Assay
Aspirin			0.100	101%

5. Conclusion

The developed UV-Spectrophotometric method for estimation of Aspirin can be validated in accordance with the ICH guideline and this method can be appear to be a suitable technique for the reliable analysis of commercial formulations containing Aspirin. The most striking features of this method are its simplicity, specificity, linearity, accuracy, precision, and robustness. It is also an easier, rapid and cost effective method. Hence the present UV-Spectrophotometric method can suitable for routine analysis of Aspirin tablet dosage form.

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