

Bathochromic Shift of UV Absorbance of Diclofenac

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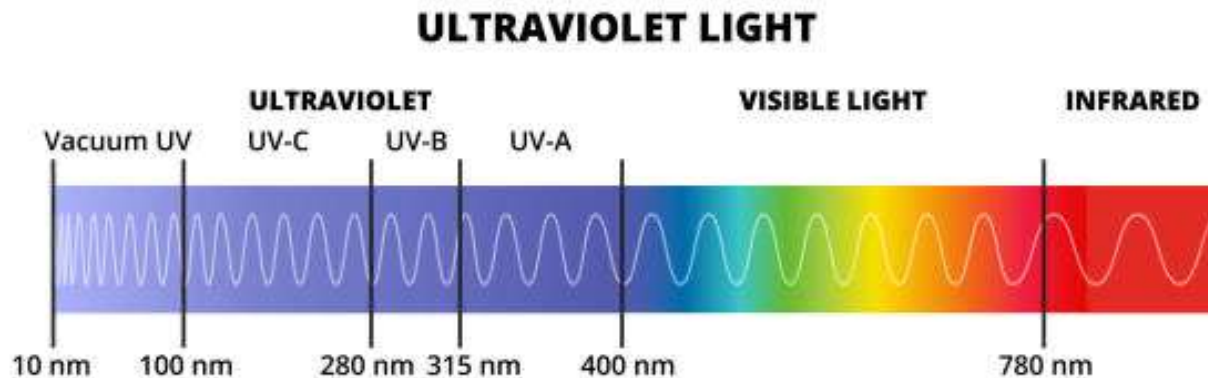


Outlines:

- **Introduction**
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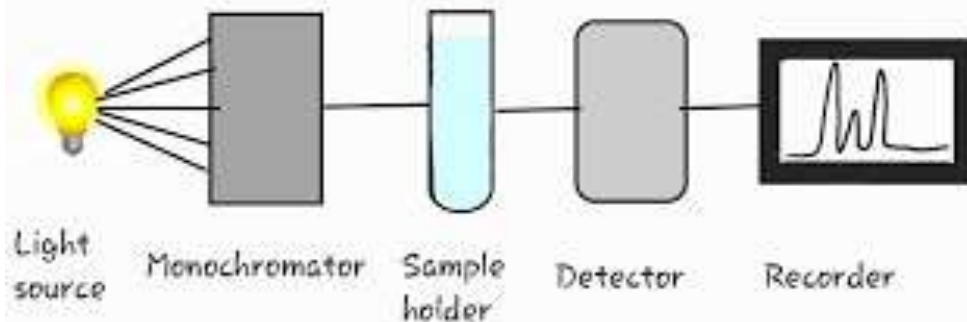
Introduction:

UV absorptions are mainly electronic in nature and are associated with resonating structures in the molecule. UV absorption is an essential tool for qualitative and quantitative determination of a single component drug or isolated extract.

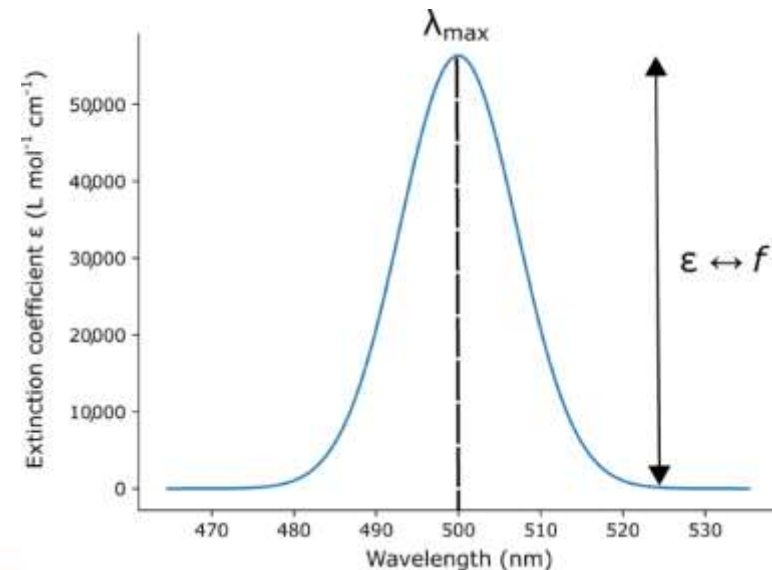


Introduction:

The Principle of UV-Visible Spectroscopy is based on the absorption of ultraviolet light or visible light by chemical compounds, which results in the production of distinct spectra.



Instrumentation



Motivation:

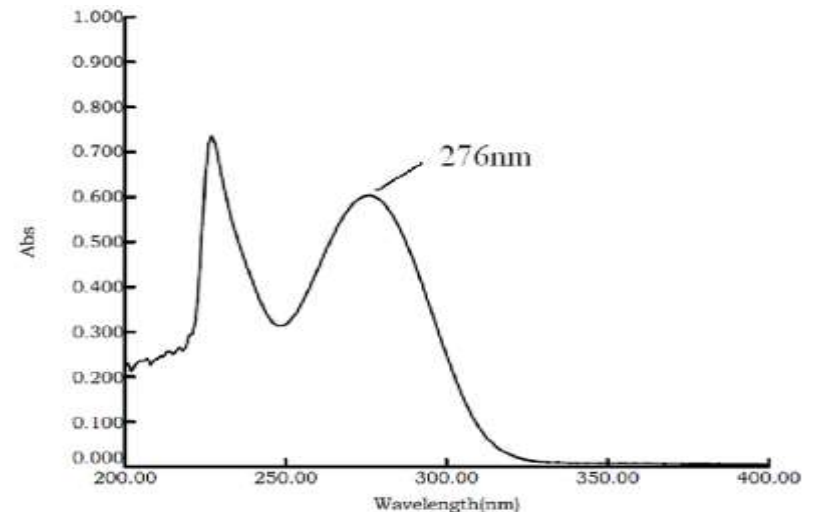
- Some of the UV spectrophotometers available in the Libyan market have limited UV range in which the maximum absorbance of APIs can be measured. This makes it almost impossible to quantitatively detect the API in solution and as a result many dissolution studies might get terminated.
- Shifting the maximum UV absorbance of some APIs could be feasible via complexation.

Objectives:

The aim of this project is to induce a bathochromic shift in the UV absorbance of some APIs with maximum UV absorbance below 300 nm in order to study their dissolution using limited capabilities UV spectrophotometers.

Methodology:

The maximum absorption of diclofenac was reported as 276 nm. This wavelength was used to generate a calibration curve.



Methodology:

The UV Absorbance of diclofenac at the full UV range was measured.

Sample	Concentration mg/mL
1	0.15
2	0.075
3	0.06
4	0.03
5	0.006

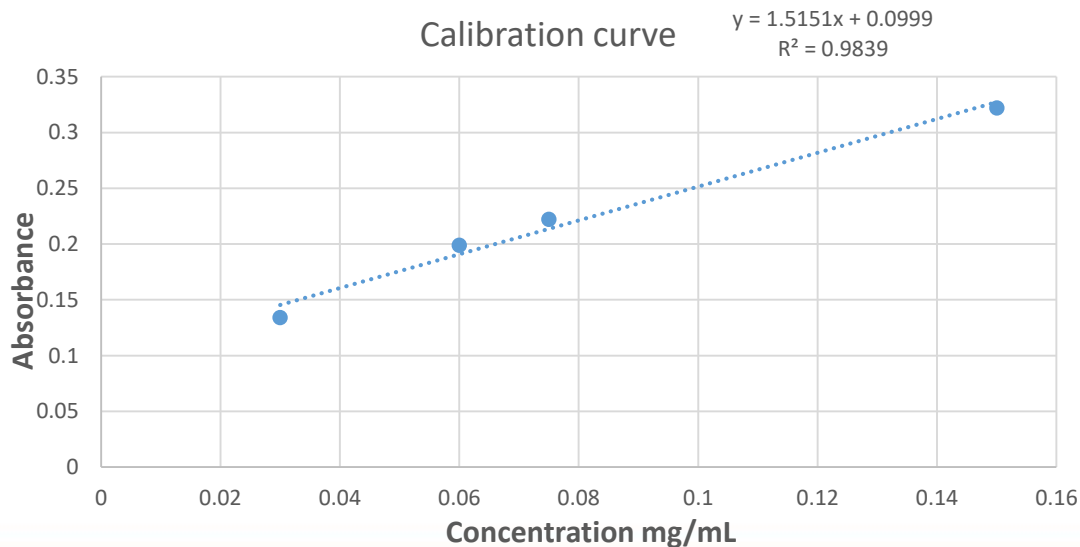
Methodology:

A feasibility study was performed where a complexing agent, Bromocresol green, was added to a solution of diclofenac and the maximum UV absorbance was determined.

Results and Discussions:

Calibration curve is shown below:

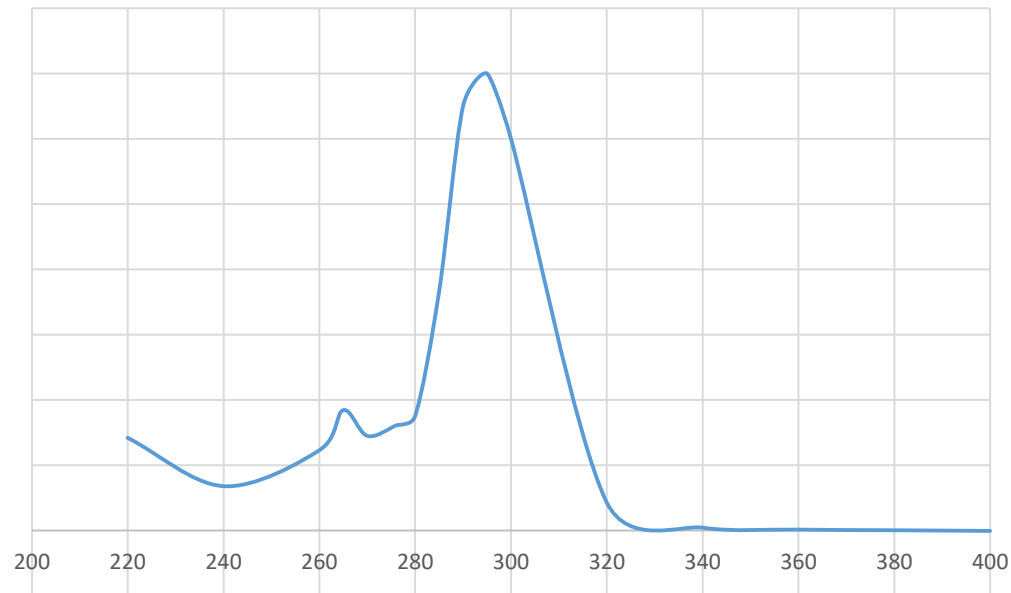
The calibration curve of diclofenac was prepared relatively easily and the measured absorbance was plotted against concentrations of the samples obtained from the serial dilutions of the Diclofenac I.V formulation, as shown in figure



Results and Discussions:

Diclofenac UV absorbance is shown below:

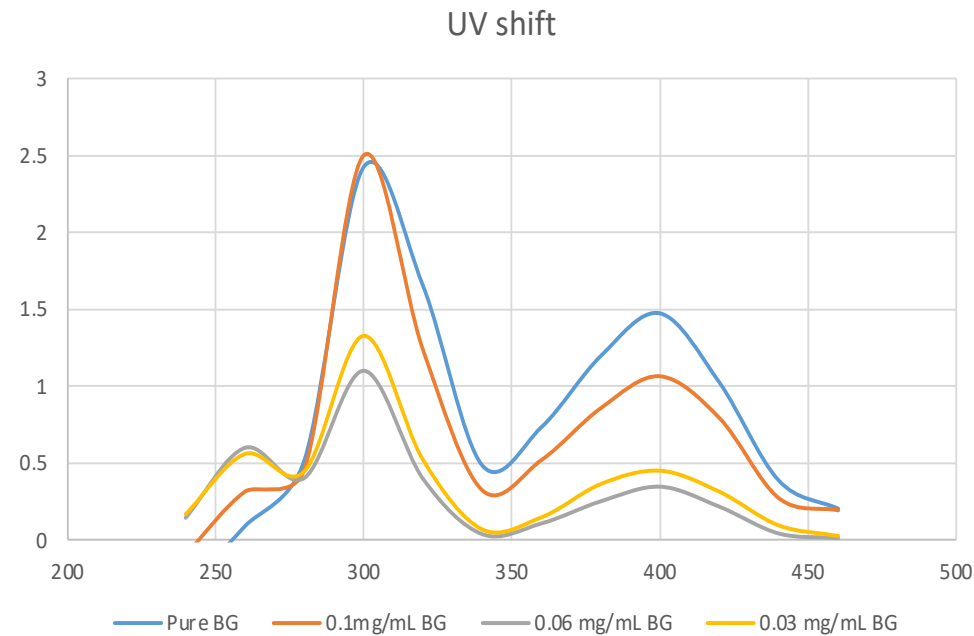
Diclofenac UV absorbance



Results and Discussions:

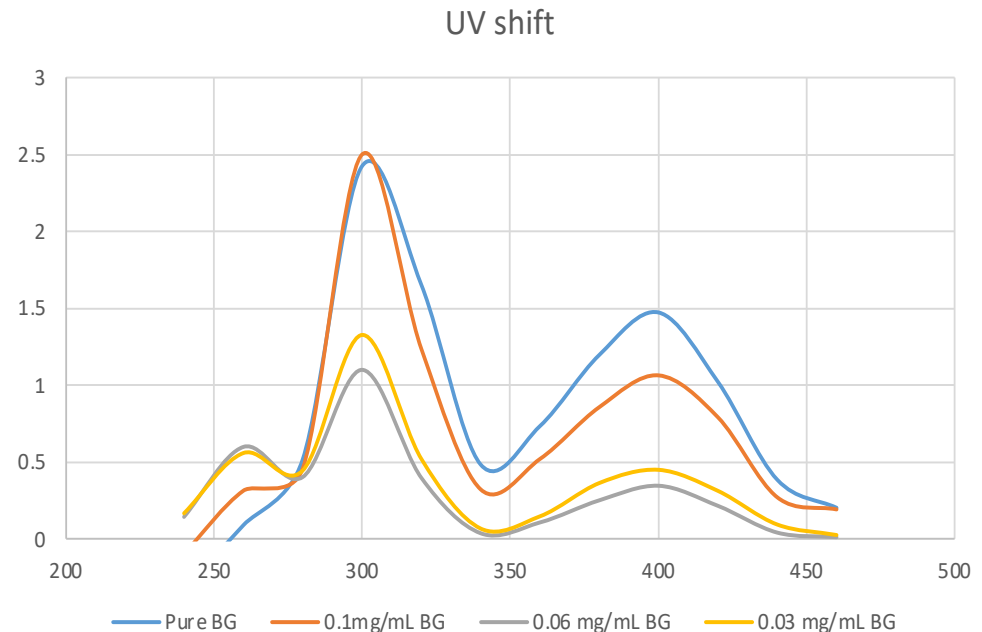
The maximum absorbance scan of the pure Bromocresol green sample and the serial dilutions of diclofenac with the addition of 100 μ L Bromocresol green.

It can be seen that the three diclofenac-BCG samples are overlapped with differences in the intensity of the small peak at ~ 260 nm.



Results and Discussions:

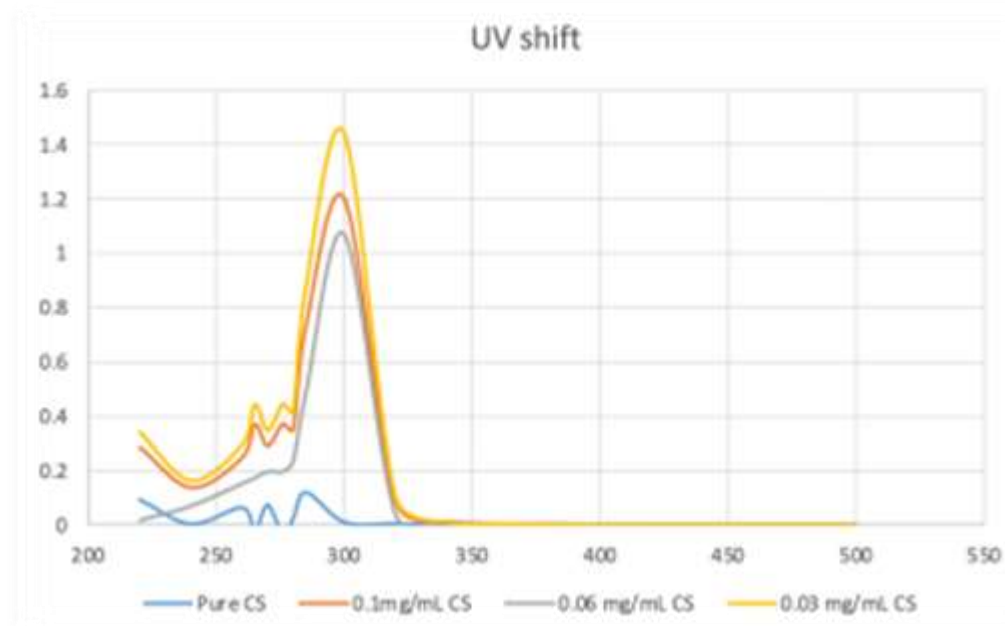
In addition, the maximum absorbance in the BCG spectrum seem to overlap with the diclofenac maximum absorption which probably lead to masking the signal of diclofenac at ~ 295 nm



Results and Discussions:

It can be seen that the three diclofenac-CS samples are overlapped with differences in the intensity of the small peak at low wavelength.

In the figure, there was no shift in the maximum absorption of diclofenac thus copper does not seem to be the best complexing agent for Diclofenac.



Conclusions:

The investigation of the feasibility of complexing two agents, Bromocresol green and Copper sulphate, with diclofenac were carried out in this study.

It has been observed that Bromocresol seems to mask the main signal of Diclofenac at 295 nm while copper sulphate seems to interact with excipients in the I.V formulation of diclofenac.

Thank You