

NOTE**UV Spectroscopic and Colorimetric Methods for the Estimation of Metadoxine in Tablets**

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Two simple and sensitive spectroscopic methods in ultraviolet and visible region were developed for the estimation of metadoxine in pharmaceutical dosage forms. Method A is based on metadoxine, showing absorbance at 290 nm in distilled water. The method B is based on the reaction of metadoxine with 1.5 % w/v (2 mL) solution of ferric nitrate reagent, to yield a yellow orange colour. This colour has characteristic light absorption in the visible region, with absorption maximum at 445 nm. These methods obey Beers law in the concentration range of 2 to 28 and 10 to 100 µg/mL, respectively.

Key Words: UV and Colorimetric estimation, Metadoxine, FeNO₃.

Chemically metadoxine is pyridoxol L-2-pyrrolidone-5-carboxylate an ion pair that combines pyridoxine and pyrrolidone carboxylate¹. Metadoxine exerts several actions that are beneficial to patients with alcoholic liver diseases². It increase the clearance of alcohol and acetaldehyde and decreases the damaging effect of free radicals, restores ATP and glutathione levels, reduces steatosis and prevents liver fibrosis³. Metadoxine has been estimated by HPLC⁴ and HPTLC⁵ methods, but no spectrophotometric methods are cited in the literature. In present studies, the two simple and sensitive spectrophotometric methods for the estimation of metadoxine in solid dosage forms are reported.

Shimadzu 1601 UV spectrophotometer with 1 cm matched cuvettes was used for estimation. Ferric nitrate reagent used was of analytical grade. A standard solution of metadoxine containing 1 mg/mL was prepared by dissolving pure 100 mg metadoxine in 100 mL of distilled water for method A and B. It was further diluted to a concentration of 100 µg/mL for method A and 1000 µg/mL for method B.

In method A, aliquots of working standard metadoxine (0.2 to 2.8 mL) solutions were transferred into a series of 10 mL volumetric flask and the volume was made up to 10 mL with distilled water. The absorbance of

each solution was measured at 290 nm against distilled water as blank. In method B, aliquots (0.1 to 1.0 mL) of the solutions were taken into 10 mL volumetric flask and 2 mL of ferric nitrate (1.5 % w/v) solution was added and kept aside at room temperature for 10 min. The absorbance of the resulting yellow orange colour chromogen was measured at 445 nm against the reagent blank.

20 Tablets of metadoxine (metadoxil 500 mg tablets from micro labs, Hosur and Alcoliv 500 mg tablets from sun pharmaceuticals, Jammu), were weighed accurately and powdered. The amount of powder equivalent to 100 mg of metadoxine, was weighed and dissolved in distilled water to make 100 mL and filtered through Whatmann filter paper no. 41. The filtrate was further diluted to 100 µg/mL for method A and 1000 µg/mL for method B. the amount of metadoxine present in tablets were estimated by interpolation, from the calibration curve.

The optical characteristics such as Beer's law limits, Sandell's sensitivity, molar extinction coefficient, coefficient of variance, are summarized in Table-1. The recovery studies were carried out to ascertain the accuracy and precision of the proposed method by adding a known amount of standard solution at three levels to the previously analyzed sample solution and the absorbance was measured. The results obtained by the proposed methods were in good agreement with the labeled amount (Table-2).

TABLE-1
OPTICAL CHARACTERISTICS AND PRECISION

Parameters	Method A	Method B
Absorption maxima (nm)	290	445
Beer's law limits (µg/mL)	2-28	10-100
Molar extinction coefficient (mol ⁻¹ cm ⁻¹)	0.025364	0.003729
Sandell's sensitivity (µg/cm ² /0.001 absorbance units)	0.039414	0.26826
Regression equation (y)	0.9997	0.9998
Slope (b)	0.0264	0.00371
Intercept (a)	-9.3 × 10 ⁻³	1.13 × 10 ⁻³
Standard deviation	0.0041211	0.0019464
Coefficient of variance	1.48850	1.09736

TABLE-2
ANALYSIS OF METADOXIN FORMULATION BY PROPOSED METHODS

Formulations	Label claim (mg)	Amount estimated* (mg)		Recovery* (%)	
		Method A	Method B	Method A	Method B
Tablet 1	500	488.156	489.70	100.14	99.63
Tablet 2	500	489.700	497.93	100.09	99.87

*Values are average of three determinations. Tablet 1 is metadoxil 500 mg from Micro labs, Hosur and tablet 2 is Alcolive 500 mg from Sun pharmaceuticals, Jammu.

In method A, metadoxine exhibited λ_{\max} at 290 nm in distilled water, Method B is based on the structure of metadoxine, the phenolic hydroxyl group in the metadoxine reacts with ferric nitrate to form yellowish orange coloured complex which has an absorbance at 445 nm. Stability of the colour complex was determined by measuring absorbance of the chromogen at specified time intervals and was found to be stable for more than 1 h. These results indicate that the proposed methods are simple, sensitive, accurate and reproducible and can be employed for routine quality control analysis of metadoxine in bulk and dosage forms.

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