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(REVIEW ARTICLE)

Determination of trace amount of some drugs as in its pure form and in its Pharmaceutical Preparations by using different spectroscopic methods

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Abstract

The present study includes analytical methods for determination of the drugs Chlorpromazine hydrochloride (CPZ) and trifluoperazine hydrochloride (TFPH) in some pharmaceuticals using molecular absorption, indirect AAS, in addition to investigating complexes obtained throughout. Chlorpromazine hydrochloride and trifluoperazine hydrochloride are widely used for the treatment of schizophrenia. Synthetic formulas for the prepared drug complexes were proposed through the results of the molar ratios of the combination between the drug and each of copper, lead, chrome and iron.

Keywords: TFPH; CPZ; AAS; UV-Vis method

1. Introduction

As pharmaceutical research develops increasingly complex molecules and drug formulations, each new and highly selective analytical technique holds a lot of promise (1). As a result, pharmaceutical quality control should ensure the use of effective analytical methods, with a movement toward quicker and more reliable techniques that save money and reduce solvent use. One of the most important areas of analytical chemistry is pharmaceutical research. The creation of new analytical methods is needed to keep up with the discovery of new drugs and the ongoing updating of international regulations for the safety and efficacy of pharmaceutical formulations. Automation is unavoidable, particularly when a large number of samples must be analyzed in a short amount of time.

2. Pharmaceutical Analysis

Pharmaceutical analysis methods are far less complex than methods for analysing drugs and their metabolites in biological samples such as blood, plasma, hair, or urine from an analytical standpoint. However, since pharmaceutical product quality is directly linked to patient wellbeing, unequivocal drug determination in pharmaceutical formulations is just as critical as determination in complex matrices. Chemical analysis is crucial in drug discovery and pharmaceutical regulation to ensure high effectiveness and patient safety. As a result, adequate quality control measures (qualitative and quantitative analysis, purity testing) are essential, the pharmaceutical industry prioritizes chiral isolation, related material, and stoichiometric determination (2). The use of analytical chemistry in pharmacopoeia monographs and in the standards adopted by manufacturers reflects the advancement of analytical chemistry in the scope of instrumentalisation of chemical analysis methods.

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Chromatographic methods [high-performance liquid chromatography] have a permanent spot (HPLC), gas chromatography (GC) and thin layer chromatography (TLC)]. The unification of the equipment used necessitates the development of a very accurate and thorough explanation of the conditions under which the research will be carried out. UV-visible (UV-Vis) and infrared (IR) spectrophotometry, atomic absorption spectrophotometry (AAS), nuclear magnetic resonance (NMR), mass spectrometry (MS), and spectrofluorometry are several other useful methods. Electromigrational (capillary electrophoresis (CE), capillary zone electrophoresis (CZE), micellar electrokinetic capillary chromatography (MEKC)) and voltamperometric methods are often used to determine pharmaceuticals. Flow injection analysis (FIA), whose main benefit is to complete automation of the analysis, significantly reduces the effects of side reactions, and thus improves the sensitivity and selectivity of this approach, it is one that has been gaining more and more applications, The introduction of new methods that allow for the most precise determinations leads to an increase in interest in analytical methods as a whole. They should be able to assess individual components in multi-component preparations and biological material at the same time (3). A number of standards and standardization criteria relating to drug quality have been released, the appropriateness of their request is confirmed by fulfilment. These are numerical parameters that confirm the accuracy of the results and allow for comparison of the methods used.

Method validation is the process that is used to determine the above parameters. The development and validation of analytical methods are critical for optimizing drug analysis in the pharmaceutical industry and ensuring the quality of the final product. In laboratories where modern and expensive apparatus, such as that required for GLC or HPLC, is not available, spectrophotometric and spectrofluorometric methods for drug determination can be used. Spectrophotometric and spectrofluorometric methods, on the other hand, are versatile and cost-effective, especially in developing countries. Spectrophotometric and spectrofluorometric methods have several advantages over other methods, including low interference levels, ease of use, low cost, and reduced time. Spectrophotometric methods are simple and quick, making them ideal for pharmaceutical analysis, such as quality control of commercialized products and pharmacodynamics studies. (4,6, 8, 9)

2.1. Spectrophotometric Methods of Analysis

Spectral methods are a form of quantitative analysis that has a wide range of applications in a variety of fields. These methods (in comparison to other analytical methods) are characterized by sensitivity and tuning, as well as selectivity ranging from good to medium, and are quick and low-cost, with the ability to analyse both organic and inorganic compounds(5). In the last decade, the importance of these approaches has risen dramatically in terms of the construction of equipment and methods for sample preparation (6). Spectroscopy methods are used in the pharmaceutical study of any medication to determine the drug's structure and how it interacts with the other ingredients in the preparation (7).

2.2. Use of Ultraviolet and Visible Spectroscopy in Pharmaceutical Analysis

Organic and inorganic varieties, as well as biological varieties, are quantified using this form of spectral system. This technique has a few restricted applications, such as diagnosing some active groups in organic compounds and diagnosing compounds by contrasting the spectrum to the compound's normal spectrum (8).

These techniques are considered the best methods of study for pharmaceuticals in the absence of overlapping additives in the field of pharmaceutical analysis (excipient). They're also used to Figure out drug properties like solubility, pKa, and partition coefficients. Their applications and dissolution experiments are used to assess how much active material is released over time and to analyze the mechanisms of drug degradation reactions. Their qualitative application is to equate the pharmacologic compound's spectrum to the normal spectrum of various drug formulations (9,10). The Beer's law, which governs the relationship between absorption and concentration of the element to be recognized, is used in ultraviolet and visible spectroscopy.

$$A = \varepsilon bc$$

Where A is the absorbance, m is the molar absorption coefficient, b is the path length, and C is the species' molar concentration. When the concentrations used are molar, this relationship is applied (11). The molar absorption coefficient in Beer's law is replaced by a constant called the basic absorption, A11, and its units (daL g-1 cm-1) (1 daL=101L) when the concentration unit is the w / v percentage (which is widely used in pharmaceutical accounts). The absorption of a concentrated solution (any solution 1gm/100ml or 10g/L or 10mg/mL) in a cell with a track length of 1 cm is known as precise absorption. This is especially useful in pharmacology and pharmaceutical research when the molecular weight of the substance to be studied is unclear, such as proteins or in the case of analysis of a mixture of several components that are analyzed in the same model (12). In pharmaceutical analysis, UV visible spectroscopy is one of the most straightforward and cost-effective methods of analysis. The interference issue may be experienced in

the absorption of excitants that are present with the active ingredient for several purposes when used directly in the evaluation of medicines in formulations. (13, 14,15,16).

2.3. Pharmaceutical Analysis of Chromogenic Reactions

The majority of pharmaceutical compounds are converted into colored compounds for study, not because they lack chromospheres, but because their direct spectral measurements fall within the range of 200-330 nm, which absorbs absorbent materials, solvents, and a variety of other substances. As a result, work is being done on preparing a derivative that allows the absorption to deviate towards higher wavelengths of 380-800 nm. These reactions are used to improve the selectivity of spectral methods and can be applied to the product's active ingredient, impurities, or metabolic products. In addition to pharmaceutical compounds, several colour-generating reactions are used to estimate organic compounds, including the following:

2.3.1. Charge Transfer Complexation

Some compounds form product addition with a mole ratio of 1:1, and these products are related by weak forces such as Vandervals. When the electrons are adjacent to each other, the charge transmission (which occurs between the donor and receiver of the electrons) occurs. From the electronically rich molecule to the electronically poor molecule, there is an electronic transmission. The π or δ electrons, as well as non-signalling electrons, are the most common pharmaceutical compounds examined by this reaction. Cephradine and cefadroxil (17), terfenadine (18), atropine, and strychnine (19) are the drugs tested in this way. Reagents getting receiving an example below

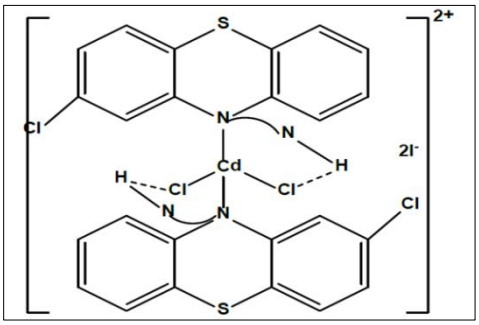

Figure 1 Charge Transfer Complexation

2.3.2. Formation of Ion Pairs

In pharmaceutical research, the reaction of the double ionic composition occurs between the drug compound and a specific dye in a specific acid function, resulting in the dye being a charge of the charge. The double ion is then removed using an organic solvent solution, and new spectral properties of the output in the organic layer are obtained. Chlorprothixene (20), mefenamicacid, diclofenac sodium, ibuprofen (21), enrofloxacin, ofloxacin, ciproflaoxacine, and norfloxacin (22) are some of the drugs studied in this way. Methylene violet and eriochromecyaniner are two pigments that have been used.

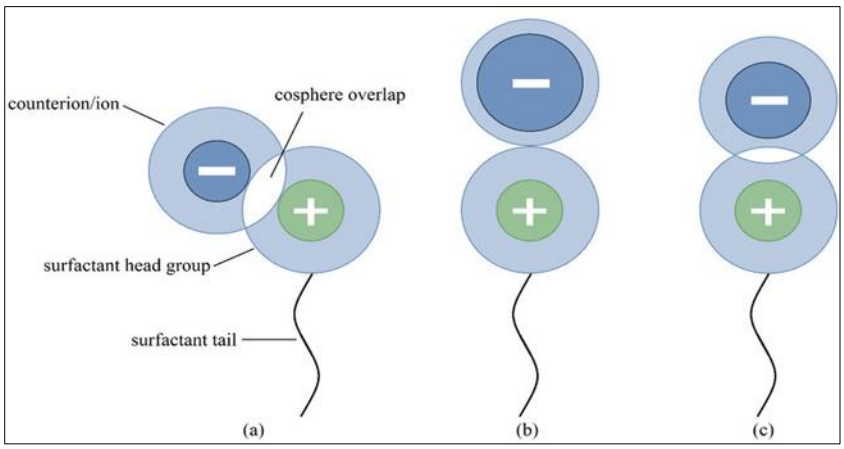

Figure 2 Formation of Ion Pairs

2.3.3. Reactions of Complexation

Metals in pharmaceuticals are estimated using this reaction. A function acid, heat, and solvent specific complex is formed when an ionic metal interacts with a complex agent called ligand, since the complex is colored, the strength of the colour is proportional to the amount of metal (23). The opposite will happen if the compound is the ligand and the metal is the reagent, in which case the colour strength is proportional to the drug concentration (24).

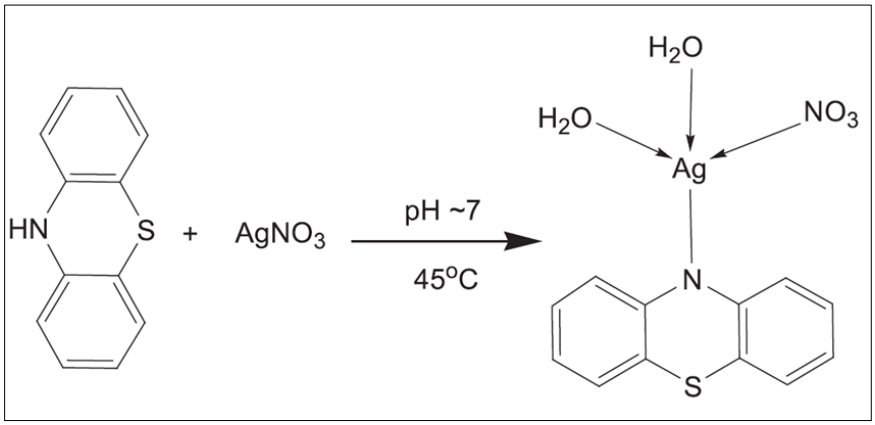

Figure 3 Reactions of Complexation

2.3.4. Reactions of Oxidation and Reduction

A recently developed theory of oxidation-reduction reactions is used to calculate the rates of organic redox reactions whose mechanism involves the transfer of an electron from one reactant to the other. The theory can be used to discuss factors affecting the rates of these reactions. These factors include a standard free energy of reaction, the Columbic interaction of the ionic charges of the reactants, and the solvation of the charged reactants. An approximate method is described for applying the theory to a molecule whose charge is not located at its center. Essentially all organic molecules lie in this category.

As an example of these considerations, several typical reactions are discussed. These reactions involve the oxidation of a series of hydroquinone by ferric ions and of a series of leuco indophenols by dissolved oxygen. They are assumed to possess electron transfer, rather than atom transfer, mechanisms. Free energies and entropies of activation of the redox step are calculated using the theoretical equation. The calculated results are considered to be in reasonable agreement with the experimental data, no adjustable parameters being employed (25, 26,27,28).

These reactions are based on the pharmacokinetics' activity as an oxidative or reduced agent in a specific reaction, followed by the creation of a colored substance that can be used in quantitative determination. Paracetamol (32), trimethoprim (29), acebutolol, butyranilinde (30), and ascorbic acid (31) are the drugs tested using this process. For example the following equation:

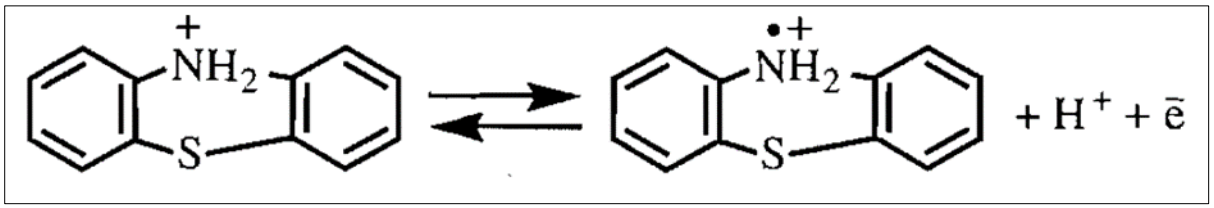

Figure 4 Reactions of Oxidation and Reduction

2.3.5. Reactions of Oxidative Coupling

The binding of two or more organic compounds with an oxidative agent occurs in this reaction. The oxidation mechanism, followed by the coupling of the compounds reacting drug and reagent (33) Amoxicillin (34) was tested using this process in a reactor with the reagent N, Ndimethyl-p-phenylenediamine and the oxidative agent K3(Fe(CN)6). Adrenaline, dopamine, and methyl dopa (35) were estimated using this reaction. The oxidative coupling reactions are crucial in the determination of a variety of pharmacological compounds, especially organic compounds, as well as many

metal ions as applied spectral methods(36,37,38), chromatography(39), and flow injection analysis(40) are used to analyze many important compounds in agriculture, food, and the environment, as well as clinical and pharmaceutical analyses. The nature of the reacted materials, the reaction conditions, and the stability of the colored products in the various reactions all have an effect on the reactions of oxidative coupling, with the probability of obtaining it in acidic, alkaline, or neutral medium depending on the nature of the reacted materials, the reaction conditions, and the stability of the colored products in the various reactions (41).

Oxidative coupling reactions, where two electrons are released from the reactants and trapped by an oxidant, have arisen as a versatile alternative to cross-coupling in chemical synthesis. Despite the large number of experimental reports on the process, a clear mechanistic picture is only starting to emerge. In this perspective, we highlight the contribution from density functional theory (DFT) calculations to the computational characterization of this mechanism. Oxidative coupling processes have been reported, differing in both the catalyst (radicals, precious metals, or Earth-abundant metals) and the oxidant. We have found it more useful to classify them according to the oxidant used, as metal-based oxidants and metal-free oxidants seem to favor different mechanistic variations. All steps in the full catalytic cycle are analyzed, and issues concerning selectivity and influence of the oxidant are considered (42,42,44)

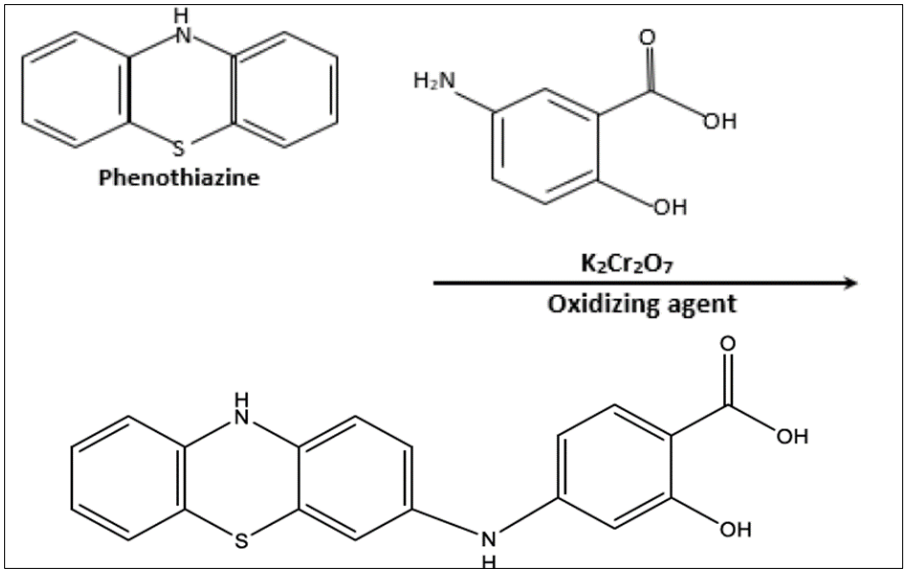

Figure 5 Reactions of Oxidative Coupling

2.4. Atomic Absorption Spectrometry

Atomic absorption spectroscopy (AAS) is defined as an analytical method for determining metals, semi-metals and some non-metals with trace concentrations in a wide variety of samples and depends on the ability of free, neutral atoms to absorb a resonant beam of that element when it is passed through atomic vapour (45,46,47).

The organic and pharmaceutical compounds have been estimated using traditional methods such as gravimetric (48,49) and volume (50,51,52,53) of different types, but these methods did not respond to the possibility of determination trace quantities of these compounds, as well as chemical interference and length of analysis time, and this is what led there is an increasing need to estimate trace or archaeological quantities of such compounds in various samples of industrial, food and biological sources such as blood, urine, etc., using automatic and high-sensitivity methods. The most prominent of these is the direct and indirect determination using flame and thermo atomic absorption spectroscopy because of the advanced advantages of this technique, including:

It is used to estimate at least (54) elements and amounts up to 10-14 grams, with high selectivity and sensitivity and not needing samples of large sizes, it is currently used indirectly in determination compounds Organic is also (55).

Spectral atomic absorption measurements are widely used and accepted to determine trace concentrations of less than nanograms per millilitre of elements in various biological, environmental, food and geological samples with high accuracy and precision (56).

2.4.1. Developments in methods of handling and entering samples in the technique of flame atomic absorption spectroscopy

Atomic traps techniques and methods of introducing samples to them are among the most widespread and advanced techniques at the present time due to the high sensitivity that can be obtained in this way compared with direct flame determination and that these techniques can be achieved in different forms (57,58,59). The most widely used is the heated quartz tube into which the sample enters by injection, either from the end of one end of the tube or through a longitudinal hole in the middle of the tube (Longitudinal-slot). In both methods, the analyzed sample remains longer. A possible period in the optical path, giving the opportunity to a higher sensitivity and a lower detection limit (60).

2.4.2. Determination of Organic Compounds and Pharmaceuticals by AAS

The indirect determination of the pharmaceutical and organic compounds is the result of its interaction with the metallic elements, forming complexes precipitated or extracted as a first stage, and then measuring the metallic content of these complexes with the AAS technique, and through this measurement, the quantification of drugs and organic compounds is made. It is also possible to directly estimate pharmaceutical compounds and drugs if they contain its particles are on a metal atom within its chemical composition (61). Despite the use of analytical atomic spectroscopy with the emission and absorption methods in determination some organic and pharmaceutical compounds in international pharmaceutical indexes such as the British and American pharmacopoeias, the use of indirect atomic absorption method in determination these compounds has been increasing and replacing many of the traditional and automatic methods that were previously followed Because of the simplicity and speed of this method as well as accuracy, high sensitivity and low detection limits (62).

2.4.3. Direct determination of organic and pharmaceutical compounds using AAS:

Some organic and pharmaceutical compounds contain in their composition a certain metal and thus can be directly estimated using AAS (63, 64), (65) such as (Vitamin B12) and Cyanocobalamine (66). It contains one atom of cobalt per molecule of the compound. Determination of Vitamin B12 was achieved by measuring its cobalt content at 240.7nm and using an oxygen-acetylene flame. Ribocarbo and Cykloplatin Platidiam contain Pt (67) in their composition.

2.4.4. Analytical Technique for the Determination of Chlorpromazine hydrochloride (CPZ-HCl)

There are many methods with different technique to determine CPZ. Table (1)

Shows these techniques.

Table 1 Different Techniques Used for the Determination of CPZ-HCl

Analytical technique	**Outline of the method**	**Linear range**	**Rec. %**	**LOD µg.mL^{-1}**	**R.S.D %**	**Ref**
UV-VIS Spectro photometric	Creation of a spectrophotometric method for determining microgram amounts of CPZ using oxidative coupling with the sodium sulphacetamide reagent in the presence of the oxidizing agent potassium persulphate in an acidic medium.	(2 - 20) µg.mL^{-1}	100.02%	0.172	0.8933 %	68
UV-VIS Spectro photometric	in the presence of sodium periodate and hydrochloride acid, the oxidative coupling reaction between Chlorpromazine hydrochloride and para chloro aniline	(0.1-5.8) µg.mL^{-1}	99.83%	0.044	0.165%	69
UV-VIS Spectro photometric	The process uses ammonium ceric sulphate dihydrate as an oxidizing agent in an oxidative coupling reaction with p-	(2.5-30) µg.mL^{-1}	100.11%	0.136	1.28%	70

	bromoaniline. Dihydrate of Sulphate					
UV-VIS Spectro photometric	The process uses KIO_3 in an acidic solution to carry out an oxidative coupling reaction with 4-nitroainlline.	(5-40) $\mu g.mL^{-1}$	99.22%	0.34	1.831%	71
UV-VIS Spectro photometric	In the presence of N–Bromosuccinimide, Chlorpromazine hydrochloride undergoes an oxidative coupling reaction with 2-nitroso-1-naphthol-4-sulfonic acid reagent in an acidic medium.	(10–60) $\mu g.mL^{-1}$	101.9354%	7.38×10^{-7}	2.89%	72
UV-VIS Spectro photometric	The proposed method uses KIO_3 in an acidic solution to perform an oxidative coupling reaction with 4-amino benzoic acid.	(10–70) $\mu g.mL^{-1}$	104.29%	0.194	0.486%	73
UV-VIS Spectro photometric	The method is based on the Oxidative coupling reaction between Chlorpromazine hydrochloride and para methoxy aniline in the presence of sodium periodate and Sulfuric acid	0.5-11.2 $\mu g.mL^{-1}$	99.89%	-	0.181%	74
UV-VIS Spectro photometric	In the presence of sodium persulphate and hydrochloride acid, the process is based on the oxidative coupling reaction between Chlorpromazine hydrochloride and para tolidene.	0.2-15.2 $\mu g.mL^{-1}$	99.85%	0.581	0.299%	75
Electro chemical	Dependent on poly-N-isopropyl acrylamide microgels, highly sensitive and selective electrochemical identification of the antipsychotic drug chlorpromazine in biological samples.	0.05-7999 µM	97.3%	0.016 µM	1.2%	76
Fluorescence quenching	The water-soluble nitrogen-doped carbon dots (N-CDs) with heavy blue fluorescence interacted with Chlorpromazine hydrochloride (CPZ), causing the strong fluorescence to be quenched.	7.5–100 µM	98.14%	0.043 µM	2.01%	77
HPLC	For simultaneous determination of Chlorpromazine hydrochloride (CPZ) in tablet formulation, a new easy, specific, precise, and accurate reversed-phase liquid chromatographic method has been created.	10-300 $\mu g.mL^{-1}$	100.05%	3.14	less than 2%	78

HPLC	Chlorpromazine in pharmaceutical preparations can be determined simultaneously using a cyclohexane mobile phase: methanol (also known as dimethyl amine) is a chemical compound that is used to make At retention time of 7.18 minutes, this process yielded the best chlorpromazine resolution.	2.0-20 $\mu g.mL^{-1}$	98.6%	0.008	1.19%	79
Electro chemiluminescence	A Ru (bpy) 32+/carbon quantum dots/gelatin composite film was used to create a novel electrochemiluminescence sensing platform for the sensitive detection of chlorpromazine (CPZ).	5.0×10^{-10} M - 1.0×10^{-5}	93.0% -104.6%	8.0×10^{-11} M	2.8%	80
UV-VIS Spectro Photometric and AAS	A simple, rapid, and sensitive spectrophotometric method for the valuation of microgram quantities of chlorpromazine hydrochloride drug in aqueous solution is defined. The method is based on the transition metal complex with $CuSO_4$ and PbO_2	(2-40) $\mu g.mL^{-1}$ (1-20) $\mu g.mL^{-1}$	(100.73,101.85)%. (100.27,99.74)%.	(0.091, 0.053) $\mu g.mL^{-1}$, (0.037, 0.032) $\mu g.mL^{-1}$	(0.254, 0.171 %) (0.326, 0.084%)	

2.4.5. Analytical Technique for the Determination of Trifloperazine Hydrochloride (TFPH-HCl)

There are many methods by different technique to determine TFPH. Table (2)

Shows these techniques.

Table 2 Different Techniques Used for the Determination of TFPH-HCl

Analytical technique	**Outline of the method**	**Linear range**	**Rec %**	**LOD**	**R.S.D %**	**Ref**
UV-VIS Spectro photometric	The method is based on the presence of the oxidized agent potassium persulfate in an oxidative coupling reaction between Trifluoperazine Hydrochloride and 2-nitroso-1-naphthol-4- sulfonic acid as a Reagent.	12–36 $\mu g.mL^{-1}$	100.53%	$2.85x10^{-7}$ $\mu g.mL^{-1}$	0.9623	81
UV-VIS Spectro photometric	The process involved forming a colored V (V)-TFPH complex in an acidic medium, then extracting the complex with the surfactant Triton X-114 as an extracting medium.	2-80 $\mu g.mL^{-1}$	98.94±2.19 %	1.21 $\mu g.mL^{-1}$	0.48-3.40 %	82
UV-VIS Spectro photometric	The process uses potassium iodate as an oxidizing agent in an acidic medium to perform	10- 80 $\mu g.mL^{-1}$	102.57%	0.3882 $\mu g.mL^{-1}$	0.229%	83

	an oxidative coupling reaction with 4- amino benzoic acid.					
UV-VIS Spectro photometric	In an acetic acid medium, the procedure is based on an oxidative coupling reaction with sulfanilic acid in the presence of sodium hypochlorite.	0.2-7.0 $\mu g.mL^{-1}$	99.63%	-	1.173%	84
UV-VIS Spectro photometric	The proposed method is based on the use of ammonium ceric salphate and sulphanilic acid in an oxidative coupling reaction.	0.5-20 $\mu g.mL^{-1}$	99.509%	0.1604 $\mu g.mL^{-1}$	<1.55%	85
Flow-injection spectrophotometric	The proposed approach involves injecting a 50µL sample solution into an ammonium ceric salphate oxidizing agent stream at a flow rate of 2.0 ml min^{-1}.	0.5-120 $\mu g.ml^{-1}$	100.40%	0.0459 $\mu g.mL^{-1}$	0.6%	86
Indirect atomic absorption spectrometric	The method is based on the formation of a metal complex between the drug (TFPH) and palladium (II) that results in an orange-yellowish substance that can be extracted in an organic solvent before being aspirated into an air-acetylene flame and is determined indirectly by AAS.	0.5-17 $\mu g.mL^{-1}$	102.4±0.135	0.038 $\mu g.mL^{-1}$	1.09%	87
Indirect atomic absorption spectrometric	This method required the creation of a TFPH-Pt(IV) complex at a particular pH and its extraction into an organic solvent. The absorbance of platinum in the complex was measured using flame atomic absorption spectrometry.	2−60 $\mu g.mL^{-1}$	102.24 ± 0.43%	0.085 $\mu g.mL^{-1}$	1.58−2.03%	88
colorimetric	The oxidation of Trifluoperazine by sodium hypochlorite in an acetic acid medium is the basis for this process.	2-30 $\mu g.mL^{-1}$	100±1.2%	-	less than 2%	89
RP-HPLC	For the simultaneous determination of Trifluoperazine and Pharmaceutical Dosage Form, a robust HPLC method has been developed and validated.	2.5-7.5 $\mu g.mL^{-1}$	99.415 % - 101.269 %	0.142 $\mu g.mL^{-1}$	0.821%	9-
Electrochemical	For the electrochemical sensing of trifluoperazine, a method based on a flower-like cerium-ruthenium sulfide nanostructure (CeeRueS NS) has been developed (TFPZ)	0.003-319 µM	98.9%	0.322 nM	2.69%	91

Potentiometry	The electrodes were made by mixing phosphotungstic acid (PTA) or phosphomolybdic acid (PMA) with di butyl phthalate (DBP) as a plasticizer and poly vinyl chloride (PVC) as a matrix to make ion-pair for (TFPH). These electrodes were highly sensitive to TFPH.	(1×10^{-6} - 1×10^{-2}) M	99.85± 0.289 99.87±0.53	4.99×10^{-6} - 4.56×10^{-6}	0.289-0.530	92
Multi walled carbon nanotubes UV/Vis spectroscopy	The method is based on a MWNTs column with extracted trifluoperazine hydrochloride that was then spectrophotometrically monitored.	0.04-1.9 $\mu g.mL^{-1}$	-	1.5×10^{-2} $\mu g.mL^{-1}$	1.93% and 2.42%	93
UV-VIS Spectro Photometric and AAS	A simple, rapid, and sensitive spectrophotometric method for the valuation of microgram quantities of trifluoperazine hydrochloride drug in aqueous solution is defined. The method is based on the oxidative coupling reaction with K_2CrO_4 and $K_3Fe(CN)_6$	(1-20) $\mu g.mL^{-1}$ (1-16) $\mu g.mL^{-1}$	(100.46,100.47)%. (100.65,100.54)%.	(0.126, 0.039) $\mu g.mL^{-1}$ (0.105, 0.029) $\mu g.mL^{-1}$	(0.039, 0.084%) (0.281, 0.155%)	

Using different easy, fast, accurate, sensitive and inexpensive spectroscopic methods for determination some medicinal compounds in their pure form and in their pharmaceutical preparations. A comparison between the spectral determination of drugs using the atomic absorption method and molecular spectroscopy and the study of each specific evaluation method and a statement of the accuracy and precision of the methods used for measurement Calculating the analytical parameters of the method and studying the best conditions for drug interaction. The possibility of using the proposed methods for determination pharmacological compounds (Chlorpromazine hydrochloride and trifluoperazine hydrochloride) of drugs and their applicability to pure medicinal substances and to pharmaceutical preparations (largactil and stelazine). Applying the following methods in assessing specific drugs in their pharmaceutical preparations, and indicating the efficiency of each method in determination. These methods are used to use conjugation, to form complex, colored compounds that can be directly measured between the drug and the metal. The compounds can be estimated by the method that takes into account the pharmaceutical compounds. Attention to the application of preparations and comparing the method with the standard method for evaluating the studied drug. There is no need for any initial model treatments or solvent extraction in this process. And these methods are precise and accurate, and the results are colourful, its excellent stability in the middle of the water sets it apart. The results of the analysis of some samples for the drug in the pharmaceutical preparation largactil and Stelazine showed a convergence between them and the results indicated on the drug package. Synthetic formulas for the prepared drug complexes were proposed through the results of the molar ratios of the combination between the drug and each of copper, lead, chrome and iron.

3. Conclusion

The study is conducted to estimate the drugs (TFPH) using UV-Vis and AAS technologies simple, rapid, and sensitive spectrophotometric method for the valuation of microgram quantities showed a remarkable superiority over many other methods in terms of accuracy, sensitivity and speed of analysis. The analytical results of the molecular spectroscopic method of CPZ and TFPH showed a superiority over the used spectroscopic methods in terms of sensitivity, linearity and speed of analysis. The results showed closeness in terms of accuracy, but the AAS is less linear than the UV-Vis method and has lower detection limits and higher sensitivity. Synthetic formulas for the prepared drug complexes were proposed through the results of the molar ratios of the combination between the drug and each of copper, lead, chrome and iron.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest.

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