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Original Research Paper

STUDY THE EFFECT OF VARIOUS CARRIERS ON THE SOLUBILITY OF ACECLOFENAC

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ABSTRACT

Aceclofenac is a new non-steroidal anti-inflammatory drug (NSAID) having fewer side effects as compared to other NSAIDs. The drug suffers from poor bioavailability due to its poor aqueous solubility. Aqueous solubility plays an important role in the dissolution of drug in the gastrointestinal fluid. The present study investigates the use of various carriers like PVP K-30, PEG-6000, Mannitol and Lactose with respect to their effect in increasing the solubility of Aceclofenac and improves its bioavailability.

Keywords: NSAID, Phase Solubility, Bioavailability, Dissolution.

INTRODUCTION

Aceclofenac is nonsteriodal anti-inflammatory, analgesic and antipyretic drug used in rheumatoid arthritis, post-traumatic pain, masculo-skeletal and joint disorders.[1] Aceclofenac, a phenylacetic acid derivative. It is a potent inhibitor of cyclo-oxygenase which is involved in the production of prostaglandins.[2] It is White or almost white, crystalline powder. Practically insoluble in water, freely soluble in acetone, soluble in alcohol.[3] But the drug suffers from poor bioavailability due to its poor aqueous solubility. It belongs to BCS class II i.e Low solubility and high permeability.[3] Various approaches for increasing the aqueous solubility of drugs have been reported in literature. The use of carriers as cosolvents is one such approach. In the present work phase solubility studied on the pure drug and drug with the above mentioned carriers were performed by adding excess amount of drug to distilled water containing various concentrations of the carriers and spectrophotometric analysis of the filtrate done at 275nm.The solubility data obtained in solubility of aceclofenac as compared to the other carriers.

MATERIALS AND METHODS

Aceclofenac BP, PEG-6000, PVP K-30 Lactose and Mannitol were obtained from Indoco Remedies, Mumbai, Methanol (AR grade), Distilled water.

Calibration Curve of Aceclofenac

Aceclofenac 50 mg was weighed in 50 ml volumetric flask & 10 ml methanol was added and contents dissolved and volume was adjusted to 50 ml by using methanol. From this 10 ml of solution transferred into 100 ml volumetric flask and volume adjusted by using methanol, and further dilutions were made to

get concentrations in the range (10-70µgm/ml) and UV- absorbance was measured at 275 nm, using methanol as blank[3] (Figure I).

Phase Solubility Studies

Phase solubility studies on pure drug and with different carriers like PVP K-30, Mannitol, PEG-6000 and Lactose were performed by the method described by Higuchi and Connors.[5] Excess amount of drug (80 mg) was added to 100 ml of distilled water containing various concentrations of carriers (0, 2,4,6,8 and 10 % w/v). The suspensions were stirred for 3 hours at 37 ± 1ºC and filtered through Whatman no.1 filter paper. The filtrates so obtained were analyzed spectrophotometrically at 257 nm and corresponding concentrations of the drug were computed from the standard curve (Figure II).

RESULT AND DISCUSSION

The results of solubility studies for the Aceclofenac and PVP K-30, PEG-6000, Lactose and mannitol are shown in table and depicted graphically in figure II. It is observed that solubility of Aceclofenac increased as increase in concentration of carriers. The solubilising ability of the various carriers was found to be in the following order:

PVP K-30>PEG-6000>Lactose>Mannitol.

CONCLUSION

The above results suggests that PVP K-30 and PEG-6000 are useful carriers for enhancing the solubility of Aceclofenac and can be utilized for further formulation development in the form of solid dispersions for improving the bioavailability of drug.

Table I: Effect of various carriers on solubility of Aceclofenac

Sr. No.	Concentration of carrier (%W/V)	Solubility of Aceclofenac (µg/ml)			
		PVP K-30	PEG-6000	Lactose	Mannitol
1	0	45.21	45.21	45.21	45.21
2	2	48.17	47.38	47.12	46.9
3	4	52.42	51.13	49.55	49.15
4	6	63.69	63.26	56.18	55.86
5	8	83.6	64.74	63.97	58.96
6	10	86.55	84.96	70.94	66.55

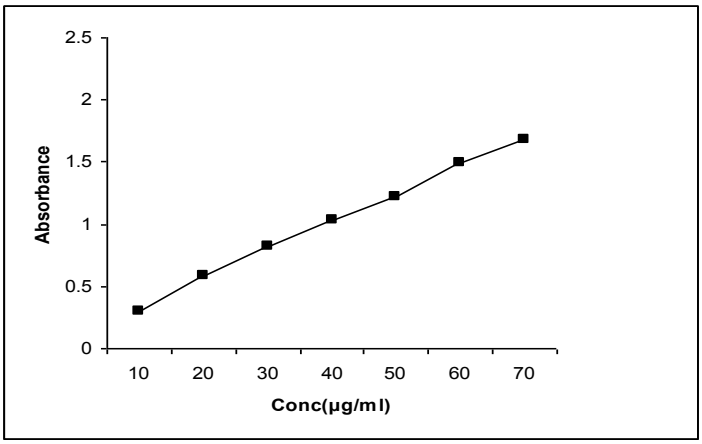

Figure I: Calibration curve of Aceclofenac in Methanol

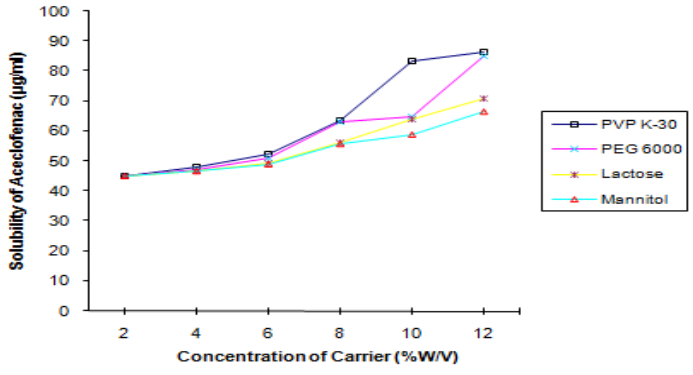

Figure II: Effect of carriers on solubility of Aceclofenac

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