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A REVIEW ARTICLE ON SOLID LIPID NANOPARTICLES

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ABSTRACT

In recent years, there has been a lot of interest in solid lipid nanoparticles (SLNs), also known as lipid carriers, which have been the subject of a lot of research. Lipid nanoparticles have gained popularity due to the fact that they are generally considered to be non-toxic, biocompatible, and simple to manufacture formulations. Because they are biodegradable, nano-structured lipid carriers and SLNs are non-toxic to living organisms. Furthermore, they are extremely stable. Moreover, despite the fact that nano-structured lipid carriers and SLNs are based on lipids and surfactants, the effect of these two matrixes in the construction of excipients is also discussed, as is their pharmacological significance in novel drug delivery approaches, stability, and long-term preservation. The release mechanism of the drug as well as the various methods of preparation of solid lipid nanoparticles, as well as their advantages and disadvantages, are discussed in detail.

KEYWORDS: Solid lipid nanoparticles, Drug delivery, Controlled release, Drug release model, Homogenization.

Nanotechnology

Nanomaterial and nanotechnology are important components of emerging science and technology, and they have the potential to have a significant and long-lasting effect on the global economy. Having an impact on the newly developed tools for manipulating matter at the smallest scale are supporting revolutionary advances that will enable solutions to society's most pressing challenges and spur economic growth across a broad spectrum of economic segments, including agriculture, medicine, and energy.[2] [3]

Solid lipid nanoparticles (SLNs)

Solid lipid Nanoparticles (SLNs) are colloidal particles with sizes ranging between 10 and 1000 nm. They are made of synthetic or natural polymers and are particularly well suited for optimising drug delivery while also reducing toxicity.[7],[9] Over time, they have established themselves as a variable substitute for liposomes in the field of drug delivery. The ability of nanoparticles for drug delivery to penetrate through a variety of anatomical barriers, the sustained release of their contents, and their stability in the nanometer size range are all important factors in their successful implementation.[9] However, the scarcity of safe polymers with regulatory approval, as well as the high cost of such polymers, has prevented nanoparticles from being widely used in clinical medicine to date.[8] Lipids have been proposed as an alternate carrier to circumvent the constraints of polymeric nanoparticles, notably for lipophilic medicines.[19] These lipid nanoparticles are known as solid lipid nanoparticles (SLNs), which are attracting wide attention of formulators worldwide.[4] SLNs are colloidal carriers that were developed in the last decade as a replacement for traditional carriers (emulsions, liposomes and polymeric nanoparticles). They are a new class of submicron-sized lipid emulsions in which a solid lipid replaces the liquid lipid (oil). SLNs are appealing for their potential to improve the performance of medicines, neutraceuticals, and other materials due to their unique qualities such as tiny size, vast surface area, high drug loading, and phase interaction at interfaces.[4],[19] As a new colloidal drug carrier for intravenous applications, SLNs are gaining a lot of attention. SLNs are sub-micron colloidal carriers made up of physiological lipid that are dispersed in water or an aqueous surfactant solution. SLNs could usher in a new era of research and treatment.[4]

Advantages of SLNs

- Control and / or target drug release.
- Excellent biocompatibility
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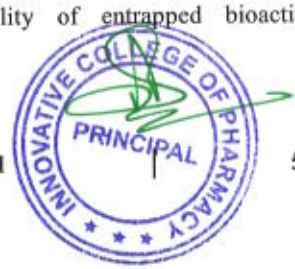

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A review on NiV (Nipah Virus): Precaution and treatments

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Submitted: 05-02-2022 Accepted: 20-02-2022

ABSTRACT:
Nipah virus is a zoonosis viral disease. Nipah virus, scientific name **Nipah henipavirus.** Nipah virus (NiV) was first discovered in 1999 following an outbreak of disease in pigs and people in Malaysia and Singapore. Twenty years ago, the world had only just discovered Nipah virus, a new zoonotic paramyxovirus closely related to Hendra virus. A concurrent disease outbreak in pigs and humans in Malaysia led to the discovery of this virus in 1999. Through the intermediate host involved in this outbreak—domestic pigs—the outbreak spread to Singapore, resulting in a total of 276 reported cases with 106 deaths; the outbreak ended with the culling of more than 1 000 000 pigs. Nipah virus (NiV) is a zoonotic virus, meaning that it can spread between animals and people. Nipah virus is also known to cause illness in pigs and people. Infection with NiV is associated with encephalitis (swelling of the brain) and can cause mild to severe illness and even death. Outbreaks occur almost annually in parts of Asia, primarily Bangladesh and India. Nipah virus infection can be prevented by avoiding exposure to sick pigs and bats in areas where the virus is present, and not drinking raw date palm sap which can be contaminated by an infected bat. During an outbreak, standard infection control practices can help prevent person-to-person spread in hospital settings. Currently there are no licensed treatments available for Nipah virus (NiV) infection. Treatment is limited to supportive care, including rest, hydration, and treatment of symptoms as they occur. The drug ribavirin was used to treat a small number of patients in the initial Malaysian NiV outbreak, but its efficacy in people is unclear. There is no right treatment for Nipah virus.
Key words: Nipah virus, zoonosis, pig.

I. INTRODUCTION:

Nipah virus (NiV) was first discovered in 1999 following an outbreak of disease in pigs and people in Malaysia and Singapore. Nipah virus is a zoonosis viral disease. Nipah virus, scientific name **Nipah henipavirus.** The Nipah virus outbreak in Malaysia (September 1998 to May 1999) resulted in 265 cases of acute encephalitis with 105 deaths, and near collapse of the billion-dollar pig-farming industry [1]. Nipah virus, is a bat-borne virus that causes Nipah virus infection in humans and other animals, a disease with a high mortality rate. Nipah virus belongs to the genus Henipavirus along with the Hendra virus, which has also caused disease outbreaks [2]. Nipah is a virus which commonly affects animals like bats, pigs, dogs, horses, etc. The virus can spread from animals to humans and can sometimes cause serious illness among humans [3]. Twenty years ago, the world had only just discovered Nipah virus, a new zoonotic paramyxovirus closely related to Hendra virus. A concurrent disease outbreak in pigs and humans in Malaysia led to the discovery of this virus in 1999 [4]. Through the intermediate host involved in this outbreak—domestic pigs—the outbreak spread to Singapore, resulting in a total of 276 reported cases with 106 deaths; the outbreak ended with the culling of more than 1 000 000 pigs [4,5]. Scientists and public health officials quickly learned that Nipah virus had the ability to spread from person to person [6]. NiV is belonging to the family of Paramyxoviridae, genus Henipavirus. Nipah virus is zoonosis viral disease, meaning of I.e. spread between the humans and animals. Infected food, water and fruits can spread the disease in humans [7,8]. On 4 September 2021, the Kerala State Health department reported an isolated case of Nipah virus disease in Kozhikode district, Kerala state, India. This is the fifth outbreak of the disease in India.

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Development and Evaluation of Ophthalmic Drug Delivery System

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Date of Submission: 20-08-2021 Date of Acceptance: 03-09-2021

ABSTRACT: This research paper is about development and evaluation of ophthalmic drug delivery system. In the current work an endeavour was made up to set up to create a sustained release in-situ solution to gel polymeric delivery system utilizing polymer (Pluronic F-127, Methyl cellulose, hydroxyl propyl methylcellulose, and polyethylene glycol 6000) as copolymers. Permeability, bioavailability & Solubility of drug was enhanced. We use cold method for preparation of polymer solution. The ultimate goal of formulating in situ solution to gel with enhanced pharmacokinetic with ideal discharge of drug was prepared.

I. INTRODUCTION

In this paper i.e., polymeric solution was prepared by cold method. It has normal features and benefits over conventional dosage in better form. Drug rapidly get discharge after giving it subcutaneously or via eyes.

Controlled drug delivery refers to the administration of a medication at a preset rate and/or location based on the requirements of the body and illness over a certain length of time. Controlling the drug's release has been done in a variety of ways. Drug alteration and dosage form modification are two typical approaches. One of the most frequent methods for delaying the release of the medication from the dosage form and therefore prolonging the effective time period is to change the dose form.

The lower critical solution temperature is the name for this transition temperature (LCST). The polymers are water soluble below this temperature. These polymers become hydrophobic and water insoluble above the LCST, resulting in solidification. To validate the sol–gel transition of such thermo-reversible polymeric solutions, several methods such as spectroscopy [10], differential scanning calorimetry (DSC), and rheology may be used

The increase in hydrophobicity causes physical reversible connection between the polymer chains, allowing gels to return to solution when the temperature stimulus that caused gelation is removed.

Because of their high compatibility, degradability within the biological system, and temperature sensitivity, biodegradable thermo-reversible polymers have been widely investigated

These polymer solutions are liquid at ambient temperature, but when injected into the body, they change into gels, a process known as the sol-gel transition. When opposed to gel/semisolid dosage forms, liquid dosage forms are easier to produce, package, and give quantitatively.

II. METHODOLOGY

Preparation of Diclofenac Sodium In-situ Gel Formulations

5mg diclofenac sodium+ 180mg PLF127 The solution is continuously stirred till clear solution is obtained The final solutions were sterilized by autoclaved Afterward it was evaluated for their physicochemical properties

Composition of Diclofenac Sodium thermoreversible gel

S. No	Formulation	Diclofenac Sodium (mg)	PL (mg)	F127	MC (mg)	PEG (mg)	Distilled Water
1.	DP18	5.0	180		-----	-----	qs to 1 ml
2.	DP20	5.0	200		-----	-----	qs to 1 ml

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RESEARCH ARTICLE

A review on Nanoparticles: Preparation and characterization of Nanoparticles.

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Innovative College of Pharmacy, Greater Noida, Uttar Pradesh-201308
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ABSTRACT:
The development of innovative medication delivery systems has increased at an exponential rate in the last few years. Nanoparticles are particles with a size of between one and one hundred nanometers. Nanoparticles provide substantial benefits over conventional drug administration in terms of high bioavailability, high stability, high drug-carrying capacity, and other characteristics. This review concentrated mostly on the classification of nanoparticles, the technique of synthesis, the evaluation of nanoparticles, and the list of FDA-approved nanomedicines now available on the market.

KEYWORDS: Nanoparticles, conventional drug therapy, nanomedicines, drug-carrying capacity.

INTRODUCTION:

Nanotechnology is a fascinating field for developing medication delivery systems based on nanoparticles with dimensions ranging from 1 to 100 nanometers. Nanoparticles have the potential to deliver a wide variety of compounds to different parts of the body for long periods.

Materials with overall dimensions in the nanoscale, or less than 100 nanometers, are referred to as nanoparticles. These materials have emerged as key players in modern medicine in recent years, with applications ranging from contrast agents in medical imaging to gene carriers for individual cell delivery[1]. The term *nanomaterial* is described as "a manufactured or natural material that possesses unbound, aggregated or agglomerated particles where external dimensions are between 1–100 nm size range", according to the EU Commission. The British Standards Institution proposed the following definitions for the scientific terms that have been used in table 1.

Table 1: Shows the relationship between nanoscience and nanotechnology.

Nanoscale	Approximately 1 to 1000 nm size range.
Nanoscience	The science and study of matter at the nanoscale that deals with understanding their size and structure-dependent properties and compares the emergence of individual atoms or molecules or bulk material-related differences.
Nanotechnology	Manipulation and control of matter on the nanoscale dimension by using scientific knowledge of various industrial and biomedical applications.
Nanomaterial	Material with any internal or external structures on the nanoscale dimension.
Nano-object	Material that possesses one or more peripheral nanoscale dimensions.
Nanoparticle	Nano-object with three external nanoscale dimensions. The terms nanorod or nanoplate are employed, instead of nanoparticle (NP) when the longest and the shortest axes lengths of a nano-object are different.
Nanofiber	When two similar exterior nanoscale dimensions and a third larger dimension are present in a nanomaterial, it is referred to as nanofiber.
Nanocomposite	Multiphase structure with at least one phase on the nanoscale dimension.
Nanostructure	Composition of interconnected constituent parts in the nanoscale region.
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Review On: Preparation and Evaluation of Mucoadhesive Microsphere of Ofloxacin

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Date of Submission: 01-08-2021 Date of Acceptance: 14-08-2021

ABSTRACT
In the current work an endeavor was made to set up a Mucoadhesive microsphere of Ofloxacin utilizing microcrystalline cellulose (avicel PH 102) alone and in mix with [Polyethylene glycol-4000(PEG-4000), Polyethylene glycol-6000(PEG-6000)]; polyvinylpyrrolidone k-30 (PVP K-30) and gellucire 50/13 as copolymers. We choose direct compression techniqueto acquire quick delivery for oral conveyance. Dissolvability of Ofloxacin (an ineffectively water-solvent medication) was improved by the surface strong scattering strategy utilizing MCC as a transporter with PVP K-30, and gelucire 50/13 by the dissolvable vanishing technique. The ultimate goal of creating mucoadhesive microsphere of ofloxacin with ideal drug discharge was prepared.

I. INTRODUCTION

In this paper i.e., Mucoadhesive microsphere are prepared by direct pressure technique. It has general features & benefits over conventional dosage form in better form Mucoadhesive Microspheres are deteriorating and additionally disintegrate rapidly in the salivation without water. Some microspheres are intended to smash up in salivation surprisingly rapid, inside wit in a few second, & are swift dissolving microspheres. Others contain specialists to improve the pace of microsphere breaking down in the oral cavity, and are all the more properly said to be swift dissolving microspheres, as they may draw as long as a moment to totally deteriorate.

Oral route is most favoured administration route due to lower cost therapy and also can be administered easily i.e., Desirable for patient. Oral dosage form that are said conventional provide specific concentration of drug in systemic circulation without any control on delivery of drug and leads to fluctuations in plasma drug level.Oral drug delivery system has many advantages like increase efficacy drug activity duration, patient compliance, dose frequency decrement, route administration, reduce adverse effect and specific delivery to the site.

This microsphere design is intended to permit organization of an oral strong portion structure without water or liquid admission. Such microspheres promptly shutter down or deteriorate in the spit by and large inside <60seconds. Rapid dissolving microspheres is being found for child, geriatric, and disabled patients.

Different convention that may find issues utilizing regular oral measurements structures incorporate the intellectually sick, the formatively handicapped, and patients who are uncooperative, on diminished fluid admission designs, or are disgusted

Strong dose structures are mainstream in light of simplicity of, exact measurement, self-drug, torment evasion & in particular the consistence of patient. The most famous high measurement structures are found to be microspheres & cases; one significant downside of this dose structures for certain patients, is the bother for swallowing.

The upside of mouth soluble structures is progressively been perceived in both, scholastics & industry. The significance of developing was noted as of late when pharmacopeia Europe meet with the expression "Oro-dispersible microsphere" as a microsphere that to be set in the mouth where it scatters swiftly prior to gulping. As indicated by European pharmacopeia, the ODT ought to scatter/break down in 3 minutes.

The methodology i.e., being formulated of MUCOADHESIVE MICROSPHERE is the utilizing the disintegrants like super disintegrant like cross connected carboxymethyl cellulose &, sodium starch glycolate (primo gel, EXPLOTAB), polyvinyl pyrrolidone (polycladose) and so on, those perform immediate deterioration of microsphere just after placing on tongue, by discharging the medicament in salivate. The bio-availability of certain medicament could only be enlarged just coz of retention of medicament depressing in buccal cavity and further-more because of pre gastric assimilation of salivation

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Review On: Preparation and Evaluation of Mucoadhesive Microsphere of Ofloxacin

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ABSTRACT
In the current work an endeavor was made to set up a Mucoadhesive microsphere of Ofloxacin utilizing microcrystalline cellulose (avicel PH 102) alone and in mix with [Polyethylene glycol-4000(PEG-4000), Polyethylene glycol-6000(PEG-6000)]; polyvinylpyrrolidone k-30 (PVP K-30) and gellucire 50/13 as copolymers. We choose direct compression techniqueto acquire quick delivery for oral conveyance. Dissolvability of Ofloxacin (an ineffectively water-solvent medication) was improved by the surface strong scattering strategy utilizing MCC as a transporter with PVP K-30, and gelucire 50/13 by the dissolvable vanishing technique. The ultimate goal of creating mucoadhesive microsphere of ofloxacin with ideal drug discharge was prepared.

I. INTRODUCTION

In this paper i.e., Mucoadhesive microsphere are prepared by direct pressure technique. It has general features & benefits over conventional dosage form in better form Mucoadhesive Microspheres are deteriorating and additionally disintegrate rapidly in the salivation without water. Some microspheres are intended to smash up in salivation surprisingly rapid, inside wit in a few second, & are swift dissolving microspheres. Others contain specialists to improve the pace of microsphere breaking down in the oral cavity, and are all the more properly said to be swift dissolving microspheres, as they may draw as long as a moment to totally deteriorate.

Oral route is most favoured administration route due to lower cost therapy and also can be administered easily i.e., Desirable for patient. Oral dosage form that are said conventional provide specific concentration of drug in systemic circulation without any control on delivery of drug and leads to fluctuations in plasma drug level.Oral drug delivery system has many advantages like increase efficacy drug activity duration, patient compliance, dose frequency decrement, route administration, reduce adverse effect and specific delivery to the site.

This microsphere design is intended to permit organization of an oral strong portion structure without water or liquid admission. Such microspheres promptly shutter down or deteriorate in the spit by and large inside <60seconds. Rapid dissolving microspheres is being found for child, geriatric, and disabled patients.

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RESEARCH ARTICLE ON FORMULATION AND EVALUATION OF COLON TARGETED MUCOADHESIVE MICROSPHERE OF ACECLOFENAC

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ABSTRACT

The colon may be one of the finest sites for drug delivery because of the long residence time and the low digestive enzymatic activity; this may be useful for prolonged drug delivery. Also it is a prospective site for systemic delivery of therapeutic drugs. Mucoadhesive microspheres are comprehensively proved as a targeted drug delivery system for pharmaceutical appliances. To formulate and evaluate the colon targeted mucoadhesive microsphere of Aceclofenac. Formulation containing sodium alginate as a release retarding polymer and pectin as a mucoadhesive polymer prepared by ionotropic gelation method using calcium chloride as cross-linking agent. Mucoadhesive microsphere was enclosed in to hard gelatin capsule and capsule shell was coated with pH sensitive polymer to prevent the adherence of mucoadhesive microsphere in upper GIT. The microspheres were evaluated for physical characteristics such as surface morphology by scanning electron microscopy, drug entrapment efficiency, in vitro drug release and in vitro mucoadhesion. The optimized formulation was found on the basis of evaluation of mucoadhesive microspheres. Formulation (A30) showed the best result as drug entrapment efficiency 82.5%, in vitro drug release 98.7% and in vitro mucoadhesion 84%. Capsule was subjected to evaluate for in vitro drug release, disintegration time and drug release kinetic model was found as 96.43%, 2.41±1.16904 hr and first order model with R^2 is0.951 respectively. The microspheres are found to have a good mucoadhesive property. Due to the mucoadhesive property of microsphere it was adhering to colonic mucosa for extended period of time and exerts local action in colonic mucosa. The outer enteric coating provided a satisfactory acid resistibility due to negligible release of drug in upper GIT. This proves the ability of the formulated capsule to sense the arrival of the dosage form to the colon where it gave the highest release. Thus it is signifying a promising sustained release drug delivery system.

KEYWORDS: Aceclofenac, Calcium Chloride, Colonic Mucosa, Hard Gelatin Capsule Sodium Alginate.

INTRODUCTION

Colon is a part of digestive system and is responsible for absorbing water from stool before it exit the body. Colon is also known as the large intestine, where the solidifying and processing of solid wastes take place with the aid of bacterial flora. Colon drug delivery system refers to targeted delivery of drug in to the lower parts of GI tract, mainly large intestine.

Colon drug delivery has gained increased importance not just for the delivery of drug for the treatment of local disease associated with the colon, such as chrone's disease, ulcerative colitis, colorectal cancer, also it is a potential site for systemic delivery of therapeutic drugs (Brahmankaret. al, 1995). Drug targeting to colon is useful when a delay in drug absorption is desired from the therapeutic point of views, an oral colonic delivery system should retard drug release in the stomach but allow complete release in the colon. Treatment might be more effective, if the drug substance were targeted directly on the site of action in the colon(Kramer et al., 2003; Krogars et al., 2000; Sarasija et al.,2000).

There are several approaches, which is utilized in achieving colon targeting include use of pH, enzyme, transit time and microbial flora. (Sarasijaet al., 2000; Chourasia et al., 2003). The site specific delivery of drug to the target receptor site has the potential to reduce side effects and to increase pharmacological response. Frequent administration of drug is necessary when those have shorter half life and all these leads to decrease in patient's compliance (Rajkumar et al., 2012).In order to overcome the above problems, various types of

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