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A REVIEW ON DIFFERENT TECHNIQUES OF SOLID DISPERSION FOR SOLUBILITY ENHANCEMENT OF TERBINAFINE HYDROCHLORIDE

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ABSTRACT: This review is compilation of the different solid dispersion methods used for the enhancement of solubility of terbinafine hydrochloride. The dissolution rate of terbinafine hydrochloride is increased by using polymers such as polyvinyl pyrrolidone K30 and carrier polyethylene glycol 6000. The drug and carrier are used in different ratios. The evaluation of drug content after enhancement is estimated by using chromatography technique.

KEYWORDS: solubility, solid dispersion, terbinafine hydrochloride.

INTRODUCTION: Solubility is the process of a solid dissolving into a liquid to form a homogenous framework. It is one of the most important barriers to achieving the desired grouping of medications in systematical circulation in order to demonstrate pharmacological reaction. After oral administration, a poorly water soluble medication frequently requires a substantial dose to reach therapeutic plasma levels. Low water solubility is a critical issue that must be addressed while developing novel chemical components. Any medication that needs to be absorbed as a fluid must be available at the absorption site. As a result, a variety of approaches are employed to increase the solubility of poorly water-soluble drugs1.

When used orally or topically, Terbinafine HCl is a synthesised allylamine compound with a broad range of antifungal activity. Terbinafine is fungicidal to dermatophytes and certain yeasts, but only fungistatic to Candida albicans. Terbinafine HCl is a poorly water-soluble medication, thus it's critical to improve its solubility and bioavailability. Surfactants, micronization, and the generation of solid dispersion2 are some of the

methods that have traditionally been used to increase the solubility and bioavailability of poorly water-soluble medicines.

The most effective strategy for encouraging dissolution is solid dispersion. It's described as the solid dispersion of one or more active substances in an inert carrier or matrix, which can be achieved through melting, solvent evaporation, or other solid dispersion processes. Drug molecules dispersed in polymeric carriers may achieve the greatest particle size reduction and surface area augmentation, resulting in improved dissolving rates3.

Solid dispersions are prepared to[4]:

1. To increase the solubility of drugs.

2. To increase the drug's stability.

3. To disguise the drug's unpleasant flavour.

4. To receive the release profile that is necessary.

Hard lumps are created during the manufacture of a medicine that are difficult to break on a big scale. Solid dispersion techniques include the following:

a. Solvent evaporation method: In this process, the drug and carrier physical mixture is dissolved in a common solvent, then evaporated until a transparent, solvent-free film is formed, which is subsequently dried to a consistent weight5.

b. Melting method: it is also known as the fusion method, in which a physical mixture of a drug and a water-soluble carrier is prepared and heated until it melts6.

c. Melt evaporation: it is also known as the melting solvent method, in which the drug is dissolved in an appropriate liquid solvent and then incorporated directly into the melt of polyethylene glycol, further which is referred to as the melting solvent method.

TABLE 1: METHOD I

a. Preparation of solid dispersion[8]:

Formulation Code Carrier Drug: carrier Method	Carrier	Drug: carrier	Method
SD PEG1 SD PEG2 SD PEG3	PEG 6000	1:1 1:2 1:3	Solid dispersion (Melting method)
SD PVP 4 SD PVP 5 SD PVP 6	PVP K 30	1:1 1:2 1:3	Solid dispersion (solvent evaporation method)
PM PEG 1 PM PEG 2 PM PEG 3	PEG 6000	1:1 1:2 1:3	Physical mixture
PM PVP 1 PM PVP 2 PM PVP 3	PVP K 30	1:1 1:2 1:3	Physical mixture

b. Composition of the tablet formulated with Solid dispersion

S.No	Ingredients	Qnt/Tablet (in mg)	Qnt/Tablet (in mg)
1.	Solid dispersion (equivalent to Terbinafine Hydrochloride)	500	25
2.	Micro Crystalline Cellulose (Avicel- pH 102)	82.64	4.132
3.	Croscarmellose Sodium (Acdisol)	12.40	0.62
4.	Colloidal Silicon Dioxide (Aerosil 200)	1.86	0.093
5.	Magnesium Sterate	3.10	0.155
6.	Total weight	600	30000

TABLE 2: METHOD II

Coating composition, preparation method, and drug content of solid dispersion[9]

Carrier	Product name	Drug (mg)	Carrier (mg)	Ratio of drug to carrier	Drug content	Preparation and method
Polyvinyl pyrrolidone K30	A11	1500	1500	1:1	98±4.32	Solvent evaporation
Polyvinyl pyrrolidone K30	A12	1000	2000	1:2	91±1.06	Solvent evaporation
Polyvinyl pyrrolidone K30	A13	750	2250	1:3	86±3.12	Solvent evaporation
Polyvinyl pyrrolidone K30	A15	500	2500	1:5	83±1.59	Solvent evaporation
Polyvinyl pyrrolidone K30	PMA13	500	1500	1:3	96.2±2.09	Physical mixture

CONCLUSION:

The antifungal activity of terbinafine hydrochloride has been improved utilising the solid dispersion approach. The approaches employed for the enhancement and their evaluation are reflected in the above-mentioned combined work. The release profile of the created solid dispersion, which was characterised by drug content, was better than that of the pure drug and physical mixture.

REFERENCES:

1. Varun Raj Vemula, Venkateshwarlu Lagishetty, Srikanth Lingala, A review: solubility enhancement techniques, Volume 5, Issue 1, November – December 2010
2. Drug Information Antifungal antibiotics, AHFS; 2001.
3. Galia E, Nicolaides E, Horters D, Lobenberg R, Reppasc, Dressman B Evaluation of various dissolution media for predicting invivo performance of class I & II drugs, Pharm Res 1998, 15; 698-705.
4. BrahmankarD.M, Sunil B,Jaiswal, Bioavailability and Bioequivalence, Biopharmaceutics and pharmacokinetics A treatise,II edtn, Vallabh prakashan,2009,349-357.
5. Damian F, Blaton N, Naesens L, et al. Physicochemical characterization of solid dispersions of the antiviral agent UC-781 with Polyethylene glycol 6000 and Gelucire 44/14. Eur. J. Pharm. Sci. 2000; 10: 311-322.
6. Verheyen S, Blaton N, Kinget R, et al. Mechanism of increased dissolution of diazepam and temazepam from polyethylene glycol 6000 solid dispersions. Int J Pharm 2003.
7. .Chiou WL, Riegelman S. Pharmaceutical applications of solid dispersions systems J. Pharm. Sci 1971; 60: 1281-1302.
8. K. ArunPrasad, N. Narayanan, G. Rajalakshmi, preparation and evaluation of solid dispersion of terbinafine hydrochloride, Volume 3, Issue 1, July – August 2010.
9. Narendra Kumar, Akhilesh K Jain, Chhater Singh1 , Rajesh Kumar1, Development, characterization and solubility study of solid dispersion of terbinafi ne hydrochloride by solvent evaporation method, Asian Journal of Pharmaceutics - July-September 2008.