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A Review of UV Validation and Development Method of Anticancer Drugs

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ABSTRACT

UV-VIS Spectroscopy is the term used for the analytical evaluation of UV-VIS Spectroscopy is UV-VIS Spectroscopy. The method of analysis is based on assessing the absorption of colorless substances emitting monochromatic light in the near-ultraviolet path of the spectrum (200-400 nm). It's critical right now to create trustworthy analytical procedures for determining anticancer medicines obtain higher selectivity, sensitivity, and speed in the assay procedure than previously reported. The major goal of this study is to examine UV spectrophotometric methods that are quick and easy to use. Extraction processes that use minimal solvents and have a quick turnaround time. According to the present study, purified or distilled water is the most commonly utilized solvent since it is readily available and most medications are easily soluble it is also practicable for most method development processes and produces better results when it comes to validation. The findings were obtained. Methanol, pure ethanol, acetonitrile, and phosphate buffer saline, among other solvents, were used next were employed, with the same criteria that are required to provide superior validation findings. Next λ max is also crucial in the validation of the procedure and in determining, the maximum anticancer medicines recorded in this study. The maximum wavelength is between 210 and 277 nanometers. As a result, the UV approaches described in this research offer the advantages of being simple, precise, and accurate.

INTRODUCTION:

Spectroscopy

Spectroscopy is the measurement and interpretation of Electro Magnetic Radiation [EMR] absorbed and emitted by molecules, atoms, and ions in a sample as they shift from one energy level to the next to another state of energy.[1]

UV-VIS Spectroscopy:

Ultraviolet (UV) spectroscopy is a physical technique that involves the use of ultraviolet (UV) light. Light in the visible, ultraviolet, and near-infrared wavelengths is used in optical spectroscopy. The Beer-Lambert law is a set of rules that governs alcohol consumption and indicates a solution. The concentration of the absorbing species in the solution determines absorbance. The length of the road and the solution UV/VIS spectroscopy can thus be used to determine a substance's concentration given the length of the journey absorbing in a solution it's critical to comprehend how swiftly things happen concentration affects absorbance.[2]

PRINCIPLES OF UV-VIS SPECTROSCOPY:

1. Spectroscopy is primarily concerned with the interaction of light with matter.

2. When light is absorbed by matter, the energy content of the atoms or molecules is increased.

3. When ultraviolet radiation is absorbed, it causes the electrons in the material to be excited moving originating from a low-energy base state to a higher-energy state.

4. P-electrons or nonbonding electrons in molecules can absorb ultraviolet light to increase the anti-bonding of these electrons from a low-energy state to a high-energy state.

5. The longer the wavelength of light, the brighter it is. It can absorb. The more easily electrons can be stimulated, the better. There are four different types of transitions (p p*, n p*, s s*, and n s*), which can be arranged in the following order: s s* > n s* > p p* s s* > n s* > p p*> n p*

6. When a chemical molecule absorbs ultraviolet light, it produces a specific spectrum that aids in the compound's identification.

A molecule or ion will light absorption in the visible or ultraviolet spectrum. When radiation produces an electronic transition inside its structure, it is said to be in this area. As a result, the absorption of light by a substance. A change in the electronic state of the molecules occurs when a sample is exposed to ultraviolet or visible light in the instance. The light's energy will encourage electrons to move from one place to another. Their ground state orbital is stimulated to a greater energy level anti-bonding orbital state orbital. Three different sorts of ground state orbitals could be involved. [3-4]

In addition, there are two sorts of transition I s* (sigma star) orbital that may involve several anti-bonding orbitals.

1.σOneMolecular (bonding)

2.p Molecular orbital (bonding)

3. n atomic orbital(non-Bonding).

There is one because n electrons do not establish bonds, there is no such thing as a n*anti-bonding orbital. As a result, the following electronic document absorption of ultraviolet and visible light can cause transitions. s to s* n to s* n to p* p to p* both s to s* and n to s* transitions require a great deal of energy and therefore occur in the far ultraviolet region or weakly in the region180-240nm. As a result, groups that have been saturated do not work. Absorb a lot of light visible range as well. Salts of elements having incomplete inner electron shells (mostly transition metals), whose ions are complexed by hydration, fall into this category. These absorptions result from a charge transfer mechanism in which electrons are transported from one section of the cell to another the energy delivered by visible light from one system to another.

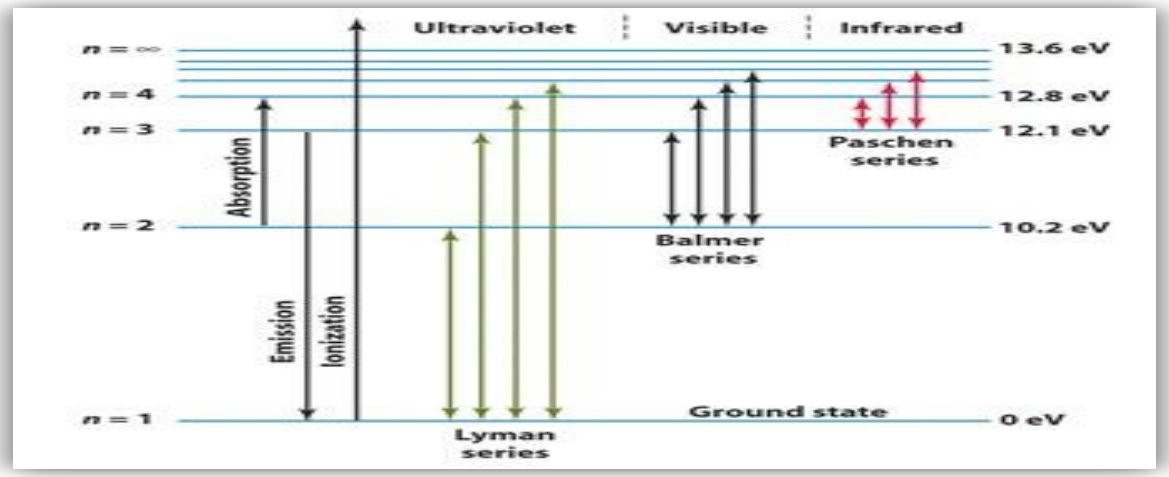

Figure No. 1: Electron Transition

INSTRUMENTATION:

In this schematic diagram of a double-beam UV-Visible Spectrophotometer.

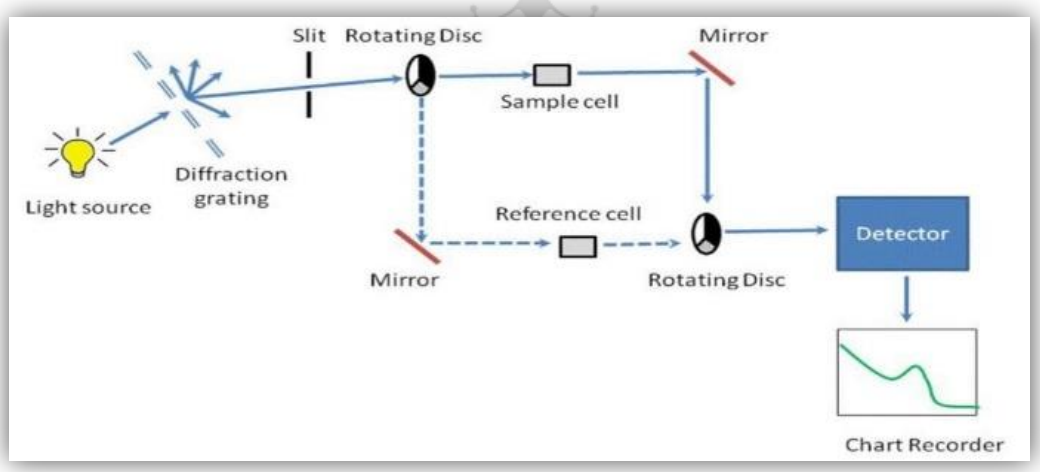

Figure No. 2: Instrumentation of Double Beam VU-Spectroscopy

Light Source

Light because they span the entire UV spectrum, lights with tungsten filaments, and Hydrogen Deuterium lamps are the most extensively utilized and appropriate lighting sources. Tungsten filament lamps release a lot of red radiation, namely 375 nm, whereas hydrogen-Deuterium lamps have a lower intensity and emit less red radiation.

Monochromator

It is a type of prism and slits make up this structure. Double beam spectrophotometers make up the majority of the spectrophotometers. With the use of revolving prisms, the radiation released by the primary source is spread.

The slits choose the various wavelengths of the light source that have been separated by the prism. Consequently, as a result of the prism's rotation, a series of wavelengths of steadily increasing wavelengths pass through the prism.

Sample and reference cell

Slits Cells as well as the sample reference the sample solution is passed through one of the two separated beams, while the reference solution is passed through the other. The cells hold both the test and the reference solution. Silica or quartz are used to make these cells.

Detector

Glass can't be broken. It can be used for the beam from the laser received by a photocell. Sample cell, while the other the beam from the laser is received by a photocell second detect or reference. The reference cell's radiation beam has a higher intensity than the sample cell's beam. Pulsating or alternating currents are a result of the generation produced light in the photovoltaic cells.

Amplifier

The alternation of present energy created there would be in the photodiodes sent to the amplifier. The amplifier is connected to a tiny power supply servometer. The photocells generate low-intensity current in general, and the major objective of the photocells is to generate low-intensity current. The purpose of amplifying something is to use an amplifier. Signals several times to obtain clear and recordable data-making recording devices.

Recording devices

The amplifier is usually connected to a tape player but uses a pen that is associated with the computer. The computer saves all of the information and generates the range of possibilities desired molecule.[7]

UV SPECTROSCOPY APPLICATIONS

1. Impurity Detection: It is one of the most effective ways of determining impurities in organic compounds. Due to contaminants in the sample, additional peaks can be seen, which can be compared to those of raw material that is standard impurities can be identified by measuring absorbance at a given wavelength detected.

2. Organic compound structure elucidation: It can help with organic compound structure elucidation.

3. Ultraviolet light quantitative determination of UV-absorbing substances can be done using absorption spectroscopy.

4. Ionization UV the technique of absorption spectroscopy can be used to identify the sorts of substances that absorb UV light used to determine the quality of compounds. The absorption spectrum is compared to identify the substance. In comparison to the spectra of recognized chemicals.

5. This method is used to determine whether something is present or not. In the compound, there is a functional group. The absence of a band at a specific wavelength is considered evidence for impurities can be identified by measuring absorbance at a given wavelength detected.

6. UV spectroscopy can be used to investigate reaction kinetics. The ultraviolet (UV) rays absorbance variations can be seen after radiation passes through the reaction cell. [9]

ANALYTICAL ELEMENTS

Validation is a procedure that involves laboratory investigations to validate or establish that a method, system, or analyst produces correct and repeatable results for the intended analytical application within a demonstrated and established range.

Validation of the Method

The validation of the method is finished. Over the required range, confirm that an analytical process is accurate, specific, reproducible, and robust. That a sample of analytics will be examined method validation ensures that a method is reliable in everyday use is also known substances, they can be measured spectrophotometrically compounds. Ensuring that a method is reliable in everyday use. is also known as "the procedure for" providing textual proof that

the approach can do what it claims to do. Depicts what was supposed to be done and the parameters.

Precision

Precision refers to the degree to which an analytical technique can be repeated. In normal circumstances for a particular sample, it is indeed generally shared as a cent standard deviation value. Given an operational large enough number of samples to be statistically significant precision should be conducted at three levels according to the ICH.[9]

Accuracy

Accuracy is a metric for the precision of an analytical method or the degree of agreement. Between the values that are accepted as a conventional, real value or an accepted reference value and the value which is acceptable as a value that is accepted as a value that is accepted as a value that is accepted as a value that is accepted as a standard, actual value, or a widely accepted set point the value discovered. It's calculated as the percentage of analyses retrieved by assay when samples are spiked in a blind trial. A set of components the accuracy of impurity quantification is determined by examining samples (drug). (If impurities are not disclosed, see a substance or drug product) spiked with known quantities of contaminants specificity.)

Specificity

The ability to quantify the analyses of interest properly and specifically in the laboratory is referred to as specificity. Presence of other components in the sample matrix that would be expected to be present. It is a metric for determining the size of a group of people. Degree of interfering factors such as Excipients, contaminants, and degradation are some of the other active constituents. Products ensure that a peak reaction is caused solely by one component.

Limit of Detection

Tests for impurity/assay Limits of Detection- The smallest concentration of a material that can be detected is known as the detection limit. As the concentration range (LOD). An analysis that is detectable but not quantifiable in a sample. It's a type of limit test that determines whether or not something is possible. LODs determined by techniques such as thin layer imaging are examples of non-instrumental visual methods Titrations or chromatography (TLC). LODs can be determined using the data's standard deviation.

According to the LOD = 3.3 (SD/S) formula, the height of the calibration curve (S) and also the response (SD) at levels close to approximate the LOD. The standard deviation of the blank, and the residue standard deviation, can be used to compute the response standard deviation.

Limits of Quantification

The Limit of Measurement refers to the lowest concentration of an analytical procedure that can be determined with adequate sensitivity and efficiency under the product's laboratory-confirmed circumstances. Quantification (LOQ) like LOD is expressed as a concentration, but with greater precision and accuracy. The measurement's precision was also given.

Linearity and Range

The ability of a method to produce test results that are directly related to the method inversely proportionate to the analyses linearity of dosage within a certain range is reported. The method's ability to produce test findings that are proportionate analysis. The capacity of the method to provide concentration within a particular range is known as linearity.

Ruggedness

The USP defines ruggedness as the degree of consistency of data achieved under a variety of conditions. RSD is represented as a percentage. These circumstances include a variety of laboratories, analysts, and instruments. This apparent omission, however, is a question of semantics, as ICH elected instead of covering the subject ruggedness is a component of accuracy, as previously stated. Robustness refers to a procedure's capacity to stay unaffected by minor changes.

Robustness

Robustness refers to the ability to handle deliberate changes in input. The method's parameters Variable Organic, pH, and other procedure characteristics are used to measure a technique's robustness. Determining the effect of ionic strength, temperature, and other variables (if any) on outcomes of the procedure robustness should be considered early in the development of a procedure, according to the ICH standards. [10]

DIFFERENT UV VALIDATION AND DEVELOPMENT METHODS OF ANTICANCER DRUGS

A simple, rapid, cost-effective, and extractive UV spectrophotometric method had been Gemcitabine HCL (GMCT) determination in bulk drugs and pharmaceutical formulations were developed. The findings were based on UV spectrophotometric studies of the drug's reaction with gold nanoparticles. (AuNP) and transforms its original color into a dark blue-colored solution that exhibits. At 688 nm, the absorption peaks. The apparent molar absorptivity and Sandell's sensitivity coefficient were discovered to be 3.9510-5 l mol-1 cm-1 and 0.060 g cm-2 respectively. Beers law was obeyed in the concentration range of 2.040 g ml-1. According to ICH criteria, this approach was evaluated and verified for a variety of characteristics. The described approach was used to determine GMCT in pharmaceutical formulations with great success (parental formulation). The results showed that the method is precise. (Relative standard deviation of 2%). It is simple, inexpensive, and time-saving. Can be used to determine the amount of GMCT in various dose formulations.[11]

Letrozole(4-[(4-cyanophenyl)-(1,2,4-phenyl)-(1,2,4-phenyl)-(1,2,4-phenyl)-(1,2,4 An oral non-steroidal aromatase inhibitor, triazol-yl)methyl]benzonitrile, is used to treat hormonally sensitive breast cancer following surgery. To do this, it is critical to establish reliable analytical methods for determining Letrozole. Greater selectivity, sensitivity, and speed than those previously published assay methods. The most important goal of this project is to create a short and simple RP-UFLC and UV spectrophotometric method extraction procedures that use little solvent and have a quick turnaround time throughout the mobile phase for RP-UFLC acetonitrile: phosphate buffer (pH6.8) (50:50 v/v) in this work. For the UV spectrophotometric technique, methanol is used. The samples were tested using reversed flow chromatography (UFLC). PDA detector set at 241 nm, phase C-18 column mobile phase consists of a PBS (pH 7) mixture: acetonitrile (50:50 v/v) was pumped at a flow rate of 1.0 liters per minute. The best separation of medication and internal standard was found with mLmin-1 (Letrozole- d4). [12]

The current research provides a UV-VIS Spectrophotometric approach for the estimation that is simple, accurate, precise, and cost-effective in bulk and therapeutic dosages of Chlorambucil, an anti-cancer medicine form. The solvent that was utilized was the max or absorption maximum, of acetonitrile was discovered to be 258 nm. There was a linear reaction. With a regression coefficient of 0.9994, it was found in the range of 2-10 g/ml. The

method was then put to the test. According to the ICH (International Conference on Harmonization) guidelines for various parameters, this method can be used to determine Chlorambucil in formulation quality control without the need for a microscope. The excipients are interfering. [13]

In the UV area, a simple, sensitive spectrophotometric approach has been developed. Bulk and tablet dosage forms were designed for the determination of Letrozole. Letrozole standard solution with an apparent molar absorptive of 3.3016, the greatest absorbance is at 240 nm. 104 l/mol/cm. Beers law was obeyed in the concentration range of 1 -10 g /ml with regression, slope, and intercept 0.9998,-0.016, 0.1164respectively. The result of the analysis was validated statically and by recovery studies. The % recovery of the data is 100.63 0.4215, indicating that the method is free of additives and contaminants during drug quantification in the formulation. This demonstrates the method's suitability for routine quality control examination of drugs in bulk and individual dose formulation.[14]

A high-performance liquid chromatographic assay that is simple, quick, cost-effective, and environmentally friendly. A C18 reversed-phase analytical column was designed to determine capecitabine in human plasma and has been confirmed. A mobile phase made up of formic acid solution was used to distinguish the samples. (pH=3): ethanol (55:45) flowing at 1.0mLmin 1 with UV detection at 310 nm. In the text, in the column, the temperature was set to 50 degrees Celsius. Protein precipitation with zinc sulfate ethanol was used to prepare the samples solution. This strategy is effective. Capecitabine has a high recovery rate in human plasma, ranging from 95.98% to 100%.to a percentage of 102.50 percent. Over a range of concentrations, 0.05 to 10.00 g mL 1, the calibration curves were linear (r2 > 0.9). 0.9999). The variability between and within days was less than 15%, while the bias was within 15%. After the management of a 1500 mg oral dosage in the morning mg, this validated approach was effectively utilized in pharmacokinetic research including seven Iranian cancer patients. [15]

Anastrozole is an aromatase inhibitor that isn't steroidal and is made up of nitrile and triazole derivatives. It's a drug that's used to treat estrogen-related cancers. In postmenopausal women with receptor breast cancer in the year 2000, a new spectrophotometric approach was created. The UV region is used to figure out the presence of anastrozole in dissolution samples. It has low solubility in water (0.5).mg/mL at 25°C), and solubility in the physiological range is pH-dependent. Absorption characteristics of the pure drug were checked insolvents like water,

ethanol, phosphate buffer pH 6.8 and pH 7.4 Phosphate buffer saline has good absorption characteristics. The absorption maximum was discovered at 210 nm, and this wavelength was used to optimize and validate the process. The acceptable range was obtained for all validation parameters. The devised UV spectrophotometric approach was effectively used to study anastrozole *in vitro* in its invasomal form formulation. [16]

A simple UV- Spectroscopy approach was developed and validated for the ellagic Acid Quantitative Analysis (EA). The stock solution was produced and scanned at a concentration of 50 g/ml.277nm was discovered to be the absorption maximum. Further dilutions to various concentrations (1-5 g/ml) were carried out 277nm was used to prepare and analyze the sample. The approach was approved by the ICH. Criteria for linearity, accuracy, and precision Robustness, precision, accuracy, detection limit, and quantification are all factors to consider. In the range (1-5 g/ml), Lambert-law Beer is followed. With 0.9994correlation coefficient it had been the procedure is exact and accurate for EA analysis, with a good recovery percent of 94.47 percent, according to the findings. The percentage is 106.83 percent. The new approach was also to figure out the ellagic entrapment efficiency. Acid as well as the release of the acid from its nanoparticle dosage form. The method may be utilized for determining the concentration of EA when present as a formulation and in combination with other drugs [17].

The goal of this study is to establish a cost-effective, precise, accurate, and simple UV-Spectrophotometric method for the measurement of Sorafenib in the tablet dosage form. Instruments that were utilized ELICO SL 210 Ultraviolet-visible spectrophotometer with two matched beams. The absorbance of Sorafenib was measured using quartz cells with a one-centimeter light path. Sorafenib is a drug that is used to treat cancer. At 265.5 nm, there is the highest λ max. Beer's law was discovered to be superior across a 2-10 concentration range g/ml. r2 = 0.9998) is the correlation coefficient. The LOD (Limits of Detection) and Quantitation (LOQ) have been discovered. at 1.1337 g/ml and 0.3741 g/ml, respectively. The analysis of Sorafenib recovery was discovered. Must be between 99.9580 0.02095 and 99.9787 0.0106. The percentage assay of Sorafenib tablets (Sorafenat) yielded higher results than 99.88% of the time. Alkali, acidic, oxidation, thermal, and UV light degradation were all used to test Sorafenib. Sorafenib is a drug that is used to treat cancer. Under acidic, oxidative, and heat environments, it is more unstable, whereas, in alkaline and UV light irradiation, it is more stable. The proposed spectrophotometric technique was validated per the ICH Q1A (R2) requirements. There was no interference from additives or excipients when estimating

Sorafenib in tablet formulation. Hence this approach is safe to use for routine quality control of Sorafenib in bulk and tablet form formulations. [18]

The current project is focused on the creation of two quick, precise, and accurate algorithms. Imatinib Mesylate in bulk and the solid dosage form is estimated using spectrophotometric techniques. A) Is it a type of first-order derivative spectroscopy in which the derivative amplitudes were determined by taking into account the minimum and maximum values? The curve maximum. Method B stands for the area under the curve in which the wavelength range of 237-277nm was chosen. For calculating Imatinib Mesylate in the range of concentrations of 5-30 g/ml, linearity was observed for both method A (r2=0.9992) and method B(r2=0.9996). All of the approaches were determined to be easy, precise, and accurate and could be used regularly for quality assurance. Imatinib Mesylate was studied both in bulk and as a solid dose form. [19]

A straightforward, sensitive, and exact UV spectrophotometric procedure that is repeatable and validated has been created to determine the pure and dose forms of vincristine (VCR). The method is based on VCR's simple solubility in water. Purified water and its maximum absorption characteristics? VCR in the UV has a maximum wavelength of 295 nm. The accuracy of the method for the VCR was ~ 100.4 % with good reproducibility. The analytical curves were linear over a wide concentration range (5-50 g/ml), with a correlation coefficient(r)-0.9998, and 0.9999 for VCR in that order a relative standard deviation (RSD) of less than 1%, the approach demonstrated appropriate precision. [20]

The approach was verified using the Russian general pharmacopeia article (RGPA) 42-0113-09 and ICH recommendations...A validated method can be used in the laboratory to assess drug forms and pure substances quickly, precisely, and reliably. The goal of this study was to develop and validate a UV method for quantifying melphalan, an anticancer drug extracted from lyophilized nanosuspension. A UV detector with a wavelength of 254 nm was used to detect and quantify the melphalan. The procedure with a correlation coefficient of 0.9979 was proven to be specific and linear in the range of 10-50 g.mL-1. 9 and was precise at the intra-day level as reflected by relative standard deviation, accurate at recovery rate 99.750.08, and mobile phase and column brand are both robust to change. The limits of detection and quantification were 0.2956 g. mL-1 and 0.5874 g.mL-1, and so forth. In the presence of excipients, the proposed approach could be useful for estimating melphalan quantitation in lyophilized nanosuspension form. Conclusion: The procedure was discovered to be

straightforward, precise, accurate, and repeatable. The entrapment efficiency of melphalan from lyophilized samples was effectively determined using this approach. The concentration of nanosuspension was found to be 93.56 4.32 percent. [21]

For the first time, a simple, precise, and cost-effective UV-spectrophotometric approach has been established. Vandetanib estimate from bulk. Two methods were developed First method (A) applied was the area under the curve (AUC) in this method area was integrated into wavelength from 323.59-333.36nm. The second method (B) was the first-order derivative spectrometric method. In this method absorbance at min=311.27nm. The maximum wavelength was 340.54 nm, and the zero-cross wavelength was 328.37 nm. At the max=328.44nm, both methods were shown to be linear in the spectrum of concentration 5-30 g/ml. Studies on precision and accuracy were conducted, and the results were satisfactory. At the 80 percent, 100 percent, and 120 percent levels, the medication performed well. For both procedures, recoveries were in the range of 97.00 to 99.00 percent, therefore it could be claimed that the method is superior. Was correct limit of detection (LOD) and limit of quantitation (LOQ) were determined for the method. The method was validated by the International Conference on Harmonization. All validation settings were set to zero. The devised method was used to estimate the amount of vandetanib in a pharmaceutical formulation with great success. [22]

RESULT AND DISCUSSION

a) Gemcitabine HCl Method: Fill a series of 10 ml volumetric flasks with aliquots equal to 20 400 g GMCT. 1 ml AuNP (1 mM) in a test tube continuous stirring in each flask allows for 2 minutes of resting time before increasing the volume to the desired level of water. The GMCT AuNP solution's UV vis spectra exhibit a high absorption at 688 nm.

b) Letrozole Method: A total of 10 mg of Letrozole-d4 was carefully weighed and put into a 10 mL vial. A volumetric flask made of clean glass. It was dissolved in methanol and the volume was made up with the same to achieve the desired result make a solution withLetrozole-d4 at 1 mg/Ml. The Letrozole solution's UV vis spectrum shows Maximum absorption at 241 nm.

c) Chlorambucil Method: In a 10ml volumetric flask, 1ml was pipetted. The volume was built up to the mark with acetonitrile to prepare a concentration of 10 g/ml. Then A 4 g/ml sample was scanned in a UV-VIS Spectrophotometer using acetonitrile as a blank. 400-200nm.

d) Method ofLetrozole: The wavelength corresponding to maximum absorbance (max) was discovered to be 258nm. Letrozole: Twenty tablets were weighed and powdered well, yielding 100mg of Letrozole. Letrozole was transferred to a standard volumetric flask with a 100mL capacity. To prepare the stock solution (1 mg/ml), add a little amount of absolute ethanol and build up to the mark with ethanol. This stock number 6 for the estimation, g/ml was prepared. Aliquots of solution were taken from a standard stock solution.2, 4, 6, 8, and 10 g/ml were taken and diluted to produce different concentrations. The common answers were: scanned between 200-400nm, and they showed -max at 240 nm.

e) Method of Capecitabine: Standard stock solution (1.0 mg mL1) of capecitabine was prepared in methanol and stored in the refrigerator at 4 2 C. The standard solutions were scanned between 200-400nm, they showed -max at 266 nm.

f) Method of Anastrozole: Standard stock solutions of anastrozole (1000 g/mL) were prepared separately in pH 7.4 phosphate buffer saline. Working standard solutions of the drug (100 g/mL) were obtained by dilution of the respective stock solutions in PBS. The absorption maximum was discovered at 210 nm, and the method was improved. Validated using this wavelength.

g) Method of Ellagic Acid: From the stock solution, the samples with 1-5g/ml concentrations range were prepared in triplicate and analyzed in the spectrophotometer at 277nm against 10% PEG200 solution in water as blank.

h) Sorafenib Method: A 10 g/ml standard stock solution of Sorafenib was made by properly weighing 10 mg of standard Sorafenib into a 10 ml volumetric flask and dissolving it in MeOH and ACN. MEOH and ACN were used to bring the volume up to par. What is the best way to estimate the maximum a working standard solution containing 10 g/ml of Sorafenib was produced and scanned in the UV wavelength range of As a blank, use a wavelength range of 200 to 400 nm? The drug's maximum absorbance was found to be 265.5. For the determination of Sorafenib, a wavelength of nm was chosen as the detection wavelength.

i)Imatinib Administration Method: Imatinib Mesylate is the basic stock solution. Mesylate was made by transferring precisely weighed ingredients. To 100ml of the volumetric flask, add 100mg of Imatinb Mesylate. The medication was dissolved in water. In 50ml of water, sonication distilled water was used to bring the volume up to the required level. The wavelength range was chosen around the 257nm wavelength maxima.

j) Vincristine method: VCR solution a (stock solution)1.0 dose of vincristine Richter lyophilisate. The five ampules were carefully transferred into separate 50 ml volumetric flasks and diluted with filtered water. The final solution concentration was 100 g/ml after adding water to the nominal amount. The largest value is typically what is absorption at 295 nm, (max) was obtained.

k) Method of Melphalan: Standard stock solutions of Melphalan (1 mg mL-1) were daily prepared by dissolving the appropriate amounts of the drug in methanol. A UV detector with a wavelength of 280 nm was used to detect and quantify the melphalan 254 nm.

l)Method of Vandetanib: Standard solution of Vandetanib was prepared by transferring accurately weighed 10 mg of the drug into a 100ml volumetric flask and the volume was made up to 100ml using methanol as a solvent to get the concentration of 100g/ml. The maximum absorbance of the solution was measured at the wavelength of 328.44nm. So as per these results, it was discussed that purified or distilled water is the mainly used solvent because of its easy availability and most drugs are easily soluble within it, it is feasible for most method development processes and shows greater results when going to validate that results obtained. After that Methanol, absolute ethanol, acetonitrile, phosphate buffer saline, etc solvents were used which shows the same criteria that are required to show better results invalidation process. Next λmax also plays important role in the validation of the method and the maximum anticancer drugs recorded in this project show λmax is between 210 nm to 277 nm.

CONCLUSION

As per the result & discussion, it was concluded that most method developments and validation are successfully done on anticancer drugs. Which starts with the solvent selection according to particular drugs solubility within it. Because when method development starts at the first stage searching for various solvents as per solubility parameter then its easy availability and showing off the intense absorption peaks. Then go for the proposed analytical method that is simple, sensitive, easy, and cost-effective. The proposed method is exact and accurate. The UV spectrophotometric method offers adequate data quickly and plays a significant role in method development and validation. Now as per the results obtained it is concluded that purified or distilled water is the mainly used solvent because of its easy availability and most drugs are easily soluble within it, it is feasible for most method development processes and shows greater results when going to validate that results obtained.

After that Methanol, absolute ethanol, acetonitrile, and phosphate buffer saline solvents were used which showed the same criteria that are required to show better results invalidation process. Next λmax also plays important role in the validation of the method and the maximum anticancer drugs recorded in this project showsλmax are between 210 nm to 277 nm. As a result, the UV methods developed in this study offer simplicity, precision, and accuracy of chemistry.

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