Suitable Environment For Preparation of Drug Using Chitosan Microsheres

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Abstract: -The efficacy of many drugs is often limited by their potential to reach the site of therapeuticaction. In most cases (conventional dosage for ms), only a small amount of administered dose touches the aimed site, while the mostly of the drug spreads throughout the rest of the body in accordance with its physicochemical and biochemical properties. In many years, controlled drug dispatches formulations and the polymers followed in these systems have become much more sophisticated, with the ability todo more than simply extend the effective release period for a particular drug. So in this paper we discuss about the basic requirements that is necessary for preparation of drug using chitosan.

Keyword: Absorption, biological drug, chitosan, polymer concentration.

I. INTRODUCTION

The basic rationale for controlled drug delivery is to alter the pharmacokinetic s and pharmacodynamics of pharmacologically active moieties by using novel drug delivery systems or by modifying the molecular structure and/or physiological parameters inherent in a selected route of administration. It is desirable that the duration of drug action becomes more a design property of a rate-controlled dosage form, and less, or not at all, a property of the drug molecules inherent kinetic properties. Thus, optimal design of controlled release systems necessitates a thorough understanding of the pharmacokinetics and pharmcodynamics of drug. The successful designing of a drug delivery system also involves a basic understanding of the properties and characteristics of polymer and a thorough knowledge of the nature of polymer.

II. DRUG SELECTION

The bioavailability of drugs with an absorption window in the upper small intestine is generally limited with conventional pharmaceutical dosage forms. The residence time ofsuch systems and, thus, of their drug release into the stomach and upper intestine is often short. To overcome this restriction and to increase the bioavailability of these drugs, controlled drug delivery systems with a prolonged residence time in the stomach can be used [1].

Physic-chemical properties of drug

1. Dose size: The therapeutic dose of the drug should be low.
2. Aqueous solubility: Extremes in aqueous solubility of a drug are undesirable.
3. Partition coefficient: Extremes in partition coefficient of a drug are also undesirable.
4. Drug stability: Drug used for sustained drug deliver y should be stable over the entirelength of the gastro-intestinal tract.
5. Molecular size: Large molecules will show small diffusion coefficients and ma y beunsuitable for a sustained release system.

Biological properties

1. Biological half-life: A drug with a short half-life requires frequent dosing and this makes ita desirable candidate for sustained release formulation.
2. Absorption: Drugs thatare slowly absorbed or absorbed with variable absorption rate are poor candidates for sustained release formulation.
3. Distribution: Drugs with high apparent volumes of distribution are poor candidates.
4. Therapeutic index: Drugs with a narrow therapeutic index require precise control over the blood levels of drug placing a constraint on controlled release dosage form. Metformin hydrochloride was chosen as a model drug for the preparation of cross-linked microspheres.

III. PRECAUTIONS DURING PROCESSING

Metformin is avoided in those people who

- Have kidney problems
- Have liver problems
- Drink a lot of alcohol
- Have heart problems that is treated with medicines, such as Lanoxin (digoxin) or Lasix (furosemide)
- Are going to have an x-ray procedure with injection of dyes (contrast agents)
- Are going to have surgery

- Are 80 years or older and have not had kidney function tested [2, 3].

IV. ABSORPTION AND BIOAVAILABILITY

The absolute bioavailability of a metformin hydrochloride 500 mg tablet given under fasting conditions is approximately 50-60% [4]. Metformin doses of 0.5 to1.5 g have an absolute oral bioavailability of 40 to 60%. The discrepancy between the amount of drug absorbed and the amount available may result from presystemicclearanceor binding to the intestinal wall. Studies using single oral doses of metformin tablets of500 mg and 1500 mg, and 850 mg to 2550 mg, indicate that there is a lack of dose proportionality with increasing doses, which is due to decreased absorption rather than analteration in elimination.

Food decreases the extent of and slightly delays the absorption of metformin. The clinical relevance of these decreases is unknown.

It is rapidly distributed and negligibly bound toplasma proteins in contrast to sulfonylureas which are more than 90% protein bound,metformin partitions into erythrocytes, most likely as a function of time. At usual clinicaldoses and dosing schedules of metformin hydrochloride tablets, stead y state plasmaconcentrations of metformin are reached within 24-48 hours and are generally < 1 µg/ml.

During controlled clinical trials, maximum metformin plasma levels did not exceed 5µg/ml, even at maximum doses. No metabolites or conjugates havebeen identified.

V. CRITERIA FOR IDEAL POLYMER

- Easy to synthesize and characterize
- Non-toxic
- Non-immunogenic
- Biocompatible and biodegradable
- Inexpensive [5].

VI. PREPARATION OF STANDARD CURVES OF METFORMIN HYDROCHLORIDE

Concentration of met form in hydrochloride in the solution was estimated by stable beam spectrophotometer by reading the instrument at 233nm. The standard curve s were prepared in distilled water, pH 1.2 buffer, pH 6.8 buffer solutions and 0.1N HCl.

Preparation of buffer pH 1.2

50ml of the potassium chloride solution (0.2M) was placed in a 200ml volumetric flask and to it was added 85ml of hydrochloric acid solution (0.2M) and the n distilled water was added to make the volume to 200ml.

Preparation of buffer pH 6.8

50ml of the potassium di-hydrogen phosphate (0.2M) was placed in 200ml volumetric flaskand to it 22.4ml of sodium hydroxide solution (0.2M) was added and the volume was madeupto 200ml with distilled water.

Preparation of standard stock and working solution of drug indistilled water100mg of accurately weighed drug was dissolved in distilled water and the volume was made upto 100ml with distilled water. 1ml of standard stock solution was diluted to 10ml

with distilled water in a 25ml test tube to get a stock solution of 100µg/ml. Aliquots of0.06ml to 0.3 ml were pipetted out from the standard working solution and volume was made up to 3ml to obtain solution containing the desired concentration of met form in hydrochloride ranging from 2µg/ml to 10µg/ml. The absorbance of the different dilutions was measured at 233 nm against distilled water as blank using a stable beam spectrophotometer.

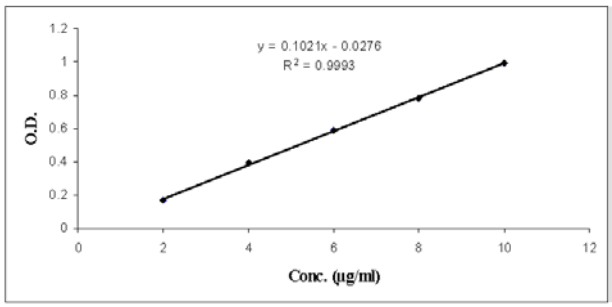

Figure 7: Standard curve of metformin in distilled water

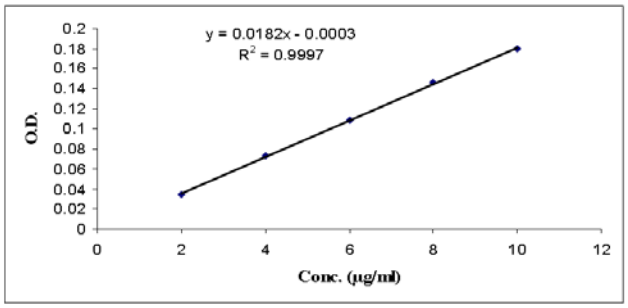

Figure 8: Standard curve of metformin in buffer of pH 1.2

VII. CONCLUSION

We study the basic requirements for the preparation of drugs by using chitosan. This paper is useful for the researchers and scientists which work on this salt. We also discussed some precaution for the researchers that help in control any tragedy. The above section explains the preparation of buffer ph using some necessary salt.

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