University of Benghazi
Faculty of Education Al marj
Global Libyan Journal

جامعة بنغازي
كلية التربية المرج
المجلة الليبية العالمية

العدد الثالث والثلاثون – 10/ ديسمبر (2017)

Spectrophotometric Determination of Piroxicam in Tablets and Gel forms

*** Nabil bader, ** Nessma .Alshelmani, *** Monia almaghboub**

Chemistry Department, Faculty of Science, University of Benghazi

Spectrophotometric Determination of Piroxicam in Tablets and Gel forms

ABSTRACT

A simple, fast and sensitive spectrophotometric method for the determination of Piroxicam in pharmaceutical formulations. Optimization of measurements conditions and the effect of presence of some common excipients on the absorbance of Piroxicam have been also tested, and real samples of Piroxicam tablets and gel have been analyzed.

Keywords: Spectrophotometric determination, Piroxicam,

تحديد بيروكسيكام بواسطة الطيفية

الملخص :

طريقة طيفية بسيطة وسريعة وحساسة لتحديد بيروكسيكام في المستحضرات الصيدلانية. تم أيضا تحسين ظروف القياسات وتأثير وجود بعض السواغات الشائعة على امتصاص بيروكسيكام، وتم تحليل عينات حقيقية من أقراص بيروكسيكام و الجل .

الكلمات المفتاحية: تحديد الطيفي، بيروكسيكام

INTRODUCTION

Piroxicam is 4 hydoxy-2-methyl-N (2-pyridyl) 2 H- 1,2-benzothiazine-3-carbaxamide-1,1-dioxide, is a potent anti-inflammatory agent and differs radically in chemical structure from all commonly used nonsteroidal anti- inflammatory drugs (NSAID). It is acidic, highly potent. It is used in variety of anti-inflammatory conditions such as rheumatoid arthritis, Osteo-arthritis and gout. Piroxicam has relative low toxicity and longer elimination half life in man compared to other NSAID [Rele; 2010].

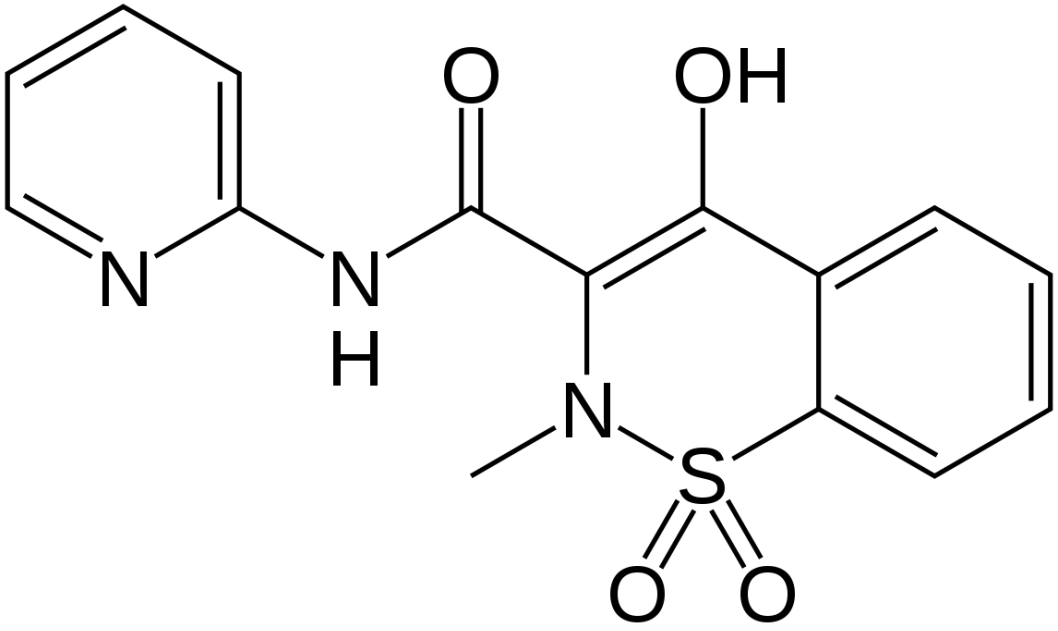


Fig.(1) Structure of Piroxicam

The great use of the drug posed pressure on the chemist to develop analytical analytical methods for the determination of the drug in commercial dosage forms. [United State Pharmacopoeia, 2008] [2] Quantitative determination of the drug is very important in pharmaceutical control and assurance. The drug is been officially reported in United State Pharmacopoeia (USP) [United State Pharmacopoeia, 2008] [i] described the assay by high performance liquid chromatographic method. In British Pharmacopoeia (BP)[British Pharmacopoeia, 2008] the assay of related substances of piroxicam capsules were described by thin layer chromatography method.

Several analytical methods have been reported which are based on high performance thin layer chromatography (HPTLC), [Qualglia M.G., 1989] high performance liquid chromatography (HPLC), [Cao L. Jang S.R., Wan R., 2001]capillary electrophoresis (CE),2 voltammetry,2 spectrophotometry, [Hu X. ,Zhou X.m,1986 & Sastry C.S.P., Rao A.R.M.,PrasadT.N.V.,1987] spectrofluorimetry,2 and Polarography [Charalampopoulos N., Avgoustakis K.,Konloyannis C.G.,2003 & Ma H.L., Xu M.I. Song J.F.,2005]

The main problem associated with these determinations is the laborious cleanup procedure required prior to analysis of piroxicam. The sample preparation of the drug included

enrichment, separation techniques such as liquid-liquid or solid-liquid extraction, co-precipitation, electrodeposition to isolate and pre-concentrate the drug.2

Most of the above listed methods used for determination of piroxicam are expensive and consume time and chemicals, and because of the need for a good quality control system and the lack of the qualified laboratories concerning with this purpose, there is a need for a simple, direct, inexpensive, non-toxic, and accurate method for determination of piroxicam in commercial dosage forms.

Spectrophotometry has the advantages over the other methods because it is easy to use and available in most laboratories in Libya.

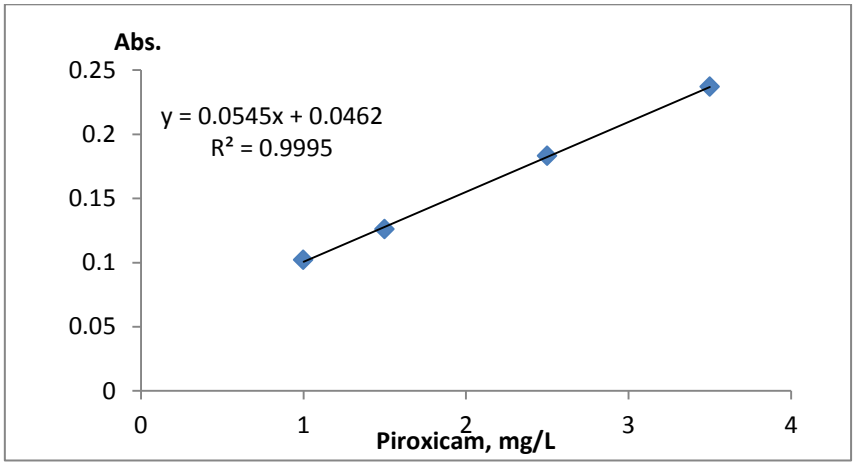
Experimental

All chemicals and reagents used were of analytical grade. CECIL – CE 7400 (Aquarius), UV-Visible spectrophotometer, Double beam with 1 cm matched quartz cuvettes were used for all absorbance measurements.

Results and discussion

Finding lambda max

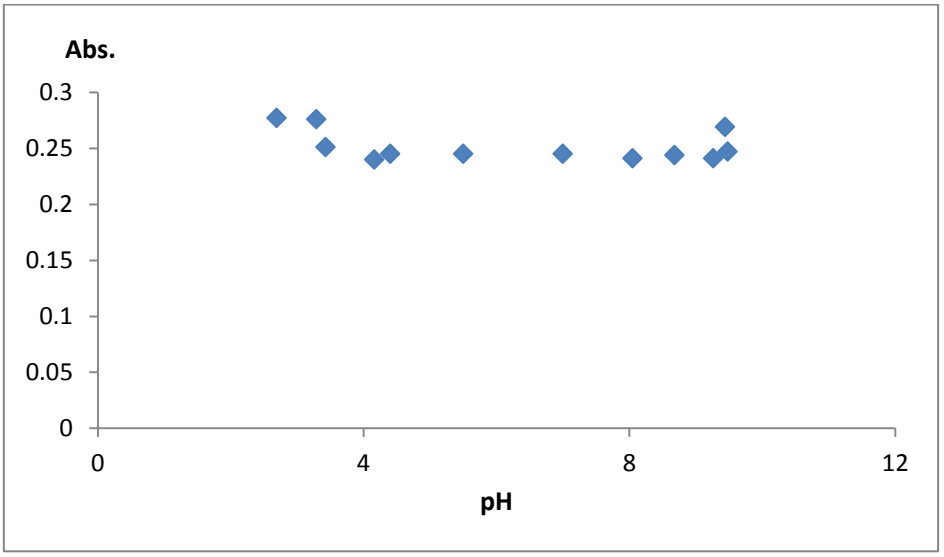
The maximum λ was at 353.5nm.UV spectra were recorded at 353.3 nm for standard solutions of piroxicam with different concentrations in the range of 0–4 μg ml^{-1} (Fig. 2). Linear equation obtained from calibration plot is represented as; ***y= 0.054 x+ 0.046*** with regression coefficient of ***R^2 = 0.999.***



Fig(2): Calibration curve of Piroxicam.

Effect of pH

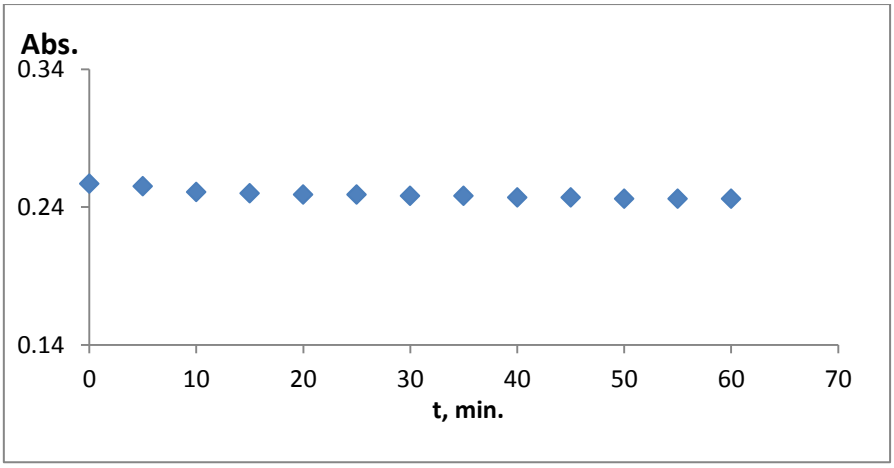
The effect of pH value on the absorbance of Piroxicam is shown in figure (3). There was no significant change in the absorbance of Piroxicam, therefore, no more additions were needed to control the pH.



Fig(3): ***Effect of pH on the absorbance of Piroxicam***

Effect of time

The effect of time value on the absorbance of Piroxicam is shown in figure (4).



Fig(4): ***Effect of time on the absorbance of Piroxicam***

Effect of temperature

It can be seen in Figure (5) that, lower temperature 5°C shows maximum absorbance

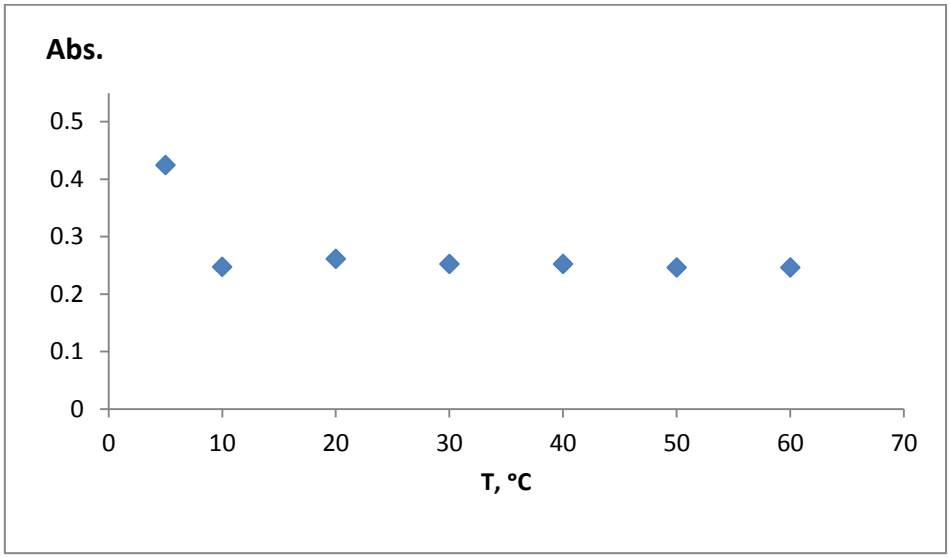


Fig. (5): Effect of temperature on the absorbance of Piroxicam.

The room temperature (20 ± 5°C) was taken as optimum temperature in order to make the process simple by avoiding additional steps.

Effect of presence of some common excipients

The effect of glucose, sucrose, and starch on the absorbance of Piroxicam (2.5ppm) has been studied and the results are shown in figure (6). There are no significant changes observed in the absorbance of Piroxicam solution in the presence of those excipients.

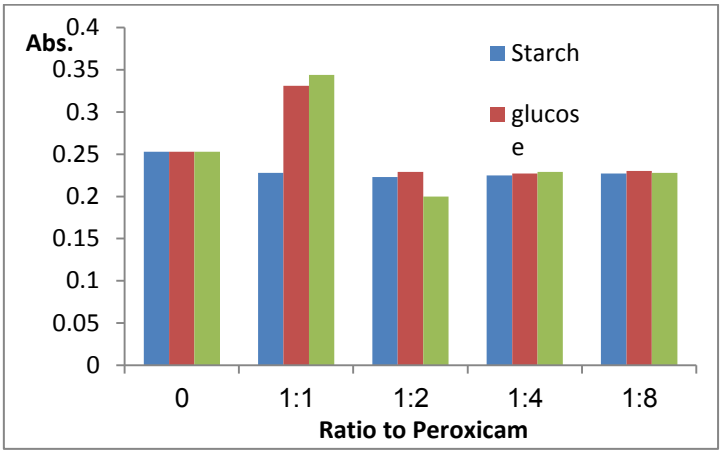


Fig. (6): Effect of presence of some common excipients on the absorbance of Piroxicam.

Determination of Piroxicam in tablet

Three tablets of commercial Piroxicam were dissolved in 100 ml distilled water and measured after the proper dilution in alcoholic medium to be in the linear calibration curve. The amount found was ***26.66±1.25 mg/tablet.*** The amount stated on the package was 20 mg/tablet. The results obtained in distilled water medium was out of the range which may attributed to presence of some additives in the tablets.

Determination of Piroxicam in Gel

Three samples (about 1g each) of commercial Piroxicam Gel were dissolved in 100 ml distilled water and measured after the proper dilution with distilled water to be in the linear calibration curve. The amount found was ***0.433±0.13 g/100g.*** The amount stated on the package was ***0.5 g/100g***.

Conclusion

The method provides a simple and sensitive means of determining the studied Piroxicam in pharmaceutical preparations and water samples. It has also the advantages of acceptable precision. This method is also easier and cheaper to perform than other methods and do not require expensive reagents or organic solvents. Further improvement still required to reach a high accuracy.

References

British Pharmacopoeia, Her Majesty's stationary office, London, 2008 Volume I, II and III.

Cao L. Jang S.R., Wan R., Assay of Piroxicam in injection solution by HPLC, Yaowu Fenxi Zazhi, 2001, 21(1), 47-48.

Charalampopoulos N., Avgoustakis K.,Konloyannis C.G., Differential pulse polorography for monitoring drug release from polymeric nano particles dispersion Anal.Chem. Acta.,2003, 491(1), 57-62.

Hu X. ,Zhou X. : Ultra-violet spectrophotometric determination of Piroxicam, Yaowu Fenxi Zazhi, 1986, 6(1) ,30-31.

Ma H.L., Xu M.I. Song J.F., Polorographic determination of piroxicam, Fenni Shiyanshi, 2005, 24(2), 51-54.

Qualglia M.G., Capitani F. Grande M., Quantitative determination of Piroxicam and it's impurities by HPTLC, Pharm. Acta Helv. 1989,64(3) ,86-89.

Sastry C.S.P., Rao A.R.M., Prasad T.N.V., Spectrophotometric determination of piroxicam with 4 aminoantipyrine and potassium ferricyanide, Indian J. pharm. Sci., 1987, 49(5), 199-200.

Rele R.V., Sawant S.A., Warkar C. B. Simple Spectrophotometric Methods for determination of Piroxicam in Pharmaceutical Formulation, International Journal of ChemTech Research, Vol.2, No.4, pp 2173-2176, Oct-Dec 2010

United State Pharmacopoeia, US Pharmaceutical convention inc. Rockville, Washington DC,USP 31 NF 26, 2008 volume I, II and III .