# Determination of Nimesulide in Suppositories by UV

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**ABSTRACT: OBJECTIVE** To establish a method for determination of Nimesulide in suppositories. **METHODS** Screening different organic solvent to extract 36 type semi-sythetic fatty acid ester in suppositories and determinating Nimesulide by UV. **RESULTS** N-Hexano was used as the solution of extraction. A good linearity was within the concentration range of 3 ~ 15μg/mL with a Borrelation coefficient of 0.9999. The average recovery was 98.3%. The RSD for reproducibility was 0.47%. **CONCLUSION** The method is simple, accurate and reliable.

**KEY WORDS:** Nimesulide Suppositories; UV; Determination

# 紫外分光光度法测定尼美舒利栓中尼美舒利含量

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摘要:目的 建立用紫外分光光度法测定尼美舒利栓中尼美舒利的含量。方法 用不同的有机溶剂萃取尼美舒利栓中的基质,用紫外分光光度法测定尼美舒利的含量。结果 用正己烷作为萃取剂,回收率高(94.4%)。用紫外分光光度法测定尼美舒利栓的含量,标准曲线线性好($r$=0.9999),精密度高(日内 RSD=0.47%)、回收率高(98.3%)。结论 用紫外分光光度法测定尼美舒利栓剂的含量,方法简便、快速、结果准确,可作为尼美舒利含量测定的方法。

关键词:尼美舒利栓;紫外分光光度法;含量测定

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## Introduction

Non-steroidal anti-inflammatory drugs (NSAIDs) are one of the most wildly prescribed drugs. Compared with older generation of NSAIDs, Nimesulide acts through selective inhibition COX-2 and thus with lesser gastrointestinal side effects. Nimesulide (4'Nitro-2'-phenoxymethane sulphomanilide) is a new kind of nonsteroidal anti-inflammatoy drugs (NSAIDs), which can show potent anti-inflammatory, antipyretic and analgesic properties. Nimesulide has been developed by Riker Labs Inc of American and sold in market by Boehringer Biochemia Company of Italy in Oct 1985[1]. In China, it was developed by the Pharmerceutical School of Tongji Medical University and Tianjin Pharmaceutical Research Institute at the same time and has got the second certification from the State Drug Administration. Nimsulide has been prove to be a high-selective, strong effect and safe NASIDs by variety data from different countries which has really anti-febrile effect and has broad anti-inflammation effect, meanwhile, it has good tolerance to the gastro-intestine, liver and kidney[2-4]. Nimesulide has been accepted by the European Pharmacopoeia, Supplement 2001. Nimesulide can show anti-febrile, analgesical and anti-inflammatory effect when administrated from rectum and deduce the first-pass effect and the side-effect which is meaningful and active to the patient who can't administrated from gastric. It's very important to control the quality of Nimesulide suppositories so it can have active effect to be used on patient. The aim of this paper is to set up the method to determine the content of Nimesulide from suppositories by Ultraviolet spectrophotometry, which could also be used for routine analysis. This paper describes a simple, economic, rapid and stability indicating UV method for the estimation of Nimesulide from suppositories.

**Fig 1** Structure of Nimesulide

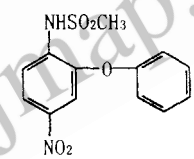


图 1 尼美舒利的化学结构式

## Materials and Methods

### Equipment

UV detector of Shimadzu(Kyoto, Japan), Banlance (German)

### Reagents

Nimesulide: Batch Date was 2001128 (provided by Dalian Guangcai Pharmaceutical Company). Nimesulide standard: the purety was 99.5%. Other chemicals were of analytical-reagent grade.

### Preparation

**Prescription (1000 grains)** Nimesulide: 100 g. 36 type semi-synthestical fatty acid glycerin ester: 1400g.

**Preparation of Nimesulide suppositories** Screen Nimesulide

raw material by 80 mesh sieve after skiving. Weigh 36 type semi-synthestical fatty acid glycerin ester and put them in the 36℃ water bath. Weigh Nimesulide and put them slowly into the melted 36 type semi-synthestical fatty acid glycerin ester and mix uniformly and then put the mixture into the suppository mould. Take the suppositories out after the suppository mould comes cool.

**Results**

**Selection of the wavelength**

Weigh Nimesulide standard exactly and confected it by 0.05 mol/L NaOH solution into 15.0μg/mL as Nimesulide standard solution. Scan the Nimesulide standard solution between UV 200 ~550nm wavelengths and Nimesulide has the max absorption at 392nm.

**Extraction of drug from base**

The blank base was dissolve with the same method and scanned between 200 ~550nm wavelengths. But the base showed the absorption which cannot be neglected (Fig 2). Therefore, different organic solutions used to eliminate the interference of the base.

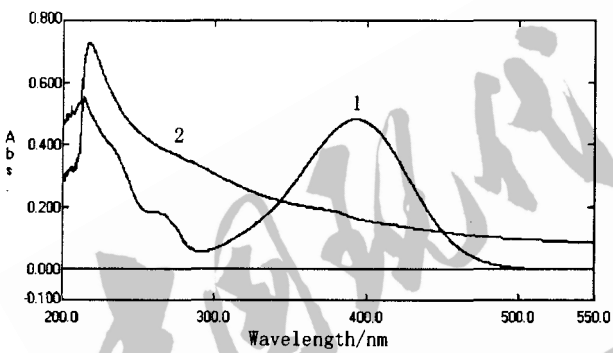


**Fig 2** UV-Vis scaning curve

图 **2** 尼美舒利及辅料紫外 -可见扫描曲线

1. Nimesulide; 2. Base

1.尼美舒利; 2.基质

**Selecting of the organic solutions**

Different organic solutions have been used to eliminate the interference of the base to Nimesulide content determination: Chloroform, Acetal, Normax hexane, Cyclo nexane, Ligroin, Methanol, Ethanol, Acetone, Aether, Bezene and Toluene. The above solutions have been used to exact Nimesulide from the suppositories. Nimeselide can solve in Ethyl acetate, Methanol, Ethanol, Acetone and it is impossible to eliminate the interference of the base. Chloroform, Bezene and Toluene are poisonous. Aether has volitilaty. So we select the Normax hexane as the organic solution to exact the drug from the suppositories. The results are in Table 1. and Fig 3.

**Clibration curve**

Weigh Nimesulide standard exactly which has been dried to invariable weight and confect it by 0.05 mol/L NaOH into a

**Tab 1** Selection of the organic solutions

表 **1** 有机溶剂的选择

| Organic soluitions | A | C/(μg/mL) | Recovery/% |
|---|---|---|---|
| Chloroform | 0.431 | 9.3565 | 93.38 |
| Ethyl acetate | -0.001 | -0.0533 | 0 |
| Normax hexane | 0.436 | 9.4731 | 94.40 |
| Ligroin | 0.423 | 9.1892 | 91.85 |
| Methanol | 5.000 | 109.000 | 108.8 |
| Ethanol | 4.758 | 103.724 | 103.4 |
| Acetone | 5.000 | 109.000 | 108.7 |
| Aether | 0.430 | 9.3436 | 93.20 |
| Aether | 0.378 | 8.1998 | 81.83 |
| Toluene | 0.407 | 8.8366 | 88.23 |

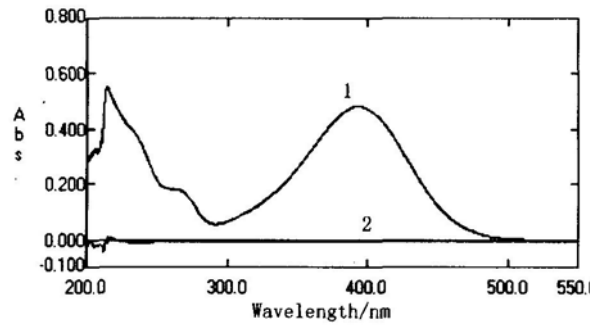


**Fig 3** The interference of the base has been eliminated by Normax hexane

图 **3** 正己烷消除基质的干扰

1. Nimesulide; 2. Base

1.尼美舒利; 2.基质

series of Nimesulide standard solutions which contain Nimesulide 3.0, 6.0, 9.0, 12.0, 15.0μg/mL respectively. 0.05mol/L NaOH solution were used as blank solution and determined the absorption at 392nm by UV Spectrophotomentry. The calibration curve showed good linearity over the range of 3-15μg/mL and the calibration curve was $C = 22.04A + 0.0277$ ($r = 0.9999$)

**Accuracy studies**

The above serious standard solutions had been used to determine the absorption at 0, 1, 4, 6.8, 12 hour respectively and results showed that the samples were stable within 24 hours and RSD <1.0%.

**Recovery studies**

As an additional check on the accuracy and precision of the method, recovery experiments were carried out. The results were in Table 2.

**Tab 2** The recovery of Nimesulide

表 **2** 尼美舒利的回收率

| Nimesuloide /mg | Determined /mg | Recovery /% | Average recovery /% | RSD /% |
|---|---|---|---|---|
| 4.99 | 4.92 | 98.50 | | |
| 10.05 | 9.64 | 95.91 | | |
| 15.01 | 14.72 | 98.07 | 98.30 | 1.57 |
| 20.02 | 19.59 | 97.85 | | |
| 25.02 | 24.70 | 98.74 | | |
| 30.00 | 30.21 | 100.7 | | |

**Content determination of Nimesulide Suppositories**

Weigh Nimesulide suppositories which contains Nimesulide about 10mg and put them into the tap funnel. Solve the suppositories with 15mL 0.05mol/L NaOH solution and add 20, 15, 10 mL Normax hexane into the tap funnul respectively. Let the NaOH solution flow into a 100 mL volumetric flask and volume and mix with 0.05mol/L NaOH solution. Determined the absorption at 392nm. The content were 100.0%, 100.5% and 98.5% respectively.

**Discussion**

The structure of Nimesulide(4'Nitro-2'-phenoxymethane sulphomanilide) contains phenyl, which has non-saturated double bonds. Therefore, it is possible to determine the content of Nimesulide by using UV spectrophotometry.

The traditional method had been applied to determine Nimesulide content, that is the base of the suppositories is dissolved in high temperature and coagulated in low temperature. Heat up the suppositories and then add 0.05mol/L NaOH solution to the melted supposities. Filter the mixture and repeat the above steps till the drug has been exacted completely. Nevertheless, the traditional method can not eliminate the interference of the base because the base has also absorption at 390nm. Therefore, different organic solutions have been screened to exact Nimesulide from suppositories and the results show Normax hexane is a good solution. The pKa of Nimesulide is 6.5, so the 0.05mol/L NaOH solution has been applied to resolve Nimesulide.

The ingredient of the Nimesulide suppositories is simple so the UV spectrophotometry has been applied to determinate the content of the drug. The proposed method is simple, rapid, sensitive, economic and stability indicating for estimation of Nimesulide from suppository form.

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