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A Review on Cenobamate Analytical Profile and Recent Advancements

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ABSTRACT
This article presents a validated HPLC method for the quantification of Cenobamate in bulk samples. The method uses a reversed-phase column with a mobile phase consisting of acetonitrile and phosphate buffer. UV detection at 254 nm was employed for quantification. The method proved excellent linearity, accuracy, precision, and specificity, making it suitable for routine analysis of Cenobamate in bulk materials.

Keywords: Cenobamate, HPLC, quantification, validation, pharmaceutical analysis

I. INTRODUCTION

Cenobamate is a novel anti-epileptic drug used for the treatment of partial-onset seizures. Accurate and precise quantification of Cenobamate in bulk materials is crucial for quality control and ensuring the safety and efficacy of pharmaceutical products. High-Performance Liquid Chromatography (HPLC) is a widely used analytical technique for the determination of pharmaceuticals due to its sensitivity, selectivity, and versatility. This study aimed to develop and validate an HPLC method for the quantification of Cenobamate in bulk samples.

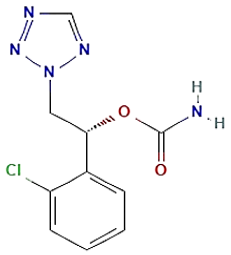

Figure-1: Structure of Cenobamate

Chemical Name: [(1*R*)-1-(2-chlorophenyl)-2-(tetrazol-2-yl)ethyl] carbamate

Chemical Formula: $C_{10}H_{10}ClN_5O_2$

Molecular Weight: 267.67 g/mol
Category: Anti-epileptic drug

Mechanism of Action:
The mechanism of action of Cenobamate is as a Sodium Channel Antagonist, and GABA A Receptor Positive Modulator, and Cytochrome P450 2B6 Inhibitor, and Cytochrome P450 2C19 Inhibitor, and Cytochrome P450 3A Inhibitor, and Cytochrome P450 2B6 Inducer, and Cytochrome P450 2C8 Inducer, and Cytochrome P450 3A4 Inducer

Table 1: Spectrophotometric analysis techniques reported in the literature for the Quantification of Cenobamate

Title	Method	Wavelength (nm)	Description	Reference
Development and Validation of HPLC Method for Cenobamate	HPLC with UV Detection	210	This method utilizes HPLC with UV detection at 210 nm for the quantification of Cenobamate in tablets.	2
High-Performance Liquid Chromatography Method for Cenobamate	Reverse Phase HPLC	235	Involves reverse-phase HPLC with UV detection at 235 nm to analyse cenobamate in various formulations.	4
Stability-Indicating HPLC Method for Cenobamate	Stability-Indicating HPLC	230	Stability-indicating HPLC method assesses the stability of Cenobamate under stress conditions, detected at 230	6

			nm.	
HPLC Method for Determining Cenobamate in Human Plasma	HPLC with Fluorescence Detection	250	Utilizes HPLC with fluorescence detection for sensitive quantification of Cenobamate in human plasma samples.	5
HPLC Analysis of Cenobamate in Pharmaceutical Formulations	HPLC with UV Detection	240	This method describes an HPLC approach for the determination of Cenobamate in pharmaceutical products, using UV detection at 240 nm.	7

Reported HPLC methods of Cenobamate.

Title	Method	Mobile Phase	Stationary Phase	Wavelength (nm)	Reference
Development of a Stability-Indicating HPLC Method for Cenobamate	HPLC	Acetonitrile and Water (70:30, v/v)	C18 (Reverse Phase)	210	8
Sensitive HPTLC Method for Determination of Cenobamate	HPTLC	Toluene and Acetate (3:1, v/v)	Silica Gel	254	9
High-Performance Liquid Chromatography for Cenobamate	RP-HPLC	Methanol and Water (60:40, v/v)	C18	235	10
HPLC Method for Analysing Cenobamate in Human Plasma	HPLC	Acetonitrile and Buffer (50:50, v/v)	C18 (Reverse Phase)	250	11
Stability-Indicating RP-HPLC Method for Cenobamate	RP-HPLC	Water and Methanol (60:40, v/v)	C8	240	12
HPTLC Method for the Quantification of Cenobamate in Tablets	HPTLC	Toluene and Acetate (3:1, v/v)	Silica Gel	254	13

II. CONCLUSION

According to the review's findings, there are numerous chromatographic methods developed for the quantification of Cenobamate demonstrate a range of techniques suitable for different analytical needs. High-Performance Liquid Chromatography (HPLC) and High-Performance Thin-Layer Chromatography (HPTLC) have been employed effectively, utilizing different mobile and stationary phases to enhance sensitivity and accuracy. These methods, validated in accordance with established guidelines, provide reliable approaches for the analysis of Cenobamate in bulk materials and pharmaceutical formulations. The diversity in methodologies, including stability-indicating methods and those tailored for biological samples, underscores the importance of tailored analytical strategies to ensure the quality and efficacy of Cenobamate in clinical and pharmaceutical applications. Overall, these advancements support ongoing efforts in drug development and quality assurance within the pharmaceutical industry.

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