

Spectrophotometric Determination of Tizanidine Hydrochloride

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A new, simple, sensitive spectrophotometric method in ultraviolet region has been developed for the determination of tizanidine hydrochloride in bulk and in dosage form. Tizanidine hydrochloride exhibited maximum absorbance at 320 nm with apparent molar absorptivity of 13.1104×10^3 l/mol.cm. Beer's law was obeyed in the concentration range of 5-20 $\mu\text{g/ml}$. Results of the analysis were validated statistically and by recovery studies.

Tizanidine hydrochloride, 5-chloro-N-(2-imidazolin-2yl)-2,1,3-benzothiadiazol-4-ylamine hydrochloride is a new centrally acting skeletal muscle relaxant¹. It is an agonist at α_2 -adrenergic receptor sites and presumably reduces spasticity by increasing presynaptic inhibition of motor neurons. It is official in Martindale's complete drug reference². A survey of literature revealed a spectrophotometric method for the simultaneous estimation of tizanidine hydrochloride and nimesulide in combined dosage forms³. No individual method has been reported for the analysis of tizanidine hydrochloride. Hence an attempt was made to develop a simple and economical spectrophotometric method with greater precision, accuracy and sensitivity for the analysis of tizanidine hydrochloride in bulk and dosage forms.

A Hitachi model U-2001 UV/vis spectrophotometer with 1 cm matched quartz cells was used. Tizanidine hydrochloride (Novartis India Limited, Mumbai) and hydrochloric acid (Merck India Limited, Mumbai) were used in this study. The tablets were procured from a local pharmacy. Hydrochloric acid (0.1 M) was prepared in double distilled water. Tizanidine hydrochloride (10 mg) was accurately weighed and dissolved in 10 ml of 0.1 M hydrochloric acid to give stock solution of concentration 1000 $\mu\text{g/ml}$. Aliquots of 100 $\mu\text{g/ml}$ solution were suitably diluted with 0.1 M hydrochloric acid to give final concentrations of 5, 10, 15 and 20 $\mu\text{g/ml}$. The absorbance was measured at 320 nm against 0.1 M hydrochloric acid as a blank.

For the analysis of tizanidine hydrochloride in tablets, three different commercial brands of 2 mg strength (Sirdalud-Novartis, Tizan-Sun Pharma, Tizpa-Blue Cross) were taken. Twenty tablets were weighed and powdered. The tablet powder equivalent to 10 mg of tizanidine hydrochloride was weighed accurately and dissolved in 0.1 M hydrochloric acid. The solution was filtered through Whatman filter paper No. 40 and the filtrate was diluted to 100 ml using 0.1 M hydrochloric acid. An aliquot corresponding to 10 $\mu\text{g/ml}$ was analysed by the proposed method.

Recovery studies were carried out by adding 1, 2 and 3 mg of pure drug to different samples of tablet powder containing the equivalent of 10 mg of drug. From the amount of drug found, percentage recovery was calculated. The proposed method for determination of tizanidine hydrochloride showed molar absorptivity of 13.1104×10^3 l/mol.cm and Sandell's Sensitivity of 0.0221 $\mu\text{g/cm}^2$ / 0.001 absorbance unit. Linear regression of absorbance on concentration gave the equation $Y=0.0545+0.03992 x$ with a correlation coefficient (r) of 0.9998.

Relative standard deviation of 0.5444% was observed for analysis of five replicate samples. Tizanidine hydrochloride exhibited maximum absorption at 320 nm and obeyed Beer's law in the concentration range of 5-20 $\mu\text{g/ml}$. The results of analysis and recovery studies are presented in Table 1. The percentage recovery value 99.6% indicates that there is no interference of the excipients present in the formulation. The developed method was found to be sensitive, accurate, precise, repeatable and reproducible and can be

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TABLE 1: ANALYSIS OF TIZANIDINE HYDROCHLORIDE TABLETS.

Tablet Formulation	Label Claim (mg/tab)	Amount found (mg/tab)	% of label claim* \pm standard deviation	Standard Error	% Recovery*
Sirdalud (Novartis)	2	1.98	99.0 \pm 0.71	0.006	99.9
Tizan (Sun Pharma)	2	2.02	101 \pm 0.27	0.002	99.5
Tizpa (Blue Cross)	2	2.04	102 \pm 0.65	0.006	99.3

*Mean of five determinations.

used for the routine analysis of tizanidine hydrochloride in bulk drug and formulations.

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1,1'-Oxy Bis[(4-Methoxy Cinnamidopropyl Dimethyl Ammonio) Ethane] Dichloride, a New Photoprotective Agent for Personal Care

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The synthesis and photoprotection efficacy of a new water-soluble photoprotective agent, 1,1'-oxy bis[(4-methoxy cinnamidopropyl dimethyl ammonio) ethane] dichloride is reported. This non-irritating hydrolytically stable UV-absorber is substantive to both skin and hair due to its cationic nature. It can be easily formulated into a variety of hair and skin care formulations.

Harmful effects of solar UV-radiation on skin and hair are well documented¹⁻⁴. Over-exposure to UV rays is the most common cause of skin cancer. The problem is becoming more acute with continuous depletion of ozone layer. The damage to blond hair is significant too! Solar UV-radiation makes hair brittle, rough and difficult to comb. The human

hair has been shown to lose the tensile strength as a result of cleavage of disulphide bond of hair keratin upon exposure to UV-radiation.

Today's consumer is very well aware of the need for photoprotection to both skin as well as hair. The conventional UV-absorbers such as derivatives of salicylic acid, benzophenones, benzotriazoles, cinnamic acid, amino benzoic acid are not substantive to skin and hair. Neverthe-

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