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NEW HPLC METHOD DEVELOPMENT FOR THE ESTIMATION OF VALBENAZINE IN PHARMACEUTICAL DOSAGE FORM

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ABSTRACT

A new precise, accurate, rapid method has been developed for the estimation of Valbenazine pharmaceutical dosage form by HPLC. From results the proposed method is highly sensitive, precise and accurate and it successfully applied for the quantification of API content in the commercial formulations of Valbenazine Educational institutions and Quality control laboratories A simple and selective HPLC method is described for the determination of Valbenazine Chromatographic separation was achieved on a Phenomenex C18 (250×4.6 ×5µ) using mobile phase consisting Acetonitrile : Water : Triethylamine buffer (60: 40: 0.5%) v/v with detection of 264 nm. Linearity was observed in the range 50-150 µg /ml for Valbenazine (r^2 =0.999) for the amount of drugs estimated by the proposed methods was in good agreement with the label claim.

Key Words: Valbenazine, HPLC mehod

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INTRODUCTION

Pharmaceutical analysis simply means analysis of pharmaceuticals. Webster' dictionary defines a pharmaceutical is a medical drug. A more appropriate term for a pharmaceutical is active pharmaceutical ingredient (API) or active ingredient to distinguish it from a formulated product or drug product is prepared by formulating a drug substance with inert ingredient (excipient) to prepare a drug product that is suitable For administration to patients. Research and development (R&D) play a very comprehensive role in new drug development and follow up activities to ensure that a new drug product meets the established standards is stable and continue to approved by regulatory authorities, assuring that all batches of drug product are made to the specific standards utilization of approved ingredients and production method becomes the responsibility of pharmaceutical analysts in the quality control (QC) or quality assurance department. The methods are generally developed in an analytical R&D department and transferred to QC or other departments as needed. At times they are transferred to other divisions. Chromatography is a family of analytical chemistry techniques for the separation of mixtures.

It involves passing the sample, a mixture that contains the analyte, in the "mobile phase", often in a stream of solvent, through the "stationary phase." The stationary phase retards the passage of the components of the sample. When components pass through the system at different rates they become separated in time, like runners in a marathon. Ideally, each component has a characteristic time of passage through the system. This is called its "retention time." A physical separation method in which the components of a mixture are separated by differences in their distribution between two phases, one of which is stationary (stationary phase) while the other (mobile phase) moves through it in a definite direction. The substances must interact with the stationary phase to be retained and separated by it. Chromatograph separates the chemical mixture either liquid or gas into its components by differential distributions of the solutes, as they flow with different rate over the stationary phase. Type of the technique used for the separation of complex mixtures depends on the differential affinities of substances for a gas or liquid mobile medium and for a stationary adsorbing medium through which they pass; such as paper, gelatin, or magnesium silicate gel. Analytical chromatography is used to determine the identity and concentration of molecules in a mixture. Preparative chromatography is used to purify larger quantities of a molecular species (1-6).

Valbenazine is used to treat tardive dyskinesia in adults. Tardive dyskinesia is a neurological disorder characterized by involuntary movements. Valbenazine and its active meabolites bind to and inhibit vesicular monoamine transporter 2 (VMAT2) with high selectivity (valbenazine Ki = 150nM, [+]-α-HTBZ Ki = 1.98nM, NBI136110 Ki = 160nM) with no significant binding to VMAT1 (Ki <10microM for each). This prevents the reuptake and storage of monoamine neurotransmitters noradrenaline, dopamine, and serotonin in synaptic vesicles making them vulnerable to metabolism by cytosolic enzymes. The presynaptic release of monoamine neurotransmitters is decreased due to the lack of vesicles with packaged neurotransmitter ready for release into the synapse. Neither valbenazine nor its active metabolite exhibit significant off target binding at dopamine, serotonin, or adrenaline receptors or uptake transporters at 10microM concentrations. Valbenazine decreases the availability of monoamine neurotransmitters by preventing their storage in synaptic vesicles. This is believed to be the reason behind its therapeutic effect in tardive dyskinesia although the exact mechanism is unknown (7).

Aim is to develop new HPLC method for the estimation of Valbenazine in pharmaceutical dosage form**.**

MATERIALS AND METHODS

Determination of Working Wavelength (λ_{max})

Preparation of Standard solution (8-10)

10 mg of Valbenazine was weighed and transferred in to 100 ml volumetric flask and dissolved in methanol and then make up to the mark with methanol and prepare 10 µg /ml of solution by diluting 1ml to 10ml with methanol.

Preparation of samples for Assay

Preparation of Standard solution

10 mg of Valbenazine was weighed and transferred in to 100 ml volumetric flask and dissolved in mobile phase and then make up to the mark with mobile phase and prepare 10 µg /ml of solution by diluting 1ml to 10ml with mobile phase.

Preparation of Sample solution

Sample name: Ingrezza 10 mg capsules

Weigh 20 capsules by removing the shell then crush with mortar and pestle then weigh a quantity of powder equivalent to 10mg of Valbenazine and transferred in to 100 ml volumetric flask and dissolved in mobile phase and then make up to the mark with mobile phase and prepare 10 µg /ml of solution by diluting 1ml to 10ml with mobile phase.

$$\%\ \text{Assay} = \frac{AT}{AS} \times \frac{\text{WS}}{DS} \times \frac{\text{DT}}{WT} \times \frac{\text{P}}{100} \times \frac{\text{AW}}{LC} \times 100$$

Validation

To verify that the analytical system is working properly and can give accurate and precise results were evaluated by 10µg/mL of valbenazine was injected six times and the chromatograms were recorded for the same. Method precision was determined by injecting sample solutions of concentration valbenazine (10µg/mL) for six timesare prepared separately.

RESULTS AND DISCUSSION

The wavelength of maximum absorption (λ_{max}) of the solution of the drug in mobile phase were scanned using UV-Visible spectrophotometer within the wavelength region of 200–400 nm against mobile phase as blank. The absorption curve shows characteristic absorption maxima at 264 nm for Valbenazine 248 nm was selected as detector wavelength for the HPLC chromatographic method.

The amount of Valbenazine present in the taken dosage form was found to be 99.35 % (Table-1 and 2).

Table-1 Results for Valbenazine

Valbenazine		
	Standard Area	**Sample Area**
Injection-1	54335283	54609367
Injection-2	53884296	54791671
Injection-3	54091715	54876254
Injection-4	54660522	54122289
Injection-5	54144218	54060009
Average Area	54223207	54491918
Assay(%purity)	99.35	

Table-2 Results of assay

Drug	Label claim(mg)	Amount found(mg)	% Assay
Valbenazine	10	9.85	98.5

The plate count and tailing factor results were found to be within the limits and the % RSD was found to be 0.1 so system is suitable and giving precise results (Table-3).

Table-3 Results for system suitability of valbenazine

Injection	RT	Peak area	Theoretical plates (TP)	Tailing factor (TF)
1	1.189	41587410	4578	1.2
2	1.188	41585753	4582	1.1
3	1.190	41585954	4576	1.2
4	1.189	41598374	4852	1.0
5	1.187	41598854	4563	1.1
6	1.191	41588765	4577	1.3
Mean	1.189	415908512	-	-
SD	0.0014	6112	-	-
%RSD	0.11	0.01	-	-

The % RSD of Assay for 6 Samples determinations of valbenazine found to be within the acceptance criteria (less than 2.0%). Hence method is precise (Fig-1).

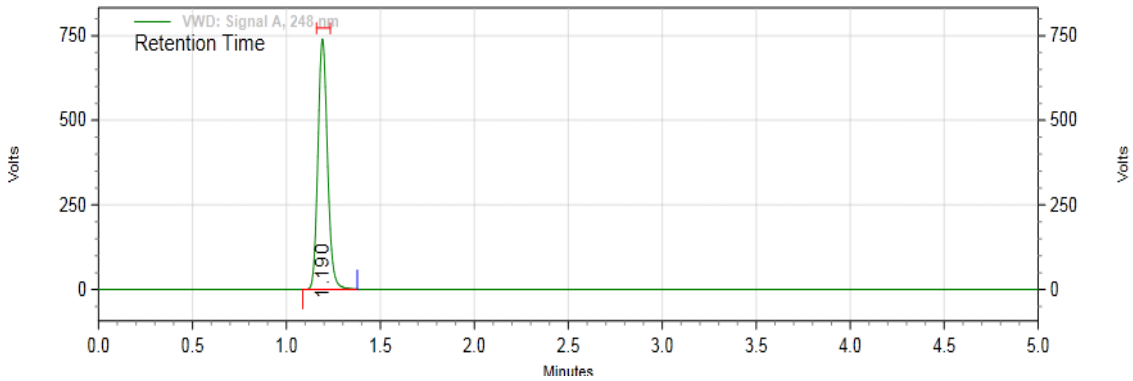

Fig-1 Chromatogram of Method Precision

A graph was plotted for valbenazine against the concentrations of the solutions and the peak areas. The correlation coefficient R^2 was determined and was found to be 0.999 for valbenazine (Fig-2)

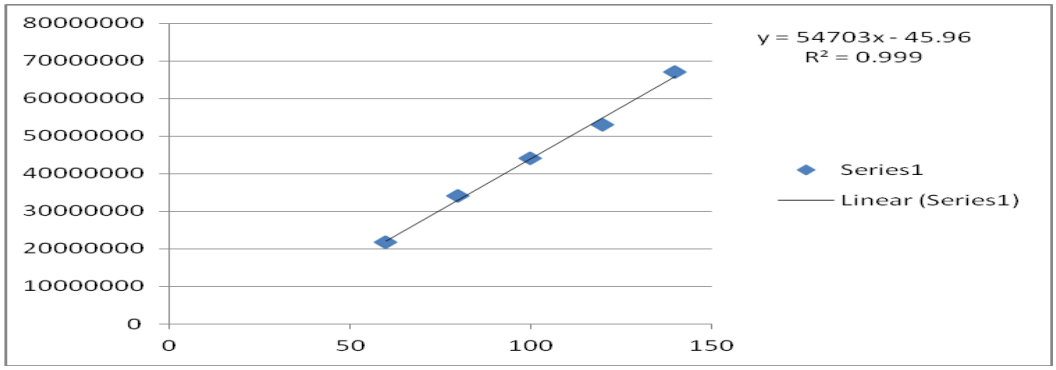

Fig-2 Graph for Linearity data of valbenazine

CONCLUSION

A new precise, accurate, rapid method has been developed for the estimation of Valbenazine pharmaceutical dosage form by HPLC. From the above experimental results and parameters it was concluded that, this newly developed method for the estimation Valbenazine was found to be simple, precise, accurate and high resolution and shorter retention time makes this method more acceptable and cost effective and it can be effectively applied for routine analysis in research institutions, quality control department in meant in industries, approved testing laboratories studies in near future. From results the proposed method is highly sensitive, precise and accurate and it successfully applied for the quantification of API content in the commercial formulations of Valbenazine Educational institutions and Quality control laboratories.

REFERENCES

1. Chatwal**,** R**.** G**.;** Anand**,** K**.** S**.** *High performance liquid chromatography***.** *Instrumental methods of chemical analysis***,** 5thed**.;** Himalaya publishers**:** Mumbai, 2010**;** 2.570-2.629**.**
2. Sharma**,** B**.** K**.** *High performance liquid chromatography***.** *Instrumental methods of chemical analysis***,** 24th ed**.;** Goelpublishers**:** Meerut**,** 2005**;** 295 - 300**.**
3. Dong,W. M. *HPLC instrumentation and trends*. Modern HPLC for practicing scientists, USA, 2006; 5-10, 78-110.

4. Typical diagram of HPLC
5. http://www.comsol.com/stories/waters_corp_hplc_systems/full/ Hplc diagram
6. HPLC solvent properties
7. www.sanderkok.com/techniques/hplc/eluotropic_series_extended.htm
8. Swartz, M. E.; Ira Krull, S, *Analytical method development. Analytical method development and validation*, 1st ed.; Marcel Dekker, Inc: New York, 2009; 17-80.
9. https://www.drugbank.ca/categories/DBCAT001351
10. ICH, *Text on Validation of Analytical Procedures*, ICH – Q2A, International Conference on Harmonisation, IFPMA, Geneva, 1995, 2-3, A–1 to A–3.
11. ICH, *Validation of Analytical Procedures: Methodology*, ICH – Q2B, International Conference on Harmonisation, 1996, 1-3.
12. ICH *Guidelines, Q2 (R1) - Validation of Analytical Procedures*:Text and Methodology,2005, 1-6.