

NOTE**Spectrophotometric Determination of Flurbiprofen Sodium in Biological Fluid**

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Simple and sensitive UV spectrophotometric method has been developed for estimation of flurbiprofen sodium in urine. The developed method is based on extraction of drug from urine sample using chloroform after proper treatment. The chloroform extract shows absorbance maxima at 256 nm and obeys Beer's law in the concentration range of 2-12 µg/mL of drug. No interference was observed from the common metabolites present in the urine after proper extraction.

Key Words: UV spectrometric estimation, Flurbiprofen sodium, Urine.

Flurbiprofen sodium is chemically, sodium (\pm)-2-(2-fluoro-4-biphenyl)propionate dihydrate, is a non-steroidal antiinflammatory drug used in musculoskeletal and joint disorder¹. It is commercially available as flurbiprofen sodium. The empirical formula of drug² is $C_{15}H_{12}NaO_2 \cdot H_2O$ and its molecular weight is 302.3. Literature survey reveals that few HPLC method have been reported for estimation of flurbiprofen sodium in biological fluids^{3,4}, however none of the spectrophotometric methods is yet reported for estimation of flurbiprofen sodium in biological fluid.

In present study, an attempt has been made to develop an accurate and reliable UV spectroscopic method for estimation of flurbiprofen sodium in urine. All chemical used were of analytical grade. A Thermospectronic UV1, UV-Vis double beam spectrometer (with 1 mm matched quartz cells) was used for all absorbance measurement.

The stock solution of flurbiprofen sodium was made in chloroform. Flurbiprofen sodium (100 mg) was accurately weighed and dissolved in chloroform. The stock solution was further diluted to obtain the working standard of 20 µg/mL. The sample solution of drug in urine was prepared by dissolving 10 mg of drug in 100 mL urine. Two different samples were prepared.

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Aliquots ranging from 1 to 6 mL were transferred into a series of 10 mL volumetric flask and volume made up to mark with chloroform. The individual samples were scanned from 200 to 400 nm, maximum absorbance was observed at 256 nm. Absorbance of all the standard solution was thus measured at wavelength maxima of drug *i.e.* 256 nm. A calibration curve was plotted between measured absorbance *vs.* concentration.

The Beer's law limit, Sandell's sensitivity, molar extinction coefficient, relative standard deviation and regression equation were also calculated (Table-1).

TABLE-1
OPTICAL CHARACTERISTICS OF THE PROPOSED METHOD

Parameters	Flurbiprofen sodium
λ_{\max} (nm)	256
Beers law limit ($\mu\text{g/mL}$)	2-12
Sandell's sensitivity ($\mu\text{g cm}^{-2}/0.001$ absorbance unit)	0.0654
Molar absorptivity ($\text{L mol}^{-1} \text{cm}^{-1}$)	1.667×10^4
Regression equation ($Y = a + bc$)	
Slope (b)	8.76×10^{-2}
Intercept (a)	2.01×10^{-2}
Correlation coefficient (r)	0.9978
Relative standard deviation (%)*	0.2850

*Average of five determinations

Analysis of drug from urine sample: The dissolved drug from the urine (20 mL) was extracted by addition of 200 μL of H_2SO_4 (0.5M) followed by addition of 100 μL of NaOH (0.1 M), with continuous stirring while addition of reagents. The resultant solution was filtered through Whatman filter paper No. 41. 10 mL of the filtrate was transferred into separating funnel and drug was extracted with 5, 3 and 2 mL portions of chloroform, respectively, followed by gentle shaking for 15 min. At the end of extraction the top organic layer was removed. Collected chloroform layers were transferred in a 10 mL volumetric flask and volume made up to mark. From this 1 mL of sample was further diluted to 10 mL with chloroform and absorbance of final dilution was measured at 256 nm. Concentration of drug was calculated in sample solution from calibration curve. Process was repeated five times with both the prepared urine samples. Result of analysis of drug from urine is reported in Table-2.

TABLE-2
ESTIMATION OF FLURBIPROFEN SODIUM IN URINE

Sample No.	Concentration of the drug in urine ($\mu\text{g/mL}$)		Concentration recovered (%)	S.D.*
	Present	Found		
1	100	99.62	99.62	0.78421
2	100	99.34	99.34	0.67487

*Average of five determinations.

Conclusion

The UV spectrometric method for analysis of flurbiprofen sodium in urine sample is based on extraction of drug from urine sample using chloroform after proper treatment to avoid the interference from normal metabolites present in urine sample. The recovery of drug using the developed method was close to 100 %. The parameters of analysis as Beer's law limit, Sandell's sensitivity, molar extinction coefficient, relative standard deviation, regression equation were calculated and are reported. Since recovery of drug from urine sample was close to 100 % so the developed method can be used for routine analysis of drug from urine.

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