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ISM Analysis, Evolution, Human-Type and Validation of UV–spectrophotometric Techniques for Assessment of Sulfadiazine in Bulk and Cream Dose Forms

Mohauman Mohammed AL-Rufaie[(1)#], Hanaa Khazal Abdulghareeb Taha[(1)], Zahraa Yosif Motaweq[(2)]
[(1)]Chemistry Department, Faculty of Science, Kufa University, Najaf, Iraq; [(2)]Biology Department, Faculty of Science, Kufa University, Najaf, Iraq.

A CONVENTIONAL, precise, clear colorimetric technique that is additionally sensitive is evaluated for the appreciation of sulfadiazine medicine as a sharp form, as well as for different sorts of pharmaceutical products with different doses. The technique is premised on the conjugation of Sulfadiazine (SUZ) antibiotic as well as the 3,5Di hydroxy benzoic acid (3,5DHB) agent with utilizing the azo coupling reaction. The (3,5DHB) in the basic media to finally produce a ligand that interacts with Cobalt (II) to generate the strength orange complex color at room temperature. The associated outcomes dye is having a solubility in water as well as flexible additionally predestined colorimetrically with ultimate absorption at (436nm). The calibration graph between the absorbance and the concentration appears that the concentration range from medicine was established with utilizing the Beer's law was between (0.12 - 18 µg/ml). The eclecticism of the best empirical envelopes is tested. The accuracy additionally the precision for the procedure are calculated by the average recovery amounts (100.122%) as well as the main relative standard deviation amounts (0.762 %) reasonably. That the technique is established on the concentration. The Sensitiveness for the procedure is obtained with molar absorptivity (2.24×10^4 $lcm^{-1}.mol^{-1}$). the Sandell sensitivity is tested (0.01 $\mu g.cm^{-2}$). The analysis facts for The technique. It is agreed upon by the official procedure. The common medicinal additive intervention has been checked. The established technique is analyzed successfully in assessing (SUZ) in various types of pharmaceutical products .

The antibacterial effectiveness capability of three different company sulfadiazine creams toward eight multidrug-resistant bacteria, the findings show that three creams with sulfadiazine had better antibacterial activity on A. Bacterial baumanii isolated as contrasted with another isolated. As for the effectiveness of sulfadiazine, they typically have high antibacterial activity on G-ve bacteria as contrasted to to G +ve bacteria, where Silverdin cream had higher biological efficacy on all bacterial isolates opposed to another creams, and Silverdin's efficacy equally to pure Sulfadiazine's antibacterial activity opposed to other two creams.

Keywords: Antibacterial activity, Bulk, Cream Dose Forms, MDR bacteria, Sulfadiazine.

Introduction

Sulfadiazine (SUZ), 4-amino-N-pyrimidine-2-yl-benzenesulfonamide, $C_{10}H_{10}N_4O_2S$, whereas its chemical structure is found in Fig. 1(Zubay et al. 1995).

The medicine is a group of antibiotic sulfonamides, which is one of the oldest and still commonly utilized sulfonamides, a group of synthetically produced antibiotics launched in 1939 (Caret et al., 1997) and used for 60 years in veterinary and human therapy (Pecorelli et al., 2004). In the literature, a variety of analytical techniques were recorded for evaluating SUZ. These included high-performance liquid chromatography, combined with chemical ionization mass spectrometry (HPLC, APCI-MS)

#Corresponding author emails: muhaimin.alrufaie@uokufa.edu.iq, mohaumanmajeed@yahoo.com or
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on-line atmospheric pressure (Combs et a., 1999), liquid chromatography (Al-Rufaie et al., 2009), UV–spectrophotometry (Kothacota e al., 2011), immune chromatographic assay (Wang et al., 2007), flow injection chemiluminescence (Liu et al., 2007), ion selective electrode (Ayman et al., 2009).

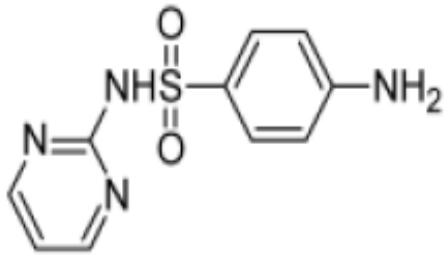


Fig 1. Sulfadiazine chemical structure

A white, pinkishwhite or yellowish-white crystal or crystalline powder is in its pure form, water insoluble, very slightly soluble in ethyl alcohol, slightly soluble in acetone. It is soluble in mineral dilute acids and alkaline hydroxides. The melting point is 255°C, and when exposed to air or light, it was stated to be unstable. SUZ is included in multiple pharmaceutical praperations as an active component including floumizin tablets as well as cream (Mycek et al., 2000; The British Pharmacopoeia, 2009).

Various analytical techniques are established and implemented in pharmaceutical preparations or in biological fluids to classify as well as quantify SUZ. The major treatments for SUZ testing are depended on direct or indirect spectrophotometric analyses based on redox, load-transfer as well as diazo-coupling reactions accompanied by a consequent calculation of the colored complete absorption (Sastry et al., 1996; Nagaraja et al., 2002, 2003; Othman, 2005).

In the current work, we progressed in creating a novel linking compound for the sensitive as well as specific spectrophotometric determination of the SUZ drugs based on the coupling of diazotic form with 3,5-dihydroxy benzoic acid giving a latter ligand that reacts with Cobalt (II) resulting in the formation of spectrophotometrically measured orange product complex at 436nm. That proved successful in evaluating SUZ in both its pure form as well as its pharmaceutical preparations.

Materials and Methods

Apparatus

- Double-beam UV-Visible 160 digital recording spectrometer (japan) was utilized for both those absorbance as well as spectral assessments.

- Analytical balance (Sartorius BL 210S).

Material and reagents

The chemicals that were utilized with a large degree of pureness in the protocol as well as did not need to be cleansed were compelled with the following solutions:-

Sulfadiazine SUZ 500ppm

Simple material was synthesized from Samara – Iraq (SDI) (State of the Drug Industries as well as Medical Appliances Company). The 500ppm standard concentration solution of SUZ was dissolved by 0,05gm of bulk substance in 10ml of ethanol and 100ml of deionized water in a volumetric flask was completed. It has been converted to a dark flask and it remains stable for at least one week the solution has remained stable for more than a month. The stock solution has been taken to perpetuate working concentrations (Nagaraja & Shrestha, 2010).

Sulfuric acid solution 1M

It was compelled by introducing concentrated Sulfuric acid in 2.8ml form in 100ml volumetric flask, well mixed and distilled water finished the volume.

3,5 di hydroxy benzoic acid 500ppm

The reagent was provided as a solvent by (BDH) (reagent Laboratory, Chemicals Ltd) company with dissolution 0.05gm of the observation reagent in 100ml ethanol solvent.

Sodium carbonate solution 0.5M

It was created in distilled water by dissolution 5.2g of (Na_2CO_3). After this, the volumetric flask palliated to 100ml.

Sodium nitrite solution 1%

It was made in distilled water by disintegrating 1g of $NaNO_2$. After this, the volumetric flask lightened to 100ml.

Cobalt chloride $CoCl_2.6H_2O$ 0.001 M

It was delivered by (BDH) Chemicals Ltd.,

reagent laboratory) company, dissolving 0.023g of distilled water in 100ml.

Suggested procedure

In the sequence of 25ml volumetric flasks, equalitarian volumes of standard solutions from Solution SUZ with concentration ranges of 0.5 – 18ppm, consecutively introduced individually in the latest volume, accompanied by an addendum of 2ml of sulfuric acid 1M and (1ml) of sodium nitrite 1%, then we leave the solutions for 10min to perform the azo-conjugation reaction, after that It has been added 1ml of Sodium carbonate 0.5M for the drug solution, then followed by addition of 1.5ml from the Reagent (3,5 dihydroxy benzoic acid) and complete the volumes by deionized water. These solutions were left for 10min at room temperature Then in the 10ml volumetric flasks we placed 1ml of a solution of cobalt at a concentration of 0.001M with 3ml of the prepared ligand supplemented with distilled water as well as the absorbance was computed at 436nm sequentially contra the blank reagent additionally a calibration graph was constructing (Negoui et al., 2010).

Assay procedure for sulfadiazine SUZ in Cream Dose Forms

Drug preparations (Cream Dose Aspects) comprising SUZ as the active ingredient have been evaluated as obeys.

Cream dose Forms Ag. SUZ 5.0g cream (involving 0.05g of Ag. SUZ) (Table 1) disbanded in 250ml of ether after that excellently shaked and transported the mixture to a separate funnel. Then, the Ag. SUZ was extracted with 125ml of deionized water three times. The aqueous layer was accumulated in a volumetric flask and was filtered (Nagaraja & Shrestha, 2010).

TABLE 1. Cream Dose Forms that are utilized in the paper and their companies

Cream Dose Forms and Declared composition	Company applied
Floumizin cream (each 100gm of cream contain 1gm silver sulphadiazine USP)	Domine pharmaceutical/ Damascus Syria
Hamazine cream (each 100gm of cream contain 1gm silver sulphadiazine)	Hayat drug production Co./ Baghdad /Iraq
Silverdin (each 1gm of cream contain 10mg silver sulfadiazine USP)	Deva Holding Co. Istanbul/Turkey

Biological activity

Bacterial isolates

The proceeding microbial pathogenic isolates of multidrug resistance (MDR): six Gram –ve bacteria (*Proteus mirabilis, Enterobacter cloacae. Escherichia coli, Pseudomonas aeruginosa, Acinetobacter baumanii* as well as *Klebsiella pneumoniae*) whereas two Gram +ve bacteria (*Staphylococcus aureus* as well as *Enterococcus faecalis)* were isolated from various clinical samples such as a wound, burns, additionally diabetic ulcer. Some phenotypic as well as biochemical initiatives were utilized to diagnose the isolates, as well as subsequent recently confirmed utilizing Vitek-2 compact instrument GP as well as GN card automatic bacterial identification instrument. Both bacterial isolates were collected on BHI broth complemented by glycerol at (-20°C) (15 percent). The isolates were sub-cultivated on BHIA as well as sterilized at 37°C for 24hrs before use (Ramalivhana et al., 2014).

Antibacterial activity experimental

The preparedness of bacterial suspensions was described (Murray et al., 1995). Agar well dispersion technique was used to assess the pharmacological productivity of three varying companies ‘ sulfadiazine creams versus bacterial isolates (Olurinola, 1996). The biological activity of varying sulfadiazine creams versus bacterial isolates was assessed using the MHA medium.

Agar well diffusion assay

The bacterial isolate suspensions were forced to meet the McFarland standard of 0.5. 100µl consumption of BHIB bacterial suspensions on MHA plate surfaces utilizing micropipette. In all the cultivation plates, four wells were perforated using a sterile corn borer. One of the wells was perforation with 100µl of sulfadiazine added as a positive control in the middle of the plate; 100µl of three varying sulfadiazine creams (Floumizin cream, Hamazine cream, additionally Silverdin) were added alone in the residual three wells. The plates of cultivation were then fertilized at 37°C for 24hrs. The evidence of inhibition zone around wells has been calculated in mm. The trials were done in triplicate (Murray et al., 1995).

Results and Discussion

The perfect circumstances were studies the reaction

Various circumstances were contemplated that

are influencing the absorbance for the resulting compound that leads to increase it.

Acid effect

The results given that the nearness of acid was making expanding in the high absorbance for the resulting product, in this manner a few acids, for example, HCl, CH_3COOH, H_2SO_4 as well as HNO_3 are inspected at 1M as concentration they were given that every one of the studied acids obtained the absorbance of color product, sulphuric acid was the best acid that obtains the largely absorption., the prefect volume was 2ml for the acid, which produces a large absorption, that was utilized in the next experiences and appearing in Fig. 2 (Jawad & Kadhim, 2013).

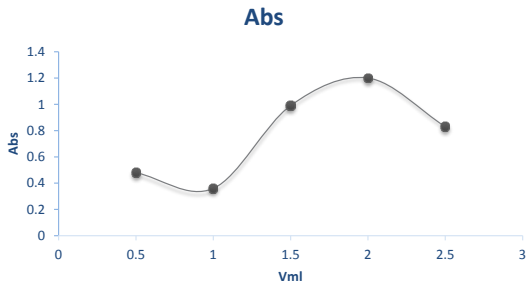


Fig. 2. The volume Influence of acid (1) M.

Base effect

The results given that the nearness of base was making expanding in the high absorbance for the resulting product, in this manner a few bases, for example, NaOH, Na_2CO_3, and KOH are inspected at 0.5M as concentration they were given that every one of the studied bases obtained the absorbance of color product, sodium carbonate was the best that obtains the large absorption, the prefect volume was 1ml for the base, which produces a large absorption, that was utilized in the next experiences and appearing in Fig. 3 (Al-Rufaie, 2016a).

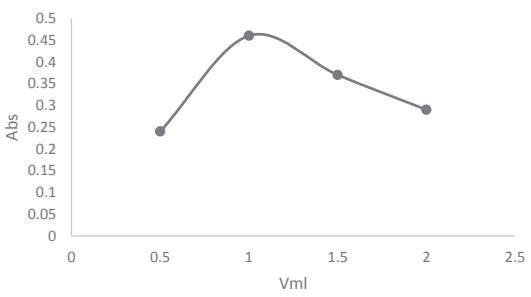


Fig. 3. The volume effect of base (0.5) M.

Effect of reagent concentration

To study the reagent effect of 3,5 di hydroxy benzoic acid concentration on the absorbance. It was making by utilizing 1ml of 500ppm Sulfadiazine SUZ drug were transposed into a sequence of volumetric flasks with volume 25ml, varying volumes for reagent 500ppm from 0.5 – 2.5ml was taking and complete the volumes to (25ml) by distilled water, for the formation the azo dye, (1) ml of Co(II) solution was added and complete the volumes by utilizing distilled water, the prefect volume was 1.5ml for the 3,5 di hydroxy benzoic acid, which produces a highly absorption, that was utilized in the next experiences and appearing in Table 2 (Negoui et al., 2010).

TABLE 2. The volume of reagent effect on the reaction

Volume of reagent (ml)	Absorbance
0.5	0.288
1	0.444
1.5	0.512
2	0.488
2.5	0.345
3	0.211

Influence of sodium nitrite concentration

The impact of the volume of sodium nitrite on the intensity of absorption was also researched. Volumes of 1% $NaNO_2$ at a volume that between 0.5 and 2ml were evaluated with 1.5ml of reagent additionally 2ml of H_2SO_4 solution as well as 1ml of sodium carbonate 0.5M. It has been found that 1ml is the optimal level ideal for optimal absorption (Fig. 4) (Hanaa et al., 2018).

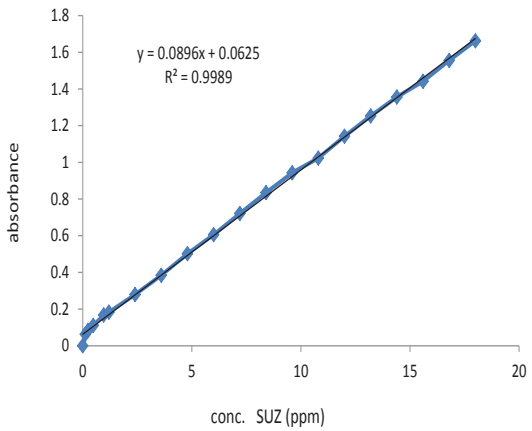


Fig. 4. The volume effect of 1% $NaNO_2$.

Reaction time effect

The intensity color for the product was shown on the maximum after the drug SUZ had been responded with the azo, and Co(II) solution and got stabilized after 10min. In this manner, the suggested strategy was showed that ten minutes of progress time was selected as optimal. The resulting color was stabilized within 24hrs

Absorption spectra

The spectral check was directed to get the more absorption wavelength of coming about the azo compound after introducing the perfect circumstances for this reaction against blank solution (ethanol and distilled water solvent), after that, The spectral check was obtained the biggest wavelength absorption for the color complex which was resulting from the reaction between the azo and Co(II) solution.

Figure 5 Appears the color complex spectra created by the reaction between the azo and Co(II) solution against blank (azo solution), the absorption was maximum at 436nm (Nagaraja, & Shrestha, 2010).

Calibration graph

The calibration diagram for SUZ identification under controlled conditions is shown in Fig. 6. The graph is linear in the concentration scale of 0.5 – 18ppm with a correlation coefficient of 0.9989, the slope of 0.0896 as well as an intercept of 0.0625, respectively. The yellow product's molar absorption was estimated to be 2.24×10^4 L mol^{-1} cm^{-1} and also the sensitivity of the Sandell was 0.01 µg cm^{-2}. LOD additionally LOQ were 0.411 µg ml^{-1} as well as 0.349µg ml^{-1}.

Precision and accuracy

The precision additionally accuracy for the studied kinetic spectrophotometric procedure was investigated at three various concentrations from Sulfadiazine (SUZ) drug breaking down five repeat tests of every concentration by the proposed method. percentage relative error (E %) as accuracy and Percentage relative standard deviation (RSD %) as precision for the proposed procedure was computed. The results in Tables 3 and 4 depict good accuracy and precision as illustrated by the low values of RSD%. and low values of E%, proving the repeatability and reproducibility of the studied method. (All the results were calculated for five determinations (Al-Rufaie, 2016b) .

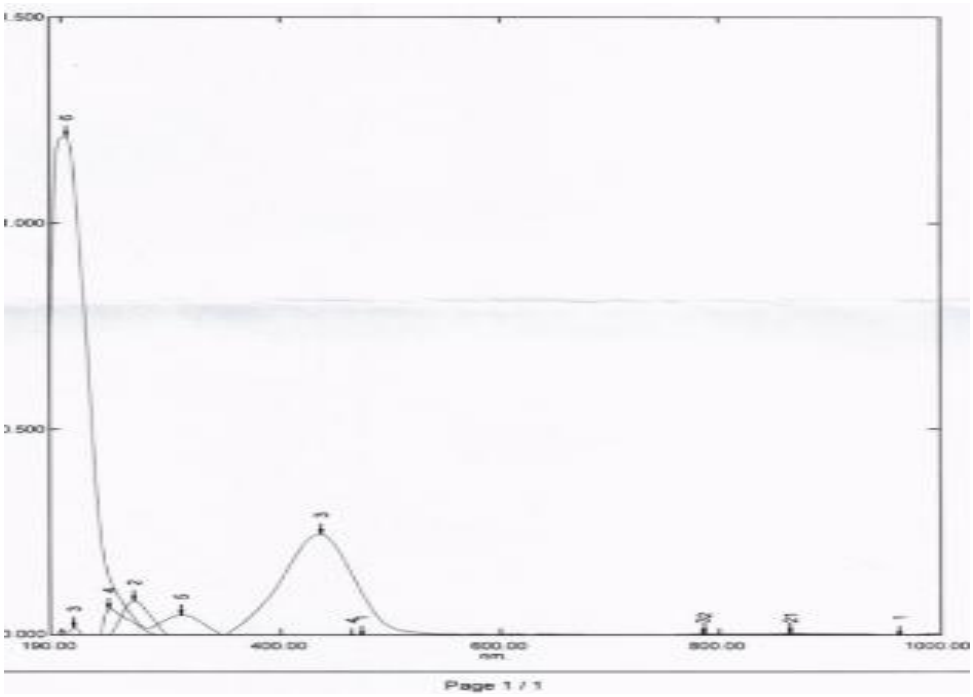


Fig. 5. Appears the spectra of orange product at 6 ppm of SUZ (A),(B) the blank (C) the spectrum for pure drug SUZ

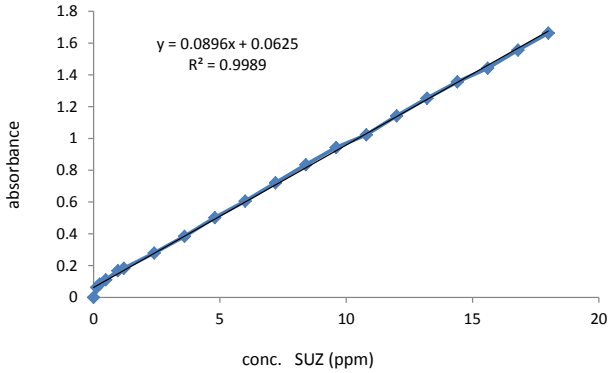


Fig. 6. The calibration curve

TABLE 3. Analytical Data for the studied procedure

Parameter	Value
λmax, nm	436
Correlation coefficient ,r^2	0.9989
Slope(b)	0.0896
The Molar absorptivity (L .mol^{-1}.cm^{-1})	2.24×10^4
The law of Beer limits (ppm)	0.12 - 18
the sensitivity of Sandell (μg.cm $^{-2}$)	0.01
Intercept (a)	0.0325
The quantification limit (LOQ) (ppm)	0.411
The detection limit (LOD) (ppm)	0.329

TABLE 4. Precision and Accuracy of the studied method

Conc. of (SUZ) ppm present	Error%	Recovery %	R.S.D %
1.20	-1.400	98.600	0.788
8.40	1.710	101.700	0.612
15.80	1.660	101.660	0.544

Stoichiometry and the mechanism

The evaluation of stoichiometry for the reaction between the observed SUZ as well as the reagent indicated and in all situations, the drug/3,5DHB ratio was 1:1 (i.e. 1 mole of the drug reacted with 1 mole of reagent). The result from this reaction was a novel ligand that interacted with cobalt ion to create new complex absorption at 436nm. For this reaction between the created ligand as well as cobalt ion, the molar ratio as well as the continuous variation method also discovered the ratio to be 1:1. Depending on these findings it was presumed that the SUZ reactions with (3.5 di hydroxy benzoic acid), as well as cobalt ion , proceeded along the direction provided in Scheme 1.

Comparison of the absorbance of the solution containing equivalent amounts of new ligand [SUZ drug reagent] as well as Co (II) and other solutions involving a five-fold excess of Co (II) ion from the starting concentration estimated the evident stabilization constant for the resulting complex. The optimal quantity for the solution is utilized as 1ml from1×10^{-3}M). The resulting complex in water under the investigated empirical condition was the average reciprocal stabilization constant 6.11×10^6 l^1.mol^{-1} (Al-Rufaie et al., 2017; Al-Rufaie**,** 2018**,** Al-Rufaie & Motaweq, 2018).

Effect of excipients substances

The excipients under examination were Starch, Talc, Acacia, Sucrose, Magnesium Stearate, lactose, Benzoic acid, Aspartate as well as Glucose, which it is founding with SUZ in the creams dosage forms, there is no effect on the measurements. For this study, the solution contained SUZ and each of the ingredients was brought individually at

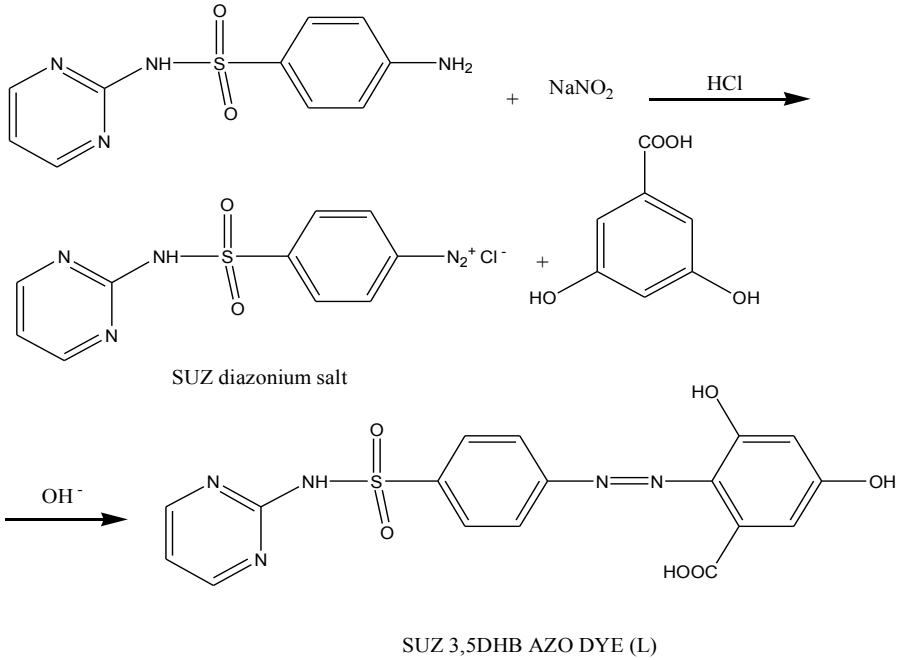
concentrations ten times larger than that of SUZ were evaluated under the same operation in the drug's calibration graph 2ml of 500ppm solution and (2ml) of each 5000 ppm excipient was brought for interference research and mark dilution. an interference level was deemed acceptable if the error was not larger than ± 2 percent compared to the predicted. No interference was witnessed in the assessment of SUZ in the existence of the learned ingredients (average of three assessments) (Table 5) (Hanaa et al., 2018). Table 5 is indicating that the method is not suffering any interference from common excipients and other substances.

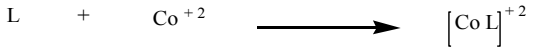
Technique application to Cream Dose Forms

The technique researched was used to calculate SUZ in its type of cream dose. The conclusions drawn were a statistical contrast between a variance ratio (F-test) for accuracy as well as a student (t-test) for accuracy with the standard approach (Al-Rufaie, **2009**) (based on the titration for pure SUZ potentiometric ally using per chloric acid 0.1M at confidence level (95 percent) with 5 degrees of accuracy) as displayed in Table 3. The findings showed that the F-test, as well as t-test, were less than the theoretical amount (F=9.28; t=2.45), indicating that there was no clear demarcation between the methodology investigated as well as the typical methodology (three investigations average) (Nagaraja & Shrestha, 2010), the methodology analyzed is favorably contrasted with other documented techniques, as seen in Table 6 (Al-Rufaie & Motaweq, 2018).

Antibacterial efficiency of three sulfadiazine creams

The antimicrobial efficacy capability of three different company sulfadiazine creams toward eight multidrug-resistant bacteria, two G +ve bacteria *(E. faecalis* and *S. aureus)* as well as six G -ve bacteria *(Pr. mirabilis, E. cloacae, E. coli, P. aeroginosa, A. baumanii* as well as *K. pneumoniae)* was measured by the presence or absence of an inhibition zone around the holes. Such creams are described in Table 7 and Fig. 7 for findings of antibacterial efficacy. The results suggest that three creams with sulfadiazine had greater antibacterial activity on *A Bacterial baumanii* separated as contrasted with other isolates.





Scheme 1. Potential reaction mechanism for the figuration of (SUZ) medicine complexes with (3,5DHB) as well as Co(II)ion.

TABLE 5. The impact of excipients substances on the assessment of medicine

Interference	% Error	% Recovery
Talc	-1.700	98.300
lactose	1.200	101.200
starch	1.650	101.650
Acacia	-0.880	99.120
Sucrose	1.030	101.030
Glucose	0.890	100.890
magnesium stearate	0.550	100.550
benzoic acid	-0.990	99.010
Aspartate	-0.770	99.230

TABLE 6. Assessment of SUZ in cream dose forms was using the strategy researched as well as compared with the common strategy

Cream Dosage Forms and Declared composition	Average recovery % and average RSD%				Theoretical Values (t),(F)
	Proposed approach		Standard approach		
Bulk SUZ	100.650	0.648	99.770	1.210	
Floumizin cream (each 100 gm of cream contain 1 gm silver sulphadiazine USP)	101.220	0.513	99.330	0.881	(F)Value =9.28
Hamazine cream (each 100 gm of cream contain 1 gm silver sulphadiazine)	98.370	0.779	99.740	0.966	(t)Value=2.45
Silverdin (each 1 gm of cream contain 10 mg silver sulfadiazine USP)	100.440	0.923	100.420	0.763	

TABLE 7. Antibacterial activity of pure sulfadiazine (inhibition region, mm) including three separate sulfadiazine creams toward multidrug resistance bacteria

Compound	*S. aureus*	*E. faecalis*	*E. coli*	*A. baumannii*	*E. clocae*	*K. pneumoniae*	*P. mirabilis*	*P. aeroginosa*
Pure SUZ	22	14	30	45	29	23	20	17
Floumizin cream	22	14	26	42	25	18	19	17
Hamazine cream	20	13	22	40	23	13	15	12
Silverdin	24	16	32	50	30	25	22	18

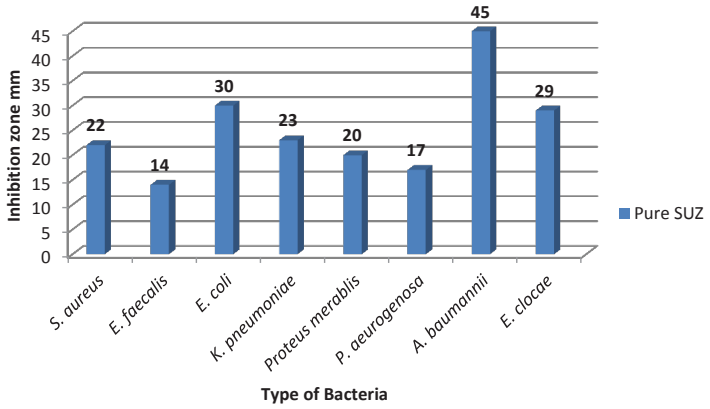


Fig. 7. Comparison of pure sulfadiazine antibacterial activity (inhibition region, mm) toward multidrug-resistance bacteria

As for the efficiency of sulfadiazine, they typically have elevated antibacterial activity on G-ve bacteria relative to G +ve bacteria, where Silverdin cream had greater biological efficiency on all bacterial isolates opposed to certain other creams, and Silverdin's efficiency comparable to basic Sulfadiazine's antibacterial activity compared to two other creams (Table 6). Floumizin cream matched the antibacterial action of Silverdin cream, but Hamazine cream has lower antibacterial activity compared to pure SUZ. These outcomes reverted to cream imperfection as well as a reduced active ingredient concentration (pure sulfadiazine) (Kohanski et al., 2007; Cowan, 1999).

Conclusion

The current spectrophotometric technique was A simple, fast, sensitive, and accurate technique for investigating small concentrations of sulfadiazine SUZ including appropriate for investigating SUZ in creams was developed. The planned technique, for example, no need the extraction stage, which is free of simple experimental requirements as well as muddled processes. The reagents used as part of the techniques are shabby, readily accessible, and also no bleak specimen preparation is included in the technique. These points of interest allow the use of the displayed technique in sulfadiazine SUZ quality regular check investigation.

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تحليل ISM وتطورها بنوع الإنسان والتحقق من صحة تقنيات القياس الطيفي للأشعة فوق البنفسجية لتقييم السلفادايازين في شكله النقي وفي اشكاله جرع الكريمات الخاصة به

مهيمن محمد مجيد سعيد الرفيعي[1]، هناء خزعل عبد الغريب طه [1]، زهراء يوسف خضير مطوق[2]
[1] قسم الكيمياء - كلية العلوم - جامعة الكوفة - النجف - العراق، [2] قسم علوم الحياة - كلية العلوم - جامعة الكوفة - النجف - العراق.

يتم تقييم تقنية القياس اللوني الدقيقة والواضحة والحساسة بشكل إضافي لتقدير دواء السلفاديازين كشكل حاد ، وكذلك لأنواع مختلفة من المنتجات الصيدلانية بجرعات مختلفة. تعتمد هذه التقنية على اقتران مضاد حيوي من سلفاديازين (SUZ) بالإضافة إلى عامل 3،5 دي هيدروكسي حمض البنزويك (3،5 دي إتش بي) مع استخدام تفاعل اقتران الآزو. (3،5 دي إتش بي) في الوسائط الأساسية لإنتاج يجند أخيرًا يتفاعل مع الكوبالت (II)لتوليد قوة اللون البرتقالي المركب في درجة حرارة الغرفة. صبغة النتائج المصاحبة لها قابلية الذوبان في الماء بالإضافة إلى المرونة المحددة سلفًا بشكل إضافي مع الامتصاص النهائي عند (436 نانومتر). يظهر الرسم البياني للمعايرة بين الامتصاص والتركيز أن نطاق التركيز من الدواء تم إنشاؤه باستخدام قانونBeer's بين (0.12 - 18 ميكروغرام / مل). تم اختبار انتقائية أفضل المظاريف التجريبية. دقة بالإضافة إلى ذلك يتم حساب دقة الإجراء من خلال متوسط مبالغ الاسترداد (100.122٪) وكذلك مبالغ الانحراف المعياري النسبي الرئيسي (0.762٪) بشكل معقول. أن التقنية قائمة على التركيز. يتم الحصول على الحساسية للإجراء من خلال الامتصاصية المولية (2.24 × 104 lcm-1.mol-1). تم اختبار حساسية (0.01 Sandell) ميكروغرام. سم -2). حقائق التحليل لهذه التقنية. يتم الاتفاق عليه من خلال الإجراء الرسمي. تم فحص التدخلات الطبية المضافة الشائعة. يتم تحليل التقنية المعمول بها بنجاح في تقييم (SUZ) في أنواع مختلفة من المنتجات الصيدلاني.

قدرة الفعالية المضادة للبكتيريا لثلاث كريمات مختلفة من شركة سلفاديازين تجاه ثمانية بكتيريا مقاومة للأدوية المتعددة ، أظهرت النتائج أن ثلاثة كريمات تحتوي على سلفاديازين كان لها نشاط مضاد للجراثيم أفضل على A. Bacterial baumanii المعزول على عكس آخر معزول. بالنسبة لفعالية السلفاديازين ، فعادة ما يكون لها نشاط مضاد للجراثيم على بكتيريا G-ve على عكس بكتيريا G + ve ، حيث كان لكريم سلفاديازين فعالية بيولوجية أعلى على جميع العزلات البكتيرية مقابل كريمات أخرى ، وفعالية سيلفردين متساوية مع سلفاديازين النقي. نشاط مضاد للجراثيم مقابل اثنين من الكريمات الأخرى.