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Research Article

DEVELOPMENT AND VALIDATION OF ULTRAVIOLET SPECTROPHOTOMETRIC METHOD FOR DETERMINATION OF MEBHYDROLIN NAPADISYLATE IN TABLET PREPARATIONS

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ABSTRACT

Objective: Mebhydrolin napadisylate is classified as an antihistamine drug classes used to treat allergies. One of the quality requirements for drug preparation was active compound levels must meet the requirements as stated in the Pharmacopeia or other standard books. The purpose of this study was to validate an ultraviolet spectrophotometric method for the determination of mebhydrolin napadisylate in the tablet preparation available in the market.

Methods: Solvents used are hydrochloric acid 0.1 N in methanol and sodium hydroxide 0.1 N in methanol for determination of mebhydrolin napadisylate and has not been reported. The ultraviolet spectrophotometric method used in the determination of mebhydrolin napadisylate will be conducted validation which includes accuracy, precision, linearity, range, limit of detection (LOD), and limit of quantitation (LOQ).

Results: Measurements were made at a maximum wavelength (λ_{max}) of mebhydrolin napadisylate 287 nm. Results of ultraviolet spectrophotometric method validation in determination of mebhydrolin napadisylate in tablet preparation; accuracy, precision, linearity, range, LOD, and LOQ meet the requirements of validation tests for methods of analysis. The obtained results of the determination of mebhydrolin napadisylate levels in tablet preparation with a branded name on the market meet the general requirements of tablet preparation.

Conclusion: Ultraviolet spectrophotometric method of mebhydrolin napadisylate determination in tablet preparation meets the requirements of validation tests for methods of analysis. The determination of mebhydrolin napadisylate levels in tablet preparation meets the general requirements of tablet preparation.

Keywords: Development, Validation, Ultraviolet spectrophotometric, Mebhydrolin napadisylate.

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INTRODUCTION

Mebhydrolin napadisylate is the first generation of an antihistamine which is useful for treating allergies, which works to inhibit the central nervous system. Antihistamines comprise a broad class of pharmacological agents that include the first generation, relatively sedating H_1 antagonists and second generation, less sedating or nonsedating H_1 antagonists [1]. In the manufacture of pharmaceuticals, examination of the active substance level is a requirement that must be met to ensure the quality of drug preparations. Good quality medicine, which will support the achievement of the expected therapeutic effect. One of the level of quality requirements contained levels must meet the requirements as stated in the Pharmacopeia or other standard books [2]. Mebhydrolin napadisylate monograph not stated in the Indonesian Pharmacopeia, so the level requirements used in mebhydrolin napadisylate tablet preparations are general level requirements that contain active compounds not less than 90.0% and not more than 100.0% of the amount stated on the label.

Based from the structure, mebhydrolin napadisylate having a chromophore group and auxochrome group [3]. Compounds which have a chromophore group can absorb radiation in the ultraviolet region [4-6]. According to Dibbern *et al.*, 2004, mebhydrolin napadisylate provides maximum absorbance in aqueous acid solvent at a wavelength of 286 nm (A_1^1 =269) and in aqueous base solvent at a wavelength of 287 nm (A_1^1 =274), so that the mebhydrolin napadisylate levels in tablet preparation can be determined by the ultraviolet spectrophotometric method [7]. Structure of mebhydrolin napadisylate can be seen in Fig. 1.

Determination of mebhydrolin napadisylate has ever done by densitometric method [8], high performance liquid chromatography method [9], and visible spectrophotometric method [10] and also has been validated the methods of analysis. However, the development and validation of ultraviolet spectrophotometric methods for determination of mebhydrolin napadisylate in tablet preparations have not been reported. Development of ultraviolet spectrophotometric methods is required because the method is simple, cheap, and fast [11].

The analytical method used for raw materials or active pharmaceutical substances should be able to provide results that can be replicated and reliably and to obtain the method used should be validated. Several parameter validation should be done, among others, the accuracy, precision, linearity, range, specificity, limit of detection (LOD), limit of quantitation (LOQ), ruggedness, and robustness [12]. Hence, the researchers are interested in determining the validity of the ultraviolet spectrophotometric method for determination of mebhydrolin napadisylate in tablet preparation using water, methanol, hydrochloric acid (HCl) 0.1 N in water, sodium hydroxide (NaOH) 0.1 N in water, HCl 0.1 N in methanol, and NaOH 0.1 N in methanol as the solvent. The method is validated with the parameters of accuracy, precision, linearity, range, LOD, and LOQ. Furthermore, the validated method is used to determine the levels of mebhydrolin napadisylate in tablet preparation on the market.

METHODS

This research is a descriptive study that aims to determine the validity of the ultraviolet spectrophotometric method for the determination of mebhydrolin napadisylate in tablet preparation marketed in Medan City, North Sumatera Province, Indonesia, whether it meets the general level requirements that contain active compounds not less than 90.0% and not more than 100.0% of the amount stated on the label.

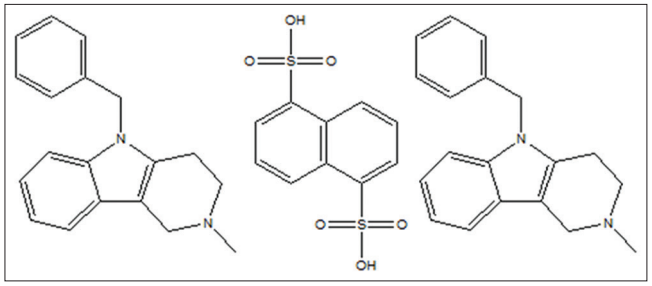

Fig. 1: Structure of mebhydrolin napadisylate

Tools

The tools used in the research were ultraviolet/visible spectrophotometer (Agilent), analytical balance (Boeco), and glassware (Iwaki).

Materials

The materials used in the research were HCl, NaOH, methanol (CH_3OH), mebhydrolin napadisylate reference standard, mebhydrolin napadisylate 50 mg tablets preparation with the branded name Histapan® (PT. Sanbe), Gabiten® (PT. Ifars), Zoline® (PT. Pyridam), Interhistine® (PT. Interbat), Omecidal® (PT. Mutifa).

Preparation of solvents

HCl 0.1 N in methanol

A carefully measured amount of 8.5 ml of HCl, and then diluted in methanol to 1000 ml [13].

NaOH 0.1 N in methanol

A carefully weighed amount of 4.0 g of NaOH, and then dissolved in methanol to 1000 ml [13].

Preparation of stock solution (SS)

Mebhydrolin napadisylate reference standard was weighed carefully the amount of 50.0 mg, put in a 100.0 ml volumetric flask, added 60.0 ml solvent, shaken until mebhydrolin napadisylate dissolved, diluted with a solvent to mark lines, shaken until homogeneous, obtained the mixture with a concentration of mebhydrolin napadisylate 500.00 µg/mL, this solution is called SS I. The SS I pipetted amount of 15.0 ml, put in a 200.0 ml volumetric flask, diluted with a solvent to mark lines, shaken until homogeneous, obtained the solution with a concentration of mebhydrolin napadisylate 37.50 µg/mL, this solution is called SS II.

Determination maximum absorbance (A_{max}) and maximum wavelength (λ_{max})

The SS II pipetted amount of 4.0 ml, put in a 10.0 ml volumetric flask, diluted with a solvent to mark lines, shaken until homogeneous, obtained the solution with a concentration of mebhydrolin napadisylate 15.00 µg/mL, then measured the absorbance of the solution at the wavelength range of 200 nm to 400 nm. A solvent used as a blank, then the specified maximum absorbance (A_{max}) and the maximum wavelength (λ_{max}) [14].

Determination of linearity, LOD, and LOQ

The SS II pipetted amount of 2.0, 3.0, 4.0, 5.0, and 6.0 ml, each put in a 10.0 ml volumetric flask, each diluted with a solvent to mark lines, each shaken until homogeneous, obtained the solution with a concentration of mebhydrolin napadisylate, respectively, 7.50, 11.25, 15.00, 18.75, and 22.50 µg/mL, then measured the absorbance of the solution at maximum wavelength (λ_{max}) obtained. A solvent used as a blank, then calculated the coefficient of correlation (r), coefficient of determination (r^2), regression line equation, LOD, and LOQ [15].

$$a = \frac{\sum XY - (\sum X) \times (\sum Y)/n}{\sum X^2 - (\sum X)^2/n}$$

$$b = \bar{Y} - a \times \bar{X}$$

$$r = \frac{(\sum XY) - (\sum X) \times (\sum Y)/n}{\sqrt{[(\sum X)^2 - (\sum X)^2/n][(\sum Y)^2 - (\sum Y)^2/n]}}$$

$$r^2 = \left(\frac{(\sum XY) - (\sum X) \times (\sum Y)/n}{\sqrt{[(\sum X)^2 - (\sum X)^2/n][(\sum Y)^2 - (\sum Y)^2/n]}} \right)^2$$

$$S_{Y/X} = \sqrt{\frac{\sum (Y - Yi)}{n-2}}$$

$$LOD = \frac{3 \times S_{Y/X}}{a}$$

$$LOQ = \frac{10 \times S_{Y/X}}{a}$$

Note:
Y=Measurement absorbance,
Yi=Calculated absorbance,
X=Concentration,
n=Number of treatments,
a=Slope,
b=Intercept,
r=Coefficient of correlation,
r^2=Coefficient of determination,
$S_{Y/X}$=Residual standard deviation,
LOD=Limit of detection,
LOQ=Limit of quantitation.

Determination of mebhydrolin napadisylate levels in tablet preparation

Not <20 tablets were weighed and powdered, weighed carefully the amount of powder equivalent to 50.0 mg mebhydrolin napadisylate (weighing powders as much as 6 times repetition), put in a 100.0 ml volumetric flask, added 60.0 ml solvent, shaken until mebhydrolin napadisylate dissolved, diluted with a solvent to mark lines, shaken until homogeneous, obtained the mixture with a concentration of mebhydrolin napadisylate 500.00 µg/mL. The mixture was filtered through a funnel and filter paper, removed 20 ml of the first filtrate was, accommodated the later filtrate, discarded residue, pipetted amount of 15.0 ml filtrate, put in a 200.0 ml volumetric flask, diluted with a solvent to mark lines, shaken until homogeneous, obtained the solution with a concentration of mebhydrolin napadisylate 37.50 µg/mL. The solution was pipetted amount of 4.0 ml, put in a 10.0 ml volumetric flask, diluted with a solvent to mark lines, shaken until homogeneous, obtained the solution with a concentration of mebhydrolin napadisylate 15.00 µg/mL, then measured the absorbance of the solution at maximum wavelength (λ_{max}) obtained. A solvent used as a blank, then calculated the concentration mebhydrolin napadisylate in the sample solution using the regression line equation, and the calculated levels of mebhydrolin napadisylate in tablet preparation. Calculated the standard deviation (SD), determination of the data received or rejected using the calculated T value (T_{calc}), determination of actual level (µ) of the analyte with confidence level 99%, and degree of freedom.

$$SD = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$$

$$T_{calc} = \frac{|X - \bar{X}|}{SD/\sqrt{n}}$$

$$\mu = \bar{X}\% \pm \left(T_{(1-\frac{1}{2}\alpha)df} \times \frac{SD}{\sqrt{n}} \right)\%$$

df = n−1

Note:

$\bar{X}$ =Average levels of sample,
n=Number of treatments,
T_{calc}=Calculated T value,
SD=Standard deviation,
μ=Actual level,
T=Table T value,
df=Degree of freedom,
α=Confidence level.

Determination of accuracy and precision

Accuracy test and precision test conducted on mebhydrolin napadisylate tablet samples in tablet preparation under the branded name Zoline® (PT. Pyridam). Accuracy test conducted by standard addition method to create a specific range of analyte concentrations with 80.00%, 100.00%, and 120.00% calculated from the amount of mebhydrolin napadisylate stated on the label, each specific range performed 3 times repetition. Each specific range containing 70% of samples and 30% of reference standards, then analyzed with the same treatment as the sample assay. Determination of the accuracy of the analysis method is determined by calculation of recovery percentage (% Recovery) after addition of the mebhydrolin napadisylate reference standard in the mebhydrolin napadisylate tablet sample [16]. Precision test is done by calculating the relative SD (RSD) of the percentage of the recovery percentage (% Recovery) that has been obtained from the accuracy test [17].

$$\%\ \text{Recovery} = \frac{A - B}{C} \times 100\%$$

$$RSD = \frac{SD}{\bar{X}} \times 100\%$$

Note:
% Recovery=Recovery percentage,
A=Analyte mass after the standard addition,
B=Analyte mass before the standard addition,
C=Standard added,
RSD=Relative standard deviation,
SD=Standard deviation,

$\bar{X}$ =Average of recovery percentage.

RESULTS AND DISCUSSIONS

According to Dibbern *et al*., 2004, mebhydrolin napadisylate has a maximum absorbance spectrum in the ultraviolet region in an acid solution at a wavelength of 286 nm (A_1^1 =269) and in a base solution at a wavelength of 287 nm (A_1^1 =274). Previously, researchers done orientation of determination of mebhydrolin napadisylate with several solvents, using water, methanol, HCl 0.1 N in water, NaOH 0.1 N in water, HCl 0.1 N in methanol, and NaOH 0.1 N in methanol. However, mebhydrolin napadisylate not completely soluble in water, methanol, HCl 0.1 N in water, and NaOH 0.1 N water. Using HCl, 0.1 N in methanol and NaOH 0.1 N in methanol as a solvent, it turns out mebhydrolin napadisylate dissolve completely, so the researchers used HCl 0.1 N in methanol and NaOH 0.1 N in methanol as solvent in this research.

Determination maximum absorbance (A_{max}) and maximum wavelength (λ_{max})

Determination of mebhydrolin napadisylate in tablet preparation, beginning with the determination of the maximum wavelength even though the maximum wavelength (λ_{max}) is already known from literature for the maximum wavelength (λ_{max}) of a compound can differ when determined by the different conditions (solvent) and tools. Determination of the wavelength is performed in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol at a concentration that gives absorbance with the smallest photometric error, which is ±0.4. Determination of the maximum wavelength with a concentration of 15 μg/mL which provides absorbance approaching 0.4. Absorbance spectrum and absorbance spectrum data of mebhydrolin napadisylate in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol can be seen in Fig. 2 and Table 1.

Mebhydrolin napadisylate absorbance spectrum in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol showed only one peak. Maximum absorbance (A_{max}) and maximum wavelength (λ_{max}) of mebhydrolin napadisylate show that the maximum absorbance (A_{max}) of mebhydrolin napadisylate in the solvent HCl 0.1 N in methanol is 0.40557 with the maximum wavelength (λ_{max}) 287 nm and maximum absorbance (A_{max}) of mebhydrolin napadisylate in the solvent NaOH 0.1 N in methanol is 0.41223 with the maximum wavelength (λ_{max}) 287 nm. Maximum wavelength (λ_{max}) obtained from measurements similar to the maximum wavelength (λ_{max}) obtained from literature (287 nm) in the base solvent, but maximum wavelength (λ_{max}) obtained from measurements different 1 nm compared to the maximum wavelength (λ_{max}) obtained from literature (286 nm) in the acid solvent. This result is still in the allowed range, the maximum wavelength (λ_{max}) difference between the measurement results and the literature is not more than 2 nm [18]. Furthermore, determination of mebhydrolin napadisylate in tablet preparation on the market is done at a maximum wavelength (λ_{max}) obtained.

Determination of linearity, LOD, and LOQ

Linearity determination of the mebhydrolin napadisylate calibration curve is done with the concentration range of 7.5-22.5 μg/mL at a wavelength of 287 nm using HCl 0.1 N in methanol and NaOH 0.1 N in methanol as a solvent and a blank. The curve calibration and calibration curve data of mebhydrolin napadisylate in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol can be seen in Fig. 3 and Table 2.

The results of the mebhydrolin napadisylate calibration curve measurements in the solvent HCl 0.1 N in methanol with the concentration range of 7.5-22.5 μg/mL at a wavelength of 287 nm obtained linear

Table 1: Absorbance spectrum data of mebhydrolin napadisylate absorbance spectrum (concentration of 15 μg/mL) in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol

S.No.	Wavelength	Absorbance	Solvent
1	287 nm	0.40577	HCl 0.1 N in methanol
2	287 nm	0.41223	NaOH 0.1 N in methanol

HCl: Hydrochloric acid, NaOH: Sodium hydroxide

Table 2: Calibration curve data of mebhydrolin napadisylate in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol

S.No	Concentration	Absorbance	
		HCl 0.1 N in methanol	NaOH 0.1 N in methanol
1	0.00 μg/mL	0.00000	0.00000
2	7.50 μg/mL	0.20289	0.20614
3	11.25 μg/mL	0.30432	0.30921
4	15.00 μg/mL	0.40579	0.41226
5	18.75 μg/mL	0.50731	0.51530
6	22.50 μg/mL	0.60873	0.61841

HCl: Hydrochloric acid, NaOH: Sodium hydroxide

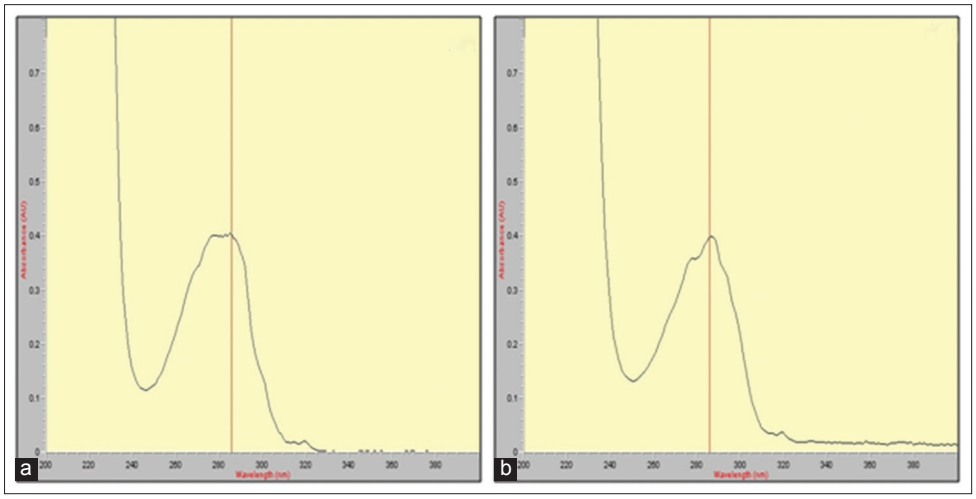

Fig. 2: Absorbance spectrum of mebhydrolin napadisylate (concentration of 15 µg/mL) in the solvent hydrochloric acid 0.1 N in methanol (a) and in the solvent sodium hydroxide 0.1 N in methanol (b)

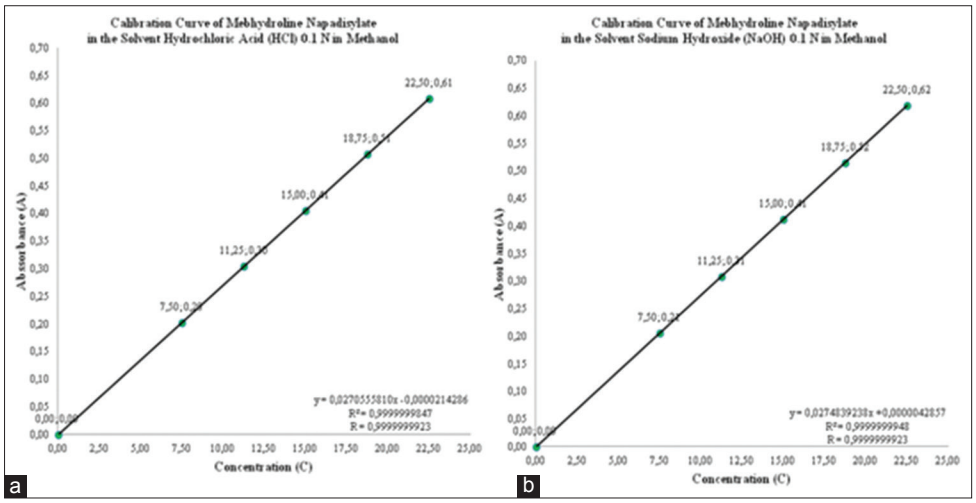

Fig. 3: Calibration curve of mebhydrolin napadisylate in the solvent hydrochloric acid 0.1 N in methanol (a) and in the solvent sodium hydroxide 0.1 N in methanol (b) at a wavelength of 287 nm

relationship between concentration and absorbance with the coefficient of correlation (r)=0.9999999923 and the coefficient of determination (r^2)=0.9999999847. The correlation coefficient obtained has met the requirements, the acceptance criteria for the correlation coefficient is r≥0.995 [3]. The calculation result of the regression line equation obtained the regression line equation Y=0.0272555810 × X − 0.0000214286. From the calibration curve, data can be calculated that determination of mebhydrolin napadisylate by an ultraviolet spectrophotometric method in the solvent HCl 0.1 N in methanol has the LOD of 0.0015 µg/mL and the LOQ of 0.0046 µg/mL. All the measurement concentration must above the LOD and LOQ to meet the requirements of accuracy and precision [19].

The results of the mebhydrolin napadisylate calibration curve measurements in the solvent NaOH 0.1 N in methanol with the concentration range of 7.5-22.5 µg/mL at a wavelength of 287 nm obtained linear relationship between concentration and absorbance with the coefficient of correlation (r)=0.9999999974 and the coefficient of determination (r^2)=0.9999999948. The correlation coefficient obtained has met the requirements, the acceptance criteria for the correlation coefficient is r≥0.995 [3]. The calculation result of the regression line equation obtained the regression line equation Y = 0.0274839238 × X + 0.0000042857. From the calibration curve, data can be calculated that the determination of mebhydrolin napadisylate by an ultraviolet spectrophotometric method in the solvent NaOH 0.1 N in methanol has the LOD of 0.0009 µg/mL and the LOQ of 0.0027 µg/mL. All the measurement concentrations must above the LOD and LOQ to meet the requirements of accuracy and precision [19].

Determination of mebhydrolin napadisylate levels in tablet preparation

Determination of mebhydrolin napadisylate in a tablet preparation results and recapitulation of mebhydrolin napadisylate levels to determine the mebhydrolin napadisylate level in Histapan® (PT. Sanbe), Gabiten® (PT. Ifars), Zoline® (PT. Pyridam), Interhistine® (PT. Interbat), and Omecidal® (PT. Mutifa) in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol can be seen, respectively, in Tables 3 and 4.

Determination of mebhydrolin napadisylate results showed that the levels of mebhydrolin napadisylate in tablet preparation in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol with a branded name on the market meet the general level requirements that contains active compounds not <90.0% and not more than 100.0% of the amount stated on the label.

Determination of range, accuracy and precision

Accuracy test conducted by standard addition method on Zoline® (PT. Pyridam) samples tablets with recovery percentage (% recovery) parameter. Precision test is done by calculating the RSD of the percentage

of the recovery percentage (% recovery) that has been obtained from the accuracy test. Accuracy test with recovery percentage (% recovery) parameter is done by making three concentrations of the samples with a specific range 80.00%, 100.00%, and 120.00% was calculated from the levels mebhydrolin napadisylate stated on the label, where each specific range was done with three repetitions, and each specific range contains 70% of samples and 30% reference standards. Solvents used in accuracy test and precision test were HCl 0.1 N in methanol and NaOH 0.1 N in methanol. Tables 5 and 6 showed the accuracy test and precision test result data on ultraviolet spectrophotometric method for the determination of mebhydrolin napadisylate in tablet preparations in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol with standard addition method.

Table 3: Mebhydrolin napadisylate level in tablet preparation results in the solvent HCl 0.1 N in methanol

S. No.	Tablet preparation branded name	Average level ($\bar{X}$) (%)	Actual level (μ) (%)
1	Histapan® (PT. Sanbe)	99.22	99.22±0.25
2	Gabiten® (PT. Ifars)	98.98	98.98±0.38
3	Zoline® (PT. Pyridam)	99.62	99.62±0.23
4	Interhistine® (PT. Interbat)	99.44	99.44±0.30
5	Omecidal® (PT. Mutifa)	99.52	99.52±0.20

HCl: Hydrochloric acid

Table 4: Mebhydrolin napadisylate level in tablet preparation results in the solvent NaOH 0.1 N in methanol

No	Tablet preparation branded name	Average level ($\bar{X}$) (%)	Actual level (μ) (%)
1	Histapan® (PT. Sanbe)	99.45	99.45±0.51
2	Gabiten® (PT. Ifars)	98.39	98.39±0.22
3	Zoline® (PT. Pyridam)	99.83	99.83±0.27
4	Interhistine® (PT. Interbat)	99.57	99.57±0.44
5	Omecidal® (PT. Mutifa)	99.67	99.67±0.37

NaOH: Sodium hydroxide

Accuracy test result with recovery percentage (% recovery) parameter in ultraviolet spectrophotometric method for determination of mebhydrolin napadisylate in tablet preparations in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol with standard addition method obtained recovery percentage (% recovery), respectively, 100.03% and 100.21%. This accuracy result meets the accuracy requirements, where the value of the recovery percentage (% recovery) is permitted between 98.0% and 102.0%. Precision test result with RSD parameter in ultraviolet spectrophotometric method for determination of mebhydrolin napadisylate in tablet preparations in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol with standard addition method obtained RSD, respectively, 0.03% and 0.18%. This precision result meets the precision requirements, where the value of the RSD is permitted not more than 2% [16]. The lower concentration of accuracy test was 80.00% from the test concentration (15.00 μg/mL) and the higher concentration of accuracy test was 120.00% from the test concentration (15.00 μg/mL). The range obtained from the method validation was 12.00-18.00 μg/mL for both solvents.

Method validation

The validation test results of ultraviolet spectrophotometric method for determination of mebhydrolin napadisylate in tablet preparations

Table 5: Accuracy test and precision test result data on ultraviolet spectrophotometric method for determination of mebhydrolin napadisylate in tablet preparations in the solvent HCl 0.1 N in methanol with standard addition method

No	Specific range (%)	Absorbance		Analyte mass (mg)			Recovery percentage
		Before the standard addition	After the standard addition	Before the standard addition	After the standard addition	Standard added	
1	80.00	0.22751	0.32488	28.0326	40.0289	11.98680	100.08
2		0.22797	0.32527	28.0893	40.0769		100.01
3		0.22768	0.32497	28.0535	40.0400		100.00
4	100.00	0.28487	0.40651	35.0995	50.0860	14.98350	100.02
5		0.28446	0.40612	35.0490	50.0379		100.04
6		0.28415	0.40588	35.0108	50.0083		100.09
7	120.00	0.34105	0.48705	42.0211	60.0087	17.98020	100.04
8		0.34144	0.48739	42.0691	60.0506		100.01
9		0.34168	0.48765	42.0987	60.0827		100.02
Average % Recovery (%)							100.03
RSD (%)							0.03

HCl: Hydrochloric acid, RSD: Relative standard deviation

Table 6: Accuracy test and precision test result data on ultraviolet spectrophotometric method for determination of mebhydrolin napadisylate in tablet preparations in the solvent NaOH 0.1 N in methanol with standard addition method

No	Specific range	Absorbance		Analyte mass (mg)			Recovery percentage
		Before the standard addition	After the standard addition	Before the standard addition	After the standard addition	Standard added	
1	80.00%	0.23102	0.32999	28.0183	40.0217	11.98680	100.14
2		0.23094	0.33018	28.0086	40.0447		100.41
3		0.23108	0.33002	28.0256	40.0253		100.11
4	100.00%	0.28882	0.41291	35.0284	50.0785	14.98350	100.44
5		0.28894	0.41247	35.0430	50.0251		99.99
6		0.28887	0.41265	35.0345	50.0469		100.19
7	120.00%	0.34612	0.49501	41.9780	60.0358	17.98020	100.43
8		0.34635	0.49488	42.0059	60.0200		100.19
9		0.34657	0.49475	42.0325	60.0043		99.95
Average % recovery (%)							100.21
RSD (%)							0.18

NaOH: Sodium hydroxide, RSD: Relative standard deviation

in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol with the test parameters: accuracy, precision, linearity, range, LOD, and LOQ showed that ultraviolet spectrophotometric method is valid for determination of mebhydrolin napadisylate in tablet preparations in the solvent HCl 0.1 N in methanol and in the solvent NaOH 0.1 N in methanol. Determination of mebhydrolin napadisylate has ever done by densitometric method [8], high performance liquid chromatography method [9], and visible spectrophotometric method [10] and also has been validated the methods of analysis. In this study, the researcher obtained the valid ultraviolet spectrophotometric method that is simpler, cheaper, and faster than previously validated methods (densitometric, high performance liquid chromatography, and visible spectrophotometric.

CONCLUSIONS

From the research, mebhydrolin napadisylate in tablet preparation can be determined using the ultraviolet spectrophotometric method using the solvent HCl 0.1 N in methanol and the solvent NaOH 0.1 N in methanol at a wavelength of 287 nm. The results of the analysis method validation test with accuracy, precision, linearity, range, LOD, and LOQ meet the requirements. Mebhydrolin napadisylate assay showed that all the tablets analyzed with the branded name Histapan® (PT. Sanbe), Gabiten® (PT. Ifars), Zoline® (PT. Pyridam), Interhistine® (PT. Interbat), and Omecidal® (PT. Mutifa) meet the general level requirements that contain active compounds not <90.0% and not more than 100.0% of the amount stated on the label.

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