

## **Identification of Sibutramine Hydrochloride Compounds in Slimming Herbal Medicine**

Siti Nurintan Fakhriah<sup>1\*</sup>, Rahmadani<sup>1</sup>, Dede Mahdiyah<sup>1</sup>

<sup>1</sup>*Sari Mulia University, Banjarmasin, Indonesia*

*stntanf@gmail.com*

---

**Keywords:** Slimming herbs, Sibutramine HCl, TLC, UV-Vis Spectrophotometry

### **ABSTRACT**

Dissatisfaction with the current body causes women to try to change their appearance by losing weight quickly which results in switching to slimming herbal products that can be trusted to lose weight instantly. With the current progress in the circulation of slimming herbal products, medicinal chemicals (BKO) are added. Slimming herbal products are prohibited from containing medicinal chemicals. Sibutramine Hydrochloride is one of the BKO's found in slimming herbs because Sibutramine HCl is a hard drug that works by inhibiting norepinephrine, serotonin and dopamine, which can suppress appetite so it can be used to lose weight. The study was conducted to identify the compound Sibutramine Hydrochloride in slimming herbs circulating in Tanah Grogot. The method used is pre-experimental with one shot case study. Sampling was done by purposive sampling technique. The sample from the study was 10 slimming herbs circulating in Tanah Grogot. The results of the TLC method identified 10 samples, only 1 sample was positive for Sibutramine HCl because it had the same R<sub>f</sub> value as the comparison standard, which was 0.95. The UV-Vis Spectrophotometry method obtained the sample results showing the levels of Sibutramine HCl exceeding the dose of 15mg with the sample content containing % Sibutramine HCl content, namely S4 0.59%. The results of this study are that there are slimming herbs with a BPOM permit that contain the medicinal chemical Sibutramine HCl.

---

### **INTRODUCTION**

Being overweight is a problem in one's appearance, especially among women. Everyone wants to have a healthy, slim and ideal body. Dissatisfaction with the current body causes women to try to change their appearance by losing weight quickly which results in switching to various slimming products which are believed to be able to lose weight instantly without side effects such as consuming (Jamu) derived from traditional medicine. Based on the results of a preliminary study of data collection conducted by researchers in the city of Tanah Grogot, it showed that as much as 69% of the population consumed slimming herbs, and as much as 75.9% knew of slimming herbal products, residents who had consumed slimming herbs felt the benefits as much as 55.2% there in all age groups, male and female. Of the 69% of the population who had consumed slimming herbs in the Tanah Grogot area, they did not know whether the products they consumed were safe or could contain medicinal chemicals.

Based on the traditional medicine public warning circulated by the Food and Drug Supervisory Agency (BPOM) on October 13 2021, it was found that traditional medicinal products containing medicinal chemicals (BKO) were circulating, BPOM found 53 traditional medicinal products containing hazardous ingredients and one of them was the presence of the drug content of sibutramine HCl in slimming herbal products. BPOM prohibits herbal products with the addition of medicinal chemicals, both isolated and synthetic chemicals with medicinal, narcotic and psychotropic properties [1].

According to the World Health Organization (WHO) and the US Food and Drug Administration (FDA), 30 traditional medicines circulating in ASEAN countries, Australia and the United States were found to contain positive medicinal chemicals (BKO). In 2010 America and most countries in the world including Indonesia have withdrawn products containing sibutramine hydrochloride because 16% have experienced an increased risk of heart attack, stroke and death[2].

Sibutramine Hydrochloride which is one of the drugs used for weight loss. Sibutramine belongs to a class of drugs that work by inhibiting norepinephrine, serotonin and dopamine. Through these inhibitors it will

reduce appetite so that it can be used for weight loss [3]. So manufacturers often add it to the preparation of slimming herbal products.

In the results of previous studies in the Curug sub-district, UV spectrophotometry on slimming herbal samples stated that all positive samples contained sibutramine hydrochloride at a level of 2.5% from every 0.2 gram sample (Sylvia et al., 2018). Subsequent research conducted in the city of Manado using Thin Layer Chromatography (TLC) on slimming herbal samples stated that 10 positive samples contained sibutramine hydrochloride in samples A, B, C, D, E, F, G, H, I, J of 8.124 g/ml, 12,790 g/ml, 9,479 g/ml, 19,52 g/ml, 10,613 g/ml, 15,461 g/ml, 18,444 g/ml, and 9,265 g/ml. (Wisnu et al., 2017). Subsequent research was conducted in the city of Banjarmasin using Thin Layer Chromatography (TLC) on slimming herbal samples that out of 10 samples there were 6 samples containing 30% sibutramine hydrochloride [4].

Based on the description above, the researcher is interested in identifying some of the slimming herbs circulating in the city of Tanah Grogot. With the aim of knowing the content and levels of Sibutramine Hydrochloride in slimming herbal products circulating in Tanah Grogot. Researchers conducted tests using the TLC method and UV spectrophotometry.

## **MATERIALS AND METHODS**

### **Materials**

The tools used include glassware, Uv-vis spectrophotometer, micropipette, analytical balance, volumetric flask, volume pipette, horn spoon, parchment paper, stir bar, funnel, pipette, filter paper.

The ingredients used include (slimming herbs) as many as ten packs of different brands in the form of powder preparations, tablets, other brands in the form of pills, Sibutramin HCl, methanol (pa), aqua bidestilata (pa), n-hexane (pa), acetone (pa), chloroform (pa).

### **Methods**

The method used was pre-experimental with a one shot case study design. This research was conducted at the Chemistry Laboratory of Sari Mulia University, Banjarmasin.

### **Sampling**

The population used in this study were slimming herbs circulating in Tanah Grogot. The samples used in this study were 10 brands of herbal slimming products using the purposive sampling technique. This sampling was in accordance with the inclusion and exclusion criteria that had been determined by the researchers.

## **Qualitative Test With Thin Layer Chromatography**

### **1. Preparation of Qualitative Standard Solutions**

The solution was made containing 500 ppm of sibutramine hydrochloride and weighing 5 mg of hydrochloride was put into a 10 ml measuring flask, dissolved and then diluted with methanol to the mark, then a 50 ppm solution was made by taking 1 ml of the 500 ppm mother liquor, then transferred to a flask. measure 10 ml then dilute it to the mark [5].

### **2. Thin Layer Chromatography Sample Preparation**

Samples that were still in the form of pills were mashed and then the sample was weighed 1 g, put into a test tube dissolved in 5 ml of methanol, shaken for 30 minutes, then filtered. The filtrate was put in a 10 ml measuring flask and methanol was added. The TLC plate was spotted with standard and sample with the mobile phase Acetone:Chloroform:N-Hexa [5].

## Quantitative Test with UV-Vis Spectrophotometry

### 1. Preparation of Quantitative Standard Solutions

The solution was made containing 1000 ppm of Sibutramine Hydrochloride with 10 mg of Sibutramine Hydrochloride and put into a 10 ml measuring flask, dissolved and then diluted with aqua bidestilata to the mark [5]

### 2. Wavelength Determination

Determination of the maximum wavelength from a standard solution of 1000 ppm and entered into a spectrophotometer to find the maximum in the wavelength range of 200-400nm [5].

### 3. Making a Standard Curve

From a 100ppm standard solution, a series of concentrations of 5 ppm: 7ppm: 10ppm: 20ppm and 25ppm was then read on a uv-vis spectrophotometer with the maximum wavelength, then tripled between the concentration of sibutramine hydrochloride and its absorbance, an equation for a linear regression line was obtained [3].

### 4. Preparation of Test Solutions

The sample is weighed 200mg. Put it in a 25 ml measuring flask, add distilled water, shake for 30 minutes and then filter it. Dilution is taken 1 ml in 10 ml measuring flask with distilled water. Then read at the maximum wavelength with UV spectrophotometry [3].

## DATA ANALYSIS

The analysis in this study using Univariate analysis aims to describe and see the levels of each study, namely measuring the levels of sibutramine hydrochloride in samples whose absorbance has been measured at the maximum wavelength.

## RESULTS AND DISCUSSION

### Qualitative Analysis

#### Qualitative Test Using Thin Layer Chromatography (TLC) Method

The results of the analysis in the qualitative test using the TLC method with the reference standard Sibutramin HCl for 10 samples of slimming herbs using the stationary phase GF254 because Sibutramin HCl is colorless, it is expected that the silica gel will fluoresce well at a wavelength of 254nm.

**Table 1:** Qualitative Test Results with the TLC Method

Baku Pemandang dan Sampel	Warna	Tinggi bercak	Jarak rambat	Nilai Rf	Hasil
BP	Bening	5,7	6	0,95	-
S1	Hijau pekat	5	6	0,83	-
S2	Merah	5,5	6	0,92	-
S3	Hijau	5,5	6	0,92	-
S4	Hijau gelap	5,7	6	0,95	+
S5	Kuning muda	5,5	6	0,92	-
S6	Kuning	5,3	6	0,88	-
S7	Oren	5,5	6	0,92	-

S8	Oren	5,8	6	0,96	-
S9	Kuning	5,5	6	0,92	-
S10	Kuning	5,5	6	0,92	-

Of the ten samples, only one sample had the same Rf value of 0.95 with Sibutramin HCl, namely sample S4 so that it could be said to contain Sibutramin HCl which had the same Rf value of 0.95. The results obtained were in accordance with the theory which stated that the sample it can be said to be positive if the Rf value is the same as the standard results of the comparison[6]. Therefore a positive sample does not meet the requirements and is dangerous if consumed regularly because Sibutramine HCl is a strong drug [7]. This research is in line with Putra's research in 2016 which has proven that 6 out of 20 samples of slimming herbs contain Sibutramin HCl, this proves that there are still slimming herbs in circulation with added medicinal chemicals. After conducting a qualitative analysis with only 1 positive sample containing Sibutramine HCl, a quantitative analysis was carried out with the aim of seeing the levels of Sibutramine HCl contained in the sample due to the higher sensitivity of UV spectrophotometry compared to the TLC method [7].

### Quantitative Test Result with UV-Vis Spectrophotometry.

The quantitative test was carried out to see the levels of Sibutramine HCl content in slimming herbs. The calibration curve is obtained, which is the result of measuring the absorbance of several series of standard solutions. By using a spectrophotometer with a wavelength of 288nm in the following table.

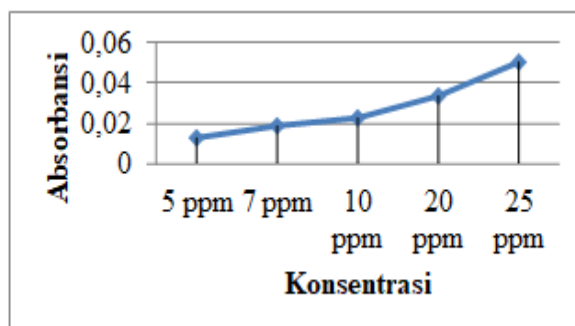


Figure 1: Standard Curve

Sibutramine HCl can be analyzed using UV spectrophotometry because it has the characteristic of a chromophore group, namely benzene chloride, so that its absorbance can be read at a wavelength of 200-400 nm. The chromophore group has atomic groups in compounds that can absorb ultraviolet light where the benzene group has a maximum of about 200nm but because Sibutramine HCl has a benzene chloride group, the maximum wavelength obtained is 288nm. Because the benzene group has shifted and made the wavelength in a larger direction. This can happen because the reference standards used are not pure comparators [3].

Measurement of the wavelength of the 1000ppm solution then read the absorbance in the range of 200-400nm and the results of the quantitative analysis obtained the maximum wavelength of 288nm with an absorbance of 0.11. Determination of the maximum wavelength is carried out with the aim of knowing when the absorbance reaches its maximum so that it can increase the absorption process of the solution to light [7].

Based on the data in the standard sibutramine hydrochloride table, concentrations of 5ppm, 7ppm, 10ppm, 20ppm, 25ppm were made from the standard sibutramine hydrochloride mother liquor. And obtained the standard curve with the absorbance and concentration of Sibutramine HCl in Aqua bidestilata solvent. The equation of the calibration curve is the x-axis expressed by the concentration obtained while the y-axis is the absorbance obtained from the measurement results obtained by the linear regression equation, namely the results obtained by the value  $y = bx + a$  with a correlation coefficient of  $r = 0.97$ . The value of the correlation coefficient which is close to 1 states that a linear relationship between concentration and absorption results in

an increase in the absorbance value of the analyte in direct proportion and significantly with an increase in concentration according to the condition that a good correlation coefficient ( $r$ ) is  $\geq 0.997$  [7].

### Precision Results Data

Precision measurements are carried out using a precision determination method which is carried out repeatedly under the same conditions with short work intervals [5].

**Table 2:** Precision Result Data

Data Pengulangan	Absorbansi
1	0,278
2	0,279
3	0,280
4	0,280
5	0,280
6	0,280
Rata-rata	0,279
SD	0,00083
RSD%	0.0029

From the results of the calculation, the RSD% is 0.0029%, where the RSD value meets the requirements and this method can provide good precision, which is  $\leq 2\%$  [5].

### Sibutramine HCl Levels Test on Slimming Herbal Samples

After obtaining linear results from testing the calibration curve and determining precision repeatedly, a sample test was carried out to see the levels of Sibutramine HCl contained in slimming herbs using the UV spectrophotometry method with a wavelength of 288nm. Calculation of content can be seen in the appendix, here is one example of calculating sample content using the equation ( $y=bx+a$ ) where  $a= 0.0058$ ;  $b= 0.0016$ ;  $r = 0.97$

Calculation of sample levels of slimming herbs

$$\text{Dilution factor (Fp)} = \frac{25\text{ml}}{10\text{ml}} = 2,5 \text{ ml}$$

**Table 3:** Determination of Sibutramine HCl Concentration in Slimming Herbal Samples

Sampel	Abs	Konsentrasi (ppm)	Kadar (%)	Kadar rata-rata (%)	Kadar rata-rata ( $\mu\text{g/ml}$ )	Ket
S4	0,081	47	0,58	0,59	47.62	Terdeteksi
	0,083	48.25	0,60			
	0,082	47.625	0,59			

Note: Sample S4 shows Sibutramine HCl levels exceeding a dose of 15 mg. therefore the use of medicinal chemicals in slimming herbal products is prohibited in Indonesia.

Based on the results obtained, from 10 herbal samples and 3 replications were carried out, only one positive sample was obtained, namely in sample S4 the average concentration ( $\mu\text{g/ml}$ ) was 47.62 and the average concentration was 0.59%. certainly not in accordance with the regulation of the minister of health number 007 of 2012 which states that traditional medicines may not contain medicinal chemicals (Sylvia et al., 2018). The drug Sibutramine HCl is a weight loss drug that contains anorexia which is a substance that suppresses appetite. So that the 10 samples contained Sibutramine HCl which was deliberately added to give

a quick and instant effect to consume these herbs and it is dangerous if consumed regularly because sibutramine is a strong drug that is contraindicated for cardiovascular disease.

## **CONCLUSION**

Of the 10 samples of slimming herbal medicine tested by qualitative analysis using the TLC method using 3 different mobile phase mixtures, the positive sample contained BKO Sibutramin HCl, namely herbal sample no S4 with capsule preparations and preparations with BPOM distribution permits. And the results of quantitative analysis using the UV spectrophotometry method showed that there were levels in positive samples containing BKO Sibutramin HCl and it was found that every 200 mg of herbal medicine had a sample level of S4, which was 0.59%.

## **REFERENCES**

- [1] BPOM.. *Siaran PERS Public Warning Obat Tradisional, Suplemen Kesehatan, dan Kometika Mengandung Bahan Kimia Obat/Bahan Dilarang Tahun 2021.*
- [2] WHO.. *Restrictions in use and availability of pharmaceuticals, 2010-2018.* (2020)
- [3] Sylvia et al.,. *ISSN : 2302-4933 Vol. V No. 2 ± Mei 2018 Jurnal. V(2).* 2018.
- [4] Putra. *Di Wilayah Banjarmasin Tengah Qualitative Analysis of Sibutramin Hydrochloride on Slimming Herbal Medicines.* (2016). *1(1)*, 36–41.
- [5] Novani, N., & Hayatus. Analisis Kandungan Sibutramin Hidroklorida Pada Produk Herbal Pelangsing Dengan Metode Spektrofotometri Uv-Vis. *Medical Sains : Jurnal Ilmiah Kefarmasian*, *6(1)*, 45–56. <https://doi.org/10.37874/ms.v6i1.214> (2021).
- [6] Rasyid, R., Nofriyelli, E., & Andayani, R. Validasi Metode Analisis Mangiferin Dalam Plasma In Vitro Secara Kromatografi Lapis Tipis-Densitometri. *Universitas Andalas*, *1*, 1-9. (2006).
- [7] Wisnu et al. Analisis Bahan Kimia Obat Sibutramin Hcl Pada Jamu Pelangsing Yang Beredar Di Kota Manado. *Pharmacon*, *6(4)*, 75–81. <https://doi.org/10.35799/pha.6.2017.17720> (2017).