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NOTE

Spectrophotometric Determination of Pramiexole Dihydrochloride Monohydrate

G. SRINU BABU and CH. A.I. RAJU*
Center for Biotechnology, Department of Chemical Engineering
Andhra University, Visakhapatnam-530 003, India
Tel: (91)(891)2844881; (91)9346303808 (M)
E-mail: immy_chair@yahoo.com

A simple, sensitive, spectrophotometric method in UV region has been developed for the determination of pramipexole in bulk and tablet dosage form. Pramipexole is a new antipsychotic drug, which shows maximum absorbance at 261 nm with apparent molar absorptivity of 5.37208×10^3 L/mol cm. Beer's law was obeyed in the concentration range of 4–60 μg/mL. Results of the analysis were validated statistically and by recovery studies.

Key Words: Pramipexole, UV spectrophotometry.

Pramipexole (PPX), (–)2-amino-4,5,6,7-tetrahydro-6-D-propylamino-benzathiazole) is a non-ergot dopamine receptor agonist (subtype: D2 and D3) having empirical formula $C_{10}H_{17}N_3S{\cdot}2HCl{\cdot}H_2O$ and m.w. 302.27, used for symptomatic treatment of Parkinson's disease. Preclinical studies show that nanomolar concentrations of PPX protect dopaminergic neurons *in vitro*[1] or *in vivo* (about 1 mg/kg)[2] by a receptor-dependent pathway. This is possibly mediated by the high selectivity of PPX for D3-receptors[2], causing an increase of protective proteins[3]. At higher concentrations (above 10 micromolar), PPX has been shown to be neuroprotective *in vitro* independent of the dopaminergic agonism[4]. Mitochondria-targeted antioxidants accumulate in mitochondria and show higher efficacy compared to untargeted antioxidants[5]. They represent promising candidates to prevent or alleviate mitochondria oxidative stress, which is involved in the pathogenesis of Alzheimer's disease, Parkinson's disease or amyotrophic lateral sclerosis (ALS)[6]. One method is reported for the determination of pramipexole in plasma[7]. This paper reports a rapid and sensitive UV method for determination of pramipexole in bulk and its dosage forms.

A double beam UV-Vis spectrophotometer Elico-SL 164 with 1 cm matched quartz cells was used. Pure pramipexole was obtained as a gift sample from M/s Sun Pharma Ltd., Ahmedabad. Pramipexole equivalent to pramipexole dihydrochloride monohydrate was weighed accurately and dissolved in methanol so as to give a stock solution of concentration of 1000 μg/mL. Aliquots of 100 μg/mL

solution were transferred into nine 10 mL volumetric flasks and volume was adjusted with distilled water to give final concentrations of 4, 6, 8, 10, 20, 30, 40, 50 and 60 μg/mL (Fig. 1, 10 μg/mL). The absorbance was measured at 261 nm against distilled water as a blank. The proposed method was applied to the analysis of commercially available pramipexole tablet. A quantity of mixed contents of 20 tablets equivalent to 1 mg of pramipexole was transferred into a 50 mL volumetric flask. A small quantity of methanol was added and shaken well

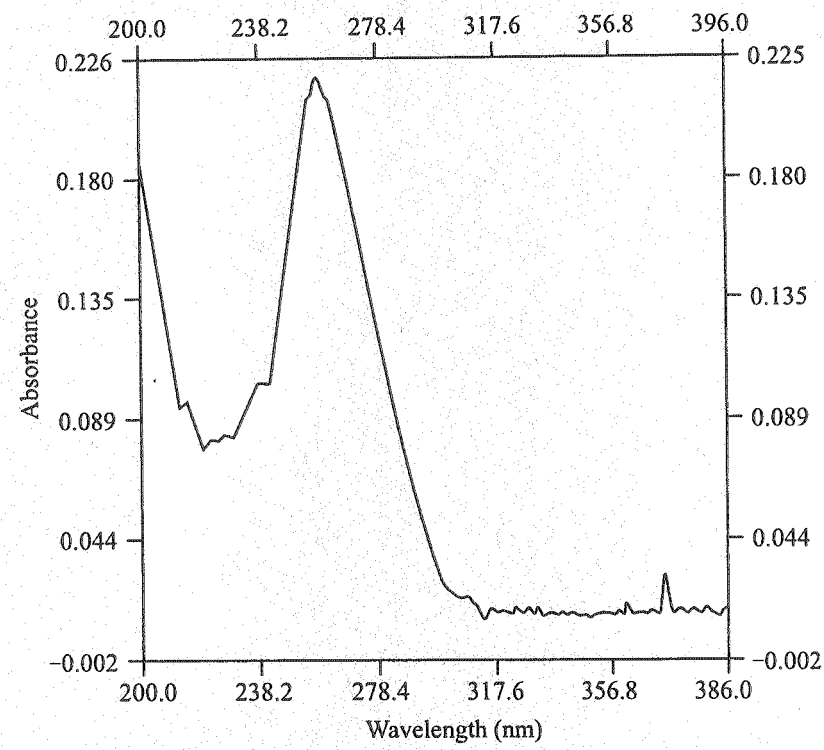

Fig. 1. Pramipexole UV spectra (10 μg/mL concentration)

to dissolve the drug. It was made up to volume with methanol and the solution was filtered. The filtrate was further diluted with distilled water to 20 μg/mL concentration and the absorbance measured at 261 nm against distilled water as a blank.

Recovery study

Recovery studies were carried out by adding a known quantity of pure drug to the pre-analyzed formulations and the proposed method was followed. From the amount of drug found, percentage recovery was calculated.

The proposed method of determination of pramipexole showed molar absorpitivity of 5.37208×10^3 L/mol cm. Linear regression of absorbance on concentration gave the equation $Y = 0.0006829 + 0.0142x$ with a correlation coefficient of 0.99984. Relative standard deviation of < 1% was observed for analysis of five replicate samples, indicating precision and reproducibility. Pramipexole exhibits its maximum absorption at 261 nm and obeys Beer's law in the concentration range of 4–60 μg/mL. The results of analysis and recovery studies are presented in Tables 1 and 2. The percentage recovery value indicates

that there is no interference from the excipient(s) present in the formulation. The developed method is found to be sensitive, accurate, precise and reproducible and can be used for the routine quality control analysis of pramipexole monohydrate in bulk drug and its formulations.

TABLE-1
RESULTS OF ASSAY

Trade name	Label claim (mg)	Amount found*		C.V. (%)
		(mg)	(%)	
Mirapex-1 (Pfizer)	1.0	0.935 ± 0.0492	98.75	0.997

*Mean of five determinations.

TABLE-2
RECOVERY STUDIES

S.No.	Label claim (mg/tablet)	Amount of standard added (mg)	Total amount recovered (mg)	Recovery (%)
I.	1	0	0.92	98.4
II.	1	10	11.04	100.2
III.	1	20	21.96	99.8
IV.	1	30	31.10	100.2
V.	1	40	41.16	100.3

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