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IDENTIFYING SIBUTRAMINE IN SLIMMING HERBS SOLD ONLINE

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ABSTRACT

Obesity is defined as the presence of abnormal amounts of body fat and is a risk factor for diabetes and can increase the risk of hernias, varices and arthroses in the knees and feet. Consumption of slimming herbs is widely used to reduce this obesity. Slimming herbal products in their ingredients or compositions contain simplisia derived from medicinal plants and have pharmacological effects. According to the regulation of the food and drug administration No. 10 0f 2024, on the marking of natural medicine, quasi-medicine and health Supplements. Concerning the registration of traditional medicines, herbs circulating in the community must meet various requirements, one of which is that they must not contain drug chemicals, narcotics or psychotropic substances and other materials that based on health considerations and research can endanger health. Sibutramine is a weight loss drug that is often used, belongs to the class of hard drugs and can only be used based on a doctor's prescription because it can increase blood pressure. The identification of sibutramine in this study was carried out qualitatively using thin layer chromatography (TLC) method, to determine the presence or absence of the addition of drug chemicals in slimming herbs sold online. The mobile phase used was methanol (p): chloroform (p) (4:1) solvent with silica GF 254 stationary phase. The results of the study showed that two of the five slimming herbs sold online contained sibutramine with the Rf value of herbal medicine A = 0.86 and herbal medicine B = 0.91.

Introduction

Maintaining weight is something that is often done today, one of the causes of weight gain is the behavior of unlimited eating activities, resulting in obesity and making the body unattractive and unhealthy. Many ways are done by some people to make the body slim to look attractive, one of which is by doing sports activities to consume traditional medicine. Based on monitoring data from the Food and Drug Administration (BPOM), there is still illegal circulation of slimming herbs and supplements containing sibutramin. This situation shows the need for periodic monitoring and analysis of slimming herbal products on the market. This analysis is important to protect consumers from exposure to harmful ingredients that can cause long-term side effects (Mayefis, et all., 2025). Based on BPOM No. 10 of

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2024, traditional medicine is prohibited from using chemicals with medicinal properties. However, in reality, in offline and online markets there are still slimming herbs circulating with the presence of drug chemicals content. Drug chemicals that are often added in herbal medicine include *paracetamol*, *phenylbultazone*, *sulfamethoxazone*, *chlorpheniramine maleat*, *glibenclamide*, *caffein*, *piroxicam, sildenafil siltrate* and *sibutramine hydrochloride*.

Herbal is a traditional medicine that is often used among the community, one of which is slimming herbal medicine which contains ingredients or ingredients whose efficacy guarantees the quality of herbal preparations derived from natural ingredients with various types and properties of their diverse content. This is due to the interaction between the compound components contained in traditional medicines and synthetic drugs. Sibutramine hydrochloride is a synthetic weight loss drug that has the properties of anorexia, and is included in the class of hard drugs, the use of which must be prescribed by a doctor. Excessive consumption of sibutramine hydrochloride can result in side effects such as hypertension, palpitations, headache, anxiety, loss of appetite, and palpitations (Kurniasih, et all., 2024).

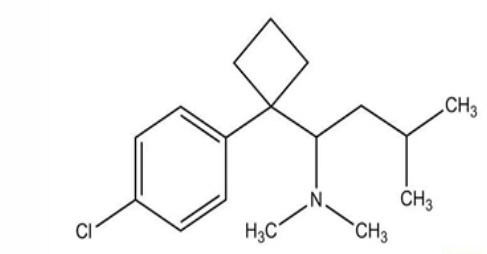

Figure 1. Chemical Structure of Sibutramine

Figure 2. Logo of Herbal

Sibutramine is the salt form of *Sibutramine hydrochloride*, a *phenethylamine* derivative with appetite suppressing properties. Sibutramine hydrochloride metabolites M_1 and M_2 competitively inhibit norepinephrine, serotonin, and dopamine to a lesser extent by pre-synaptic nerve terminals, thereby increasing satiety, leading to decreased caloric intake and may increase resting metabolism. This agent does not show anticholinergic or antihistamine effects, belongs to the class of hard drugs and can only be obtained and used based on a doctor's prescription (Kurniasih, et all., 2024). Obesity is basically caused by overeating and underworking of muscles. Other factors causing obesity are psychological factors, genetic factors, physiological factors and environmental factors. Obesity is a state of being overweight as a result of excessive accumulation of fat in the body. Fat should be present in everyone's body at least 3% of body weight. These fats are commonly known as essential fats. Fat is found in cell membranes, bone marrow and nerve tissue. These fat deposits serve as protection for the body's internal organs against injury (Pramuditha, 2023).

The discovery of BKO in slimming products still occurs in several regions of Indonesia including Surakarta, Manado, Medan and South Kalimantan. Qualitative testing of herbal products in 2016 found 6 products containing Sibutramin Hydrochloride in Central Banjamasin District. The discovery of BKO in traditional slimming medicine can also still be found in the Central Java area, namely Surakarta, from 10 test samples, 2 samples were identified as sibutramine hydrochloride (Hibatullah, et all., 2022). Separation methods are an important aspect in the field of analysis because most samples to be analyzed are mixed. To obtain

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pure compounds from a mixture, a separation process must be carried out. Various separation techniques can be applied to separate mixtures including extraction, distillation, crystallization and chromatography. In chromatographic separations, the migration speed of a sample is generally stopped before all of the mobile phase passes through the entire surface of the stationary phase. Solutes in these two chromatographies are characterized by the migration distance of the solute to the end of the mobile phase. The solute retention factor (Rf) is defined as the ratio of the distance traveled by the solute to the distance traveled by the mobile phase. The mixture of compounds that initially made a spot as a starting point, with the help of the spot mobile phase undergoes separation and each component moves independently. The purpose of this study was to determine the presence or absence of drug chemicals sibutramine in slimming herbs obtained online using the TLC method (Nopiyanti, 2020).

Materials and Methods

Materials

The materials used in this study were *ethyl acetate*, distilled water, methanol (p), chloroform (p) (4:1), 5 slimming herbs, sibutramine tablets as standard work.

Procedure

Sampling Sample

5 slimming herbs were taken by purposive sampling which are sold online, registered or not registered with BPOM. Online sample selection was conducted as a strategy to improve the efficiency and effectiveness of data collection in this study. The main considerations include time, cost, and geographical constraints that may hinder the implementation of offline data collection.

Preparation of Sibutramine Working Standard Solution

Weighed as much as 50 mg of sibutramine standard and then added 96% methanol solvent as much as 10 mL, shake until homogeneous then filtered using filter paper and put into a vial (Nopiyanti, 2020).

Preparation of Test Solution

5 g The powder of slimming herbal medicine was put into a 50 mL beaker, then 50 mL of distilled water was added, shaken for 30 minutes, filtered, and the filtrate was put into a separating funnel. Then extracted three times with *ethyl acetate* (25 mL). The *ethyl acetate* extract was collected, evaporated to remove the ethyl acetate and the extract obtained was dissolved with 5 mL of methanol and then put into a vial (Nopiyanti, 2020).

Sample Test for Slimming Herbs by TLC

a. Preparation of TLC make a horizontal line from the bottom of the TLC plate with a distance of 3 cm and also on the top of the silica gel with a distance of 2 cm. The top of the silica gel with a distance of 2 cm. the size of the silica gel used is 4 x 10 cm.
b. To activate the silica gel plate, put the silica gel plate into an oven at 100°C. for 30 minutes, then cooled.
c. Bottling of samples is done on the baseline of silica gel with a distance of 1 cm. the solution that is bottled is the sample solution, and the standard solution. The solvent propagation distance from the bottling line is 10 cm.

Preparation of Elution

The Chamber is prepared then filled with mobile phase, filter paper is placed on the chamber wall and the chamber is closed until the solution is saturated. Filter paper is used as an indicator of chamber saturation. Saturation of the chamber is characterized by the propagation of the mobile phase on the filter paper until it reaches the final limit on the filter paper. Then the TLC plate is inserted which has been bottled until the solution, and the standard solution, the chamber is closed. The TLC plate is eluted

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until the spot propagates upward and the solvent surface reaches the TLC plate boundary. Observed the appearance of spots using UV lamp 245 nm and UV lamp 366 nm (Salmaa and Wattiheluw, 2022). Calculated the Rf value of each spot.

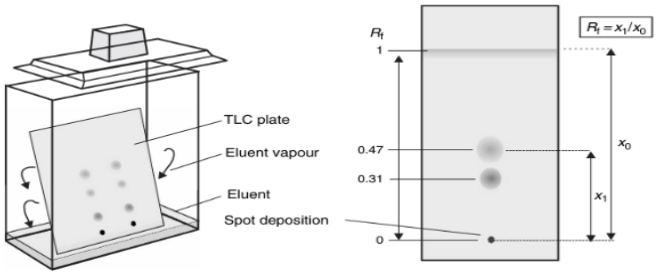

Figure 3. Developing chamber and TLC Plate

Results and Discussion

According to the Regulation of the food and drug administration No. 10 0f 2024, on the marking of natural medicine, quasi-medicine and health Supplements. Concerning the registration of traditional medicine, namely, traditional medicine is prohibited from containing drug chemicals which are isolated or synthetic products with medicinal properties, may not contain narcotics or psychotropic substances, may not contain *ethyl alcohol* more than 1%, except in the form of tincture preparations whose use is by dilution, and may not contain other ingredients that are based on health considerations and based on research endanger health.

Identification of sibutramine hydrochloride by bottling the standard solution and test solution. Bottling was done manually using a capillary pipette. Bottling is done in stages with drying between the totolan. The KLT plate that has been bottled the standard solution and the test solution is inserted into the chamber containing the saturated eluent, then the chamber is closed. After the KLT plate is eluted with an elution distance of 8 cm. The KLT plate was lifted and observed under UV 254 nm and UV 366 nm. The results of the elution were then dried by aeration, then the stain spots were observed under UV 245 nm and 366 nm (can be seen in table 1 through table 5). In these observations, the stain observed at UV 254 nm was only sample C detected but at UV 366 nm the stain was clearly visible. A good Rf is between 0.2-0.8. If the standard Rf and sample Rf have the same Rf value, then the sample is declared positive containing the analyzed compound (Pramudhita, 2023).

Research on the identification of drug chemicals on 5 brands of slimming herbs by purposive sampling which are sold online, registered or not registered with BPOM obtained 2 positive slimming herbs containing sibutramine with Rf value of herbal medicine A = 0.86 and herbal medicine B = 0.91.

Table 1. Results of Sibutramine Identification in Slimming Herbs A

Code	Spot Deposition (cm)	Rf Value	Result
S	6,9	0,86	
SP	6,8	0,85	+
B	6,9	0,86	

Table 2. Results of Sibutramine Identification in Slimming Herbs B

Code	Spot Deposition (cm)	Rf Value	Result
S	7,3	0,91	
SP	7,2	0,90	+

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B	7,3	0,91	

Table 3. Results of Sibutramine Identification in Slimming Herbs C

Code	Spot Deposition (cm)	Rf Value	Result
S	7	0,87	
SP	7,3	0,91	-
B	6,7	0,84	

Table 4. Results of Sibutramine Identification in Slimming Herbs D

Kode	Spot Deposition (cm)	Rf Value	Result
S	6	0,75	
SP	6,1	0,76	-
B	5,9	0,84	

Table 5. Results of Sibutramine Identification in Slimming Herbs E

Code	Spot Deposition (cm)	Rf Value	Result
S	7,2	0,875	
SP	7,0	0,912	-
B	7,0	0,837	

Description:
S : Test Solution of Slimming Herb
SP : Spike (Standard Solution + Sibutramine Standard)
B : *Sibutramine* Standard

Conclusions

Based on the results of the study, it can be concluded that of the 5 slimming herbs (A, B, C, D, and E) only slimming herbs A and B are positive for sibutramine because the Rf value of the herbal samples is the same as the standard Rf value of sibutramine.

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