Determination of silver content in anticancer drug Miriplatin hydrate by UV spectrum

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Abstract. In order to Determination of silver content in Anticancer Drug Miriplatin Hydrate by UV Spectrum, in the acid condition, TMK solution and the silver ions red complex substance. In the situations above, color depth is positively related to the amount of silver, in c_{Ag+}μg·ml^{-1} good linear relationship, the maximum absorption wavelength is 540nm, the molar absorptive is ε540=5.6×10 ^{3}L·mol^{-1}·cm^{-1},Determination of Miriplatin Hydrate samples can be applied under this condition. The results match the original absorption spectra.

Keywords: UV Spectrum; Miriplatin; silver.

1 Introduction

Miriplatin hydrate is hepatic artery of platinum anticancer drugs, the impurity content of silver in the European pharmacopoeia, the United States pharmacopoeia are strictly controlled. Now there are relevant literature concerning silver control of Miriplatin Hydrate [1-3].

2 Experimental sections

2.1 Instruments and reagents

Instruments: Japan ShimadzuUV2450UV spectroscopy. ZEEnit700 atomic absorption spectrometer.

TMKThiomichler's ketone

Reagent: 1 TMK solution: 1.3 × 10^{-5}M/ml ethanol solution storage in brown bottle, surrounded by black paper in the dark, can be stable for a week 2 silver standard solutions: with high pure silver, liquid concentration is 1mg.ml^{-1},When used with 0.1mol.l^{-1} nitric acid diluted 10μg.ml^{-1}.

2.2 Experimental principles

For The TMK with the silver ions generated red complexes, the color depth is associated with silver ion concentration. Silver ion concentration results can be obtained by colorimetric .In the c_{Ag+} 0 – 10ppm PPM good linear relationship.

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2.3 Experimental methods

Draw a certain amount of 10μg·ml^{-1} standard solution of silver in 25 ml volumetric flask and add 1 ml 0.1 mol·l^{-1}nitric acid, TMK add 1 ml, then add methanol dilution, configured to 1μg·ml^{-1}, 3μg·ml^{-1}, 5μg·ml^{-1}and 7μg·ml^{-1} standard solution, by spectrophotometer, respectively corresponding absorbance value, curette 1 cm, reagent blank absorbance measurement reference. Concentration-absorbance standard curve drawing.

3 Results and discussion

3.1 Silver complex substance absorption spectrum

Results are shown in figure (1), the maximum absorption peaks of Ag - TMK complex in 543 nm, this wavelength as the working wavelength.

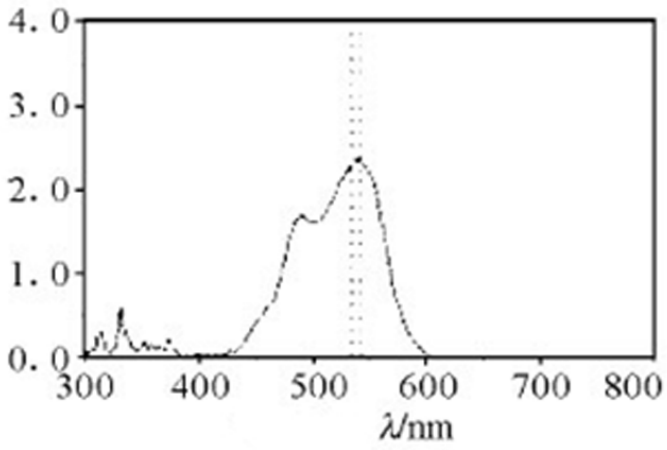

Figure 1. The Ag TMK absorption spectra of the complex substances

3.2 Chromomeric agent selections

For The TMK with the silver ions generated red complexes, the color depth is associated with silver ion concentration. Silver ion concentration results can be obtained by colorimetric .Inc$_{Ag^+}$0 –10μg·ml^{-1} good linear relationship. Specific see figure 2.

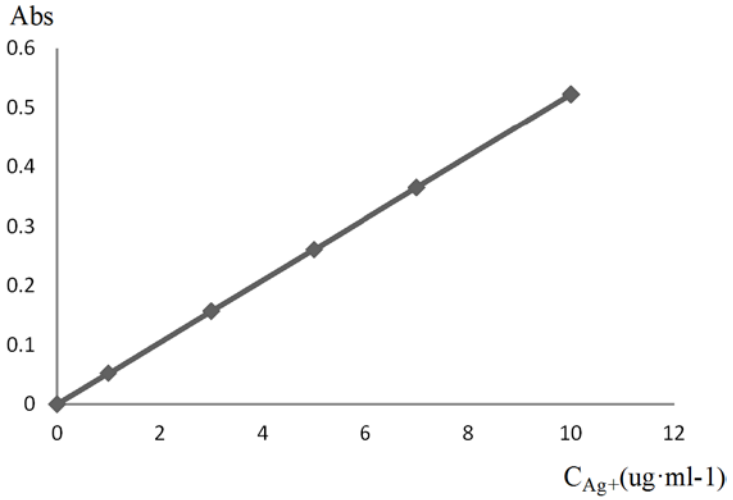

Figure 2. Absorbance and concentration of silver

3.3 Influence of pH

Ag - TMK complex of absorbance in the pH = 3-4 stably, this experiment selects pH3.3.

3.4 The dosage of TMK

When the dosage of TMK is 0.8-1.5 ml, complex substances have stable absorbance. This experiment selects 1 ml volume.

3.5 Standard curves

Experiments show that, the silver content of Bill's law in accordance with c_{Ag+} 0 –10μg·ml^{-1} range (see Figure 2). Calculate the molar absorptive is ε540=×60 ^{3}L·mol^{-1}·cm^{-1}A calibration curve linear regression equation $A=5.6\times10^{3}L\cdot mol^{-1}\cdot cm^{-1}\times C_{Ag}^{+}$

The correlation coefficient: r=0.999

3.6 Stability of chromomeric agent

Ag - TMK complex substances develop color in 5 minute completely, and keep stable in 1 hour. The absorbance decreased gradually then.

3.7 Sample analysis

Blank solution (a), Measure 2.5 mL nitric acid (0.5 mol. L^{-1}) into 250 mL volumetric flask, and add methanol to dissolve. Determination of the steps that take 20mgMiriplatin Hydrate in a25 mL volumetric flask, add Blank solution (a)to dissolve.

After cooling, with the same concentration of dilute nitric acid to the scale, shake. At the same time as reagent blank. Draw a certain volume (silver containing about 1 μ g/ml) placed in a 25 ml volumetric flask, according to standard test method for color and measuring the absorbance.

Detection of drawing: learn and test the same volume of reagent blank solution respectively into 25 ml volumetric flask, adding5.00ppmsilver standard solution, test solution. According to operation. The analysis results:

Table 1. Analytical results of samples of silver

Samples	Atomic Absorption Spectrometric Measured	The actual amount Measured	Adding quantity	The measured total	Recovery rate	RSD%
	/μg. g^{-1}	/μg. g^{-1}	/μg. g^{-1}	/μg. g^{-1}		
1	2.11	2.13	5.00	7.11	100.10	2.60
2	1.03	0.99	5.00	5.94	99.60	2.65
3	3.15	3.10	5.00	8.19	99.80	2.58

The above table shows the results that Miriplatin Hydrate silver contents meet the Europe and the United States Pharmacopoeia standards. This method has been validated in 10 batches and has a pass rate of 100%.

4 Conclusions

Under acidic condition, after silver with TMK solution reaction of Miriplatin Hydrate sample handling in the form a red complex, color depth is related to the silver content, which can be tested by colorimetry. In 0 –10ppm good linear relationship. Determination of Miriplatin Hydrate can be applied to the sample.

References

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