

# ANALYSIS OF SODIUM DICLOFENAC In HERBAL MEDICINE FOR PAIN In THE CITY OF BANJARBARU USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

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## ABSTRACT

Jamu is a traditional medicine made from natural ingredients that has been passed down from generation to generation for health. Where people in Indonesia, including the city of Banjarbaru prefer to use this traditional medicine compared to using chemical drugs because it is considered safer and does not cause side effects when used accurately and correctly compared to chemical drugs. Medicinal Chemicals Diclofenac sodium is often added to herbal medicine for aches and pains by irresponsible people intended to make a faster effect when consuming herbal aches and pains. This study aims to identify the content of chemical drugs using High Performance Liquid Chromatography (HPLC) method. The results of the tests carried out using HPLC showed 3 samples of 6 samples tested positive for the drug chemical sodium diclofenac, with a concentration of sample 1 of 1.558 mg, sample 2 of 5.448 mg and sample 3 of 2.086 mg.

**Keyword :** Jamu, Drug Chemicals, High Performance Liquid Chromatography (HPLC), sodium Diclofenac

## 1. Introduction

Jamu is a traditional medicine made from natural ingredients that have been used from generation to generation for health. The definition of herbal medicine in the Regulation of the Minister of Health No. 003/Menkes/Per/I/2010 is an ingredient and or ingredients in the form of plants, animals, minerals, preparations of sarian (galenic), or a mixture of these materials that have been used for generations for treatment. can also be applied in accordance with the norms prevailing in society.

The ingredients for traditional medicines must not contain synthetic medicinal ingredients that have medicinal, narcotic and psychotropic properties and other materials that can endanger health (Depkes RI, 2012).

Currently, there are still some traditional medicinal products that are added with medicinal chemicals (BKO). The application of BKO in traditional herbal medicine can be used as a selling point for producers. This is possible due to the lack of knowledge of producers about the dangers of consuming medicinal chemicals in an uncontrolled manner, both in dosage and how to use them. In addition, manufacturers

add BKO only to increase sales because consumers like traditional medicinal products that react quickly to the body (Angga Tiya W.S., 2010).

One of the medicinal chemicals that is often used in herbal medicine for aches and pains is diclofenac sodium. The Banjarmasin Center for Drug and Food Control (BPOM) together with the South Kalimantan Police managed to confiscate dozens of koli of illegal traditional medicines and list G drugs in the Banjar Regency area. Thousands of traditional medicines without distribution permits as well as List G drugs whose licenses have been withdrawn from the market were secured in operations carried out from March 10-12 2018, the Head of Inspection and Investigation of the POM Center in Banjarmasin revealed, the number of items seized, namely illegal traditional medicines as many as 66,151 pcs such as tamarind and muscle aches honey, chang san herbal medicine, africa black ant herbal medicine and 831,905 pcs list G drugs. Consuming illegal herbs and hard drugs listed on the G list can later cause shortness of breath, heart palpitations, cause moon faces, and damage organs, especially the kidneys.

## **2. Material and Method**

### **a. Research Sites**

The research was conducted at the Pharmaceutical Technology Laboratory, Sari Mulia University, Banjarmasin, which is located at Jl. Pramuka No. 2 Banjarmasin.

### **b. Research Times**

The research is planned to be carried out in November 2020 to August 2021.

### **c. Research Target**

The target of this research is the drug chemical Sodium diclofenac in herbal pain relief which was detected by High Performance Liquid Chromatography (HPLC).

### **d. Research Methods**

This type of research is analytic observational. Descriptive research is a research method by describing and interpreting something, for example existing conditions or relationships, developing opinions, ongoing processes, consequences or effects that occur, or about ongoing trends is cross sectional, where the researcher conducts the research subject by observing and measuring the status of the character or variable of the subject at the time of examination. So it was observed at the same time.

e. Population and Sample

The population used in this study is herbal medicine for aches and pains circulating in the city of Banjarbaru. The sampling technique in this research is purposive sampling. Samples were taken from 2 different types of herbal medicine sample dosage forms in Banjarbaru city. The sample criteria in this study were inclusion criteria, namely herbal medicine that had a license and did not have a BPOM distribution permit, obtained from licensed drug stores and herbal medicine traders on the street and exclusion criteria, namely samples located outside the city of Banjarbaru.

f. Instrument

1. Tool

The tools used were a set of HPLC (® Shimadzu), 100 L micro syringe, analytical balance, measuring flask, volume pipette, Erlenmeyer, horn spoon, spatula, parchment paper, measuring cup, beaker, stirring rod, funnel, drop pipette.

2. Ingredients

Samples (jamu pegal linu) were six brands (three brands in the form of powder dosage forms and three other brands in the form of capsules), sodium diclofenac standard, methanol mobile phase pa: Acetate Buffer 4.2 (70: 30), stationary phase (silica plate) gel GF 25), Aquabidest, 0.45 m membrane filter, filter paper, Aquadest.

g. Work Procedure

1. Creation of the mobile phase

Methanol mixture: Acetate Buffer 4.2 (70: 30), vortexed, filtered through a sieve with a porosity of 0.45 m or finer.

2. Preparation of diclofenac sodium standard

Diclofenac sodium was carefully weighed as much as 100 mg and then put in a 100 mL volumetric flask, then dissolved with aquabidest and diluted quantitatively to the mark line so that a solution with a concentration of 1000 g/mL from the solution was pipetted as much as 1 mL and then put in a 10 mL volumetric flask. quantitatively diluted with aquadest to the mark line, in order to obtain a solution with a concentration of 100 g/mL then filtered through a 0.45 m filter.

### 3. Qualitative determination of diclofenac sodium

The standard diclofenac sodium and herbal medicine samples, with a concentration of 2 g/mL were injected into HPLC with a volume of 100 L each. The peaks indicated were observed and the retention time recorded.

### 4. Quantitative determination of diclofenac sodium

From the standard solution the concentration of 100 g/mL was pipetted as much as 0.05; 0.1 ; 0.2 ; 0.4 mL. Each was put in a 10 mL volumetric flask and then stirred with Aquabidest until the marking line, in order to obtain a solution with a concentration of 0.5; 1 ; 2 and 4 g/mL. Then each concentration was injected into the HPLC with a volume of 20 L at a wavelength of 273 nm with a mobile phase flow rate of 1.2 mL/minute (Asmiyenti, 2020), then recorded the peak area shown on the chromatogram and made standard curves and regression equations. linear. Carefully weighed a total of 5 g of herbal medicine samples, put into a 25 mL volumetric flask, dissolved in Aquabidest to the mark line. 1 mL of this solution was pipetted into a 10 mL volumetric flask diluted with aquabidest to the mark line. Take 2 mL of the solution and put it in a 10 mL volumetric flask, diluted to the mark with Aquabidest. Filtered through a filter with Millex Gs (0.45 m porosity). The solution was injected into HPLC at a wavelength of 273 nm with a flow rate of 1.2 mL/min with an injection volume of 100 L.

## 3. Results and Discussion

Research on the chemical drug Natrum diclofenac uses two types of sample dosage forms for aches and pains, namely powder and capsules where each dosage form consists of three brands of herbal medicine circulating in the city of Banjarbaru using qualitative and quantitative analysis with the High Performance Liquid Chromatography (HPLC) method. This study was conducted to determine whether there is a drug chemical content sodium diclofenac and to see the effect of differences in the type of dosage form of herbal medicine for aches and pains on the chemical content of the drug sodium diclofenac circulating in the city of Banjarbaru.

At the time of sampling the herbal pain relief in the city of Banjarbaru, two types of herbal medicine dosage forms were taken, namely, powder dosage forms and capsule dosage forms where the samples taken were the samples that were frequently sold and consumed by consumers. The reason for using these two dosage forms is

because other dosage forms, such as pill forms and direct-drink steeping preparations, are very rare and almost impossible to find at the time of sampling. In addition, the basis for selecting a sample of herbal aches and pains taken is by taking the sample that is most sold and consumed by the public.

The results of the identification using High Performance Liquid Chromatography (HPLC) using UV light with a wavelength of 273 nm and a mobile phase flow of 1.2 mL/minute. (Asmiyenti, 2020).

This test begins with the preparation of a standard solution of diclofenac sodium with concentrations of 0.5 ppm, 1 ppm, 2 ppm and 4 ppm which is then injected into the HPLC and the results obtained are diclofenac sodium area of 0.5 ppm with an area of 156513; 1 ppm with an area of 289224; 2 ppm with an area of 455204 and 4 ppm with an area of 745995. Then it is entered into the equation  $y = bx + a$  and the results are a value of 105508, b of 163320 and r of 0.994 and testing was carried out on samples of herbal aches and pains as many as 6 brands where consists of 3 brands in the form of powder preparations and 3 other brands in the form of capsules.

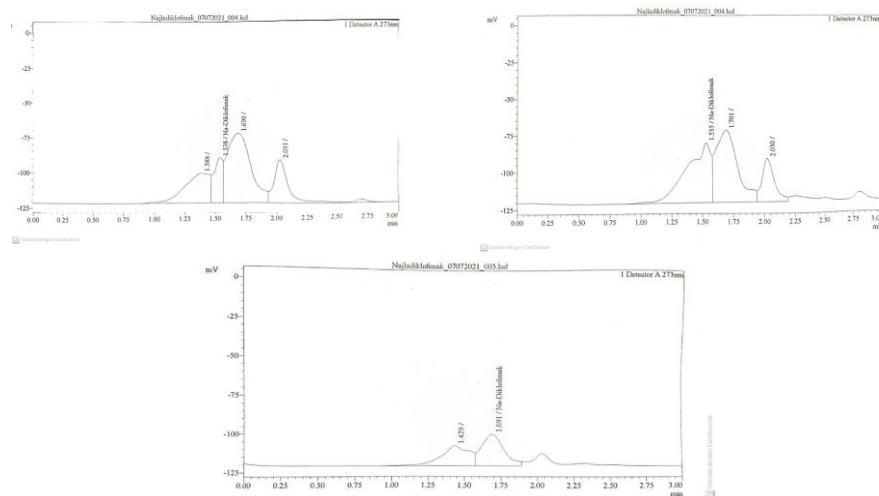


Figure 1. Chromatogram of samples 1, 2 and 3

The results of the test of 6 samples of the aches and pains herbal medicine, it was found that the 3 samples of aches and pains tested were positive for the drug chemical compound sodium diclofenac and the 3 samples used were all from powder preparations. Meanwhile, 3 samples of herbal aches and pains from capsule preparations showed negative results. On the chromatogram of the sample test results obtained.

Table 1. Diclofenac sodium sample test results

Sample	Retention Time (Minute)	Area
1	1,538	160327

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2	1,535	560823
3	1,691	214770
4	0	0
5	0	0
6	0	0

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From the results described above, it was found that the area of the six samples, namely, the largest area of diclofenac sodium was obtained from sample 2, which was 560823 with a concentration of 5.448 mg/g of diclofenac sodium, followed by an area of sample 3 of 214770 with a concentration of 2,086 sodium diclofenac. mg/g and sample 1 with an area of 160327 and diclofenac sodium concentration of 1.558 mg/g. Judging from the results obtained, the negative form of the capsule preparation results can be caused by packaging factors, namely the seal on the good packaging and also sampling at the Banjarbaru city pharmacy which can guarantee the authenticity of the product and is difficult to obtain at shops or stalls selling herbal medicine. on the outskirts of the city of Banjarbaru. Meanwhile, for the type of pain relief powder itself, it is very easy to obtain and also the price is more affordable by the public compared to other types of herbal aches and pains. From this result, of course it violates the Regulation of the Minister of Health of the Republic of Indonesia Article 7 paragraph 1 No. 007 of 2012 that traditional medicine may not contain medicinal chemicals.

#### 4. Conclusion

The results of the Research on Medicinal Chemicals (BKO) Sodium diclofenac in 6 samples of herbal aches and pains circulating in Banjarbaru City showed that samples 1, 2 and 3 were positive powder preparations containing diclofenac sodium with levels of 1.558 for sample 1, levels of 5.448 for sample 2 and 2,086 for sample 3.

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#### Declaration of Interest Statement

The authors declare that they have no conflict of interests.

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