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NOTE

A Simple and Rapid Spectrophotometric Method for the Analysis of Sulfadimidine in Pharmaceutical Veterinary Dosage Forms

N. RAMI REDDY, K. PRABHAVATHI and I.E. CHAKRAVARTHY*
Department of Chemistry, S.K.U.P.G. Centre, Kurnool-518 002, India

A new spectrophotometric method has been developed for the quantitative estimation of sulfadimidine in its pharmaceutical dosage forms. In this method the drug was reacted with sodium nitrite in acidic medium at 0–5°C temperature for diazotization. The diazotised drug was treated with 1 : 10 ammonia : water solution. A yellow colour was produced. The absorbance of the yellow colour solution was measured at 420 nm against reagent blank.

Key words: Spectrophotometric analysis, Sulfadimidine, Pharmaceutical, Veterinary, Dosage.

Sulfadimidine is 2-(*p*-aminobenzene sulphonamido)-4,6-dimethyl pyrimidine, which is used as an antibiotic in urinary tract infections and systemic infections. The method described for the estimation of sulfadimidine includes spectrophotometric methods[1–3], HPLC method[4] and UV detection method[5]. British Pharmacopoeia[6] have reported the titrimetric method. The end point was determined by the electrometric method. A new spectrophotometric method was described for the determination of sulfadimidine from pharmaceutical veterinary formulations. The method was based on the diazotized drug treated with 1 : 10 ammonia : water solution. The yellow colour produced was measured at 420 nm against reagent blank prepared by the usual manner omitting the drug solution.

A Spectronics 1001 plus spectrophotometer with matched 10 mm quartz cells cells was used for absorbance measurements.

All the chemicals used were of analytical grade. 4 N hydrochloric acid was prepared and standardized with standard procedure. Sodium nitrite (0.1 N) was prepared by dissolving 0.66 g in 100 mL distilled water. 1 : 10 ammonia : water solution was prepared in the usual way.

Stock solution: A 1 mg/mL solution was prepared by dissolving 100 mg of pure sulfadimidine in 100 mL of distilled water. This stock solution was diluted with distilled water to obtain the working concentration of 200 μg/mL.

Procedure: An aliquot of the drug solution (1.0 to 3.0 mL) was transferred into 10 mL standard flask. The volume in each flask was adjusted to 10 mL with distilled water. To each flask, 1.0 mL of 0.1 N hydrochloric acid and 1.0 mL of

0.1 N sodium nitrite solution were added. The content in each flask was mixed well and allowed to stand for 5 min at 0–5°C temperature for diazotization. Then 1.0 mL of 1 : 10 ammonia : water solution was added to each flask and the volume in each flask was made up to 10 mL with distilled water. A stable yellow colour was formed. The absorbance of the yellow coloured solution was measured at 420 nm against reagent blank prepared in a similar manner omitting the drug solution. The calibration graph was plotted between the absorbance values and the amount of drug in μg/mL. The calibration curve was found to be linear over a concentration range of 0.2 to 0.6 mg/mL of sulfadimidine. The amount of sulfadimidine was then computed from the calibration curve.

The method was then applied to the determination of the drug from the marketed tablet formulations. Tablets powder equivalent to 100 mg of the veterinary drug was weighed accurately and transferred into a 100 mL standard flask and shaken well with 50 mL of 0.1 N hydrochloric acid solution for 5 min. The solution was filtered and the volume was adjusted to 100 mL with 0.1 N hydrochloric acid solution. This stock solution was further diluted to obtained the working concentration of 200 μg/mL. Further analysis were carried out as per calibration curve procedure. The results are summarized in Table-1.

TABLE-1
ESTIMATION OF SULFADIMIDINE FROM VETERINARY PHARMACEUTICAL FORMULATIONS

S.No.	Sample	Labelled amount (g)	Amount found (g)	
			Proposed method	Official method
1.	T_1	5	4.93	4.95
2.	T_2	5	4.97	4.92
3.	T_3	5	4.96	4.94
4.	T_4	5	4.91	4.96

The results present in Table-1 indicate that the proposed method can be successfully applied to the analysis of various pharmaceutical veterinary preparations of sulfadimidine. The stable yellow colour solution exhibited λ_{max} 420 nm. The colour obeyed Beer's law in the concentration range of 0.2 to 0.6 mg/mL. Statistical analysis were carried out and results are presented in Table-2. Standard deviation and coefficient of variation values were low, indicates the high accuracy and reproducible of the method. Student t-test shows that there is no significant difference between the two methods as regards accuracy and precision. The common excipients lactose, starch, calcium lactate and gum acacia did not interfere with the assays.

Thus the proposed method is less time consuming, sensitive, reproducible and applicable for the estimation of sulfadimidine in pharmaceutical veterinary dosage forms.

TABLE-2
STATISTICAL ANALYSIS OF ESTIMATION OF SULFADIMIDINE

S.No.	Sample	Standard deviation	Coefficient of variation	t_{cal}	t_{tab}
1.	T_1	0.1258	2.551	0.9641	
2.	T_2	0.0616	1.239	0.845	
3.	T_3	0.0668	1.344	0.7792	2.132
4.	T_4	0.0849	1.729	1.8360	

t_{tab} = Tabulated value or theoretical value.
Average of three determinations based on the label claim.

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