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A REVIEW - SELF NANOEMULSIFYING DRUG DELIVERY SYSTEM (SNEDDS)

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ABSTRACT

The Drug Delivery System (SNEDDS) is a new drug delivery system to improve the water solubility of water-soluble drugs. It is an isotropic mixture of oil, surfactant, cosurretive molecules, and also contains co-solvent molecules. It is the system of Drug Administration is thermodynamically and kinetically stable. The system of Drug Administration with mild agitation is followed by dilution of aqueous media such as GI liquid and stable Nano emulsion can O / W. Having the size of the blood cells is less than 100 nm. It is an important type of drug delivery system to maintain chemical stability as well as drug solubility. Self- Nanoemulsifying drug delivery system (SNEDDS) is an important application in Class II and IV BCS drugs to improve water solubility of water-poor drugs. It is important to prevent the interfacial tension and improving the dissolution as well as absorption rate of drug molecule. It is Novel Drug Delivery System is Applicable for parenteral, Ophthalmic, intranasal and cosmetic drug delivery system. And the present review describes Preparation, components, mechanism, of self-Nano emulsification, biopharmaceutical aspects, characterization methods and applications of self-Nanoemulsifying drug delivery system (SNEDDS) For Enhancement of oral Bioavailability of poorly water soluble drugs.

KEYWORDS: Nano emulsion, Mini emulsion, Submicron emulsion, Surfactant, Self-emulsifying system and Psedoternary Phase.

INTRODUCTION

The auto emulsion Drug Administration system (SNEDDS) is an isotropic mixture of natural

or synthetic oil, surfactants and co-surfactants that have a unique ability to form Nano emulsions of fine water oil (O/W) under mild agitation followed by aqueous media1. The auto-nano drug supply system that has a buttock size flow rate is less than 100 nm below water dispensations. In recent years, the self-emulsifying drug delivery system (SNEDDS), the self-igniting drug delivery system (SMEDDS) and the self-emulsifying drug delivery systems (SEDDS) have been used to improve the solubility of water-soluble drugs. The formulation of the system of administration of self-emulsifying drugs was formulated with the use of medium-chain triglycerides and non-ionic surface oils, it is important for oral ingestion. The drug was subjected to absorption of the restriction of the rate of dissolution limitation, the drug was under SNEDDS is important for improving the rate, as well as the absorption of drugs and the reproducibility of the plasma profile of the drug concentration.

SNEDDS is one of the stable nano emulsions is important to provide a large interfacial area for the partition of the drug between the oil and the aqueous phase. Have a better rate of drug dissolution and increase the bioavailability of the drug formulation.

The auto-nanoemulsifying drug delivery system is thermodynamically stable and transparent or translucent non-ionized dispersion of (o/w) and (w/o) nanogel emulsion has been stabilized by the addition of Surfactant and co-Surfactant molecules. The system of automatic Drug Administration is also known as Nano emulsion, Miniemulsion, ultrafine emulsion, submicron emulsion. The o/w Nano emulsion of the automatic Drug Administration system (SNEDDS) in mild agitation followed by aqueous media to form a stable o/w Nano emulsion is shown in Figure 1.

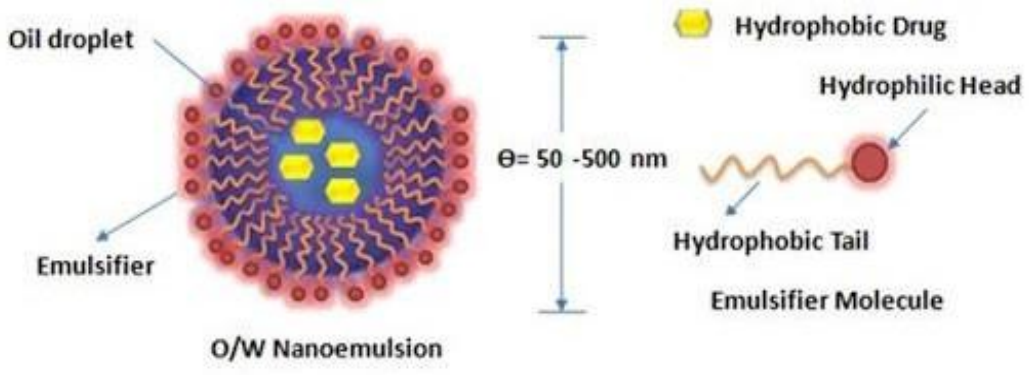

Figure No.1: Formation of o/w Nano emulsion.

Comparision between Self-Emulsifying Drug Delivery System (SEDDS) and Self-Micro Emulsifying Drug Delivery System (SMEDDS)

For better understanding of the concept of self-emulsification (SEDDS) and Self Micro emulsification (SMEDDS) was clearly differentiates and the differentiation was reported in Table No.1

Table No. 1: Differences between SEDDS and SMEDDS.

S.No	SEDDS	SMEDDS
1	It is a mix. drug, oil, surfactant	It is a mix. drug, oil, surfactant, co-surfactant
2	Droplet size was 100-300nm	Droplet size was Less than 50 nm
3	turbid appearance	Transparent appearance
4	Thermodynamically not stable	Thermodynamically stable
5	Ternary phase diagram is required to optimize the SEDDS	Psedoternary phase diagram is required to optimize SMEDDS

Comparision of Self Nanoemulsifying Drug Delivery System (SNEDDS) and Self Microemulsifying Drug Delivery System (Smedds)

The Comparision between Nanoemulsion (SNEDDS) and microemulsion (SMEDDS) is shown in Figure No.2 having the A is Indicate as Nanoemulsion and B is Indicate as Microemulsion according to their Transparency is shown in Figure No.2.

The Comparision between Self-micro emulsifying drug delivery system (SMEDDS) and Self Nanoemulsifying drug delivery system (SNEDDS) was reported in Table No.2.

Table No. 2: Comparision between SMEDDS and SNEDDS.

S.No	SMEDDS	SNEDDS
1	It is Self-Micro emulsifying drug delivery system	It is Self-Nano emulsifying drug delivery system
2	It is turbid in nature	Less energy required for preparation
3	Large amount of energy is required for preparation as compare to nano emulsion	Less energy required for preparation
4	Droplet size is 100-300nm	Droplet size is less than 100nm
5	It is thermodynamically stable	It is thermodynamically and kinetically stable
6	It is optimized by ternary phase diagram	It is optimized by Psedoternary phase diagram

Appropriate Drug Candidate for SNEDDS

The Self Nanoemulsifying Drug Delivery (SNEDDS) System is a Novel Approach for

Enhancement of oral Bioavailability of Poorly Water-Soluble Drugs. In Biopharmaceutical classification system (BCS) can Classify Four Classes, In Class II and Class IV Drugs Having Less Water Solubility as Compared to Class I and Class III drug. The Class II and Class IV Drugs under Self Nanoemulsifying Drug Delivery System (SNEDDS). They can able to Increases Water Solubility and Increases Oral Bioavailability. The Self Nanoemulsifying Drug Delivery System (SNEDDS) is Important to Prevent Problem of Enzymatic Degradation Associated to Class I and Class III drug and Improved Solubility and Bioavailability. A schematic Representation about Biopharmaceutical Classification System (BCS) having four classes of system is based on solubility and permeability analysis is shown in Figure No.2

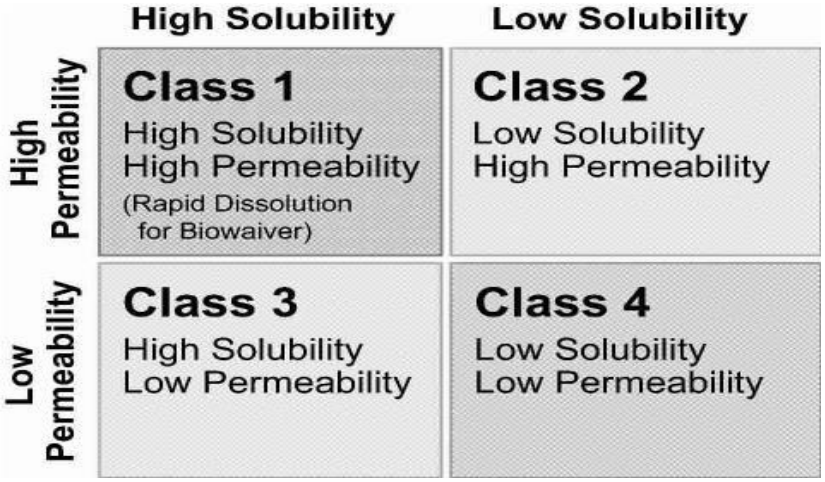

Figure No. 2: Biopharmaceutical Classification System.

TYPES OF NANOEMULSION (SNEDDS)

1) Water in oil (W/O) Nanoemulsion

In Which Droplet of Water was dispersed in Continuous Phase oil.

2) Oil in water (O/W) Nanoemulsion

In Which Oil droplet was dispersed in Continuous Phase Water.

3) Bi-continuous Nanoemulsion

In which Surfactant was Soluble in Both Oil as well as water Phase, and droplet was dispersed in both Oil as well as water phases.

Advantages of Self Nano Emulsifying Drug Delivery System (Snedds)

1) Nanoemulsion (SNEDDS) has a very large surface area and free energy compared to

micro emulsions (SMEDDS).

2) The self-emulsification system of Drug Administration is important for improving bioavailability.
3) The ability of Nano emulsion (SNEDDS) to dissolve large amounts of lipophilic drugs, along with their ability to protect drugs from hydrolysis and enzyme degradation make them ideal vehicles for parenteral transport.
4) SNEDDS it is important to provide ultra-low interfacial voltage and provide a large interfacial area O/ W.
5) Nanoemulsion (SNEDDS) has been formulated in a variety of formulations such as liquids, aerosols, foams, creams, ointments and gels and is used as a Nano emulsion in the pharmaceutical field, as well as it is used in the administration system of drugs such as oral, topical and parenteral nutrition.
6) In the self-Nanoemulsifying Drug Delivery System (SNEDDS) is essential for oils and its main components have the number of applications in medicine, food, beverage, storage, cosmetics and is also used for perfume and pharmaceutical industries.
7) It is used as Ayurvedic system and unnani system.
8) The automatic Drug Administration system (SNEDDS) which has a specific and specific Drug Administration system.

Dis Advantages of Self Nano Emulsifying Drug Delivery System (Snedds)

1) The preparations of Nanoemulsion (SNEDDS) are difficult to prepare because the high-pressure homogenizer as well as ultrasonic equipment was available in recent year and the nano emulsion preparation was expensive.

2) The Stability of Self Nanoemulsifying drug delivery system was affected by Temperature and Ph.

COMPONENTS

In self Nanoemulsifying system is consist

1) Oil 2) Surfactant 3) Co-surfactant 4) Co-solvents

1) Oil

The system of administration of medicines self-multive (SNEDDS), in which the selection of the phase to the oil specification is a very important parameter for the selection of the ingredients in Nanoemulsione, is mainly associated with the nanoemulsione O/W. oil is important for maximum solubility for the drug candidate selected, it is important for the

selection of the phase of the oil for the formulation of the nanoemulsione. This is the most important approach that has the high transport capacity of drugs. The mixture of oils and fats naturally and synthetically are triglycerides contained in long chain fatty acids.

Triglycerides are classified as short-chain triglycerides (<5 carbons, medium-chain triglycerides (6-12 carbon atoms), or long-chain triglycerides (>12 carbons) is important to reduce the degree of unsaturation and is important to prevent oxidative degradation. The choice of the oil phase depends on the ability of the solubilized drugs and is important by the Nano emulsion of the desired characteristics. Oil is important to increase the friction for the transport of drugs in the intracellular compartment is important to increase the water solubility of fewer water-soluble drugs.

For example, the mixture of fixed oil and medium-chain triglycerides is important to maintain an adequate balance between drug carrying capacity and emulsion or nano emulsification.

Long-chain and medium-chain triglyceride oils under varying degrees of saturation are important for use in SMEDDS design. Triglycerides are highly lipophilic oily molecules, and the solvent capacity of drugs is the common function of effective concentration in groups of esters, medium-chain triglyceride molecules (MCT) which have a higher solvent capacity and oxidation resistance capacity than long-chain triglyceride molecules. Now, MCT have been replaced by a new semi-synthetic MCT is important to affect the water solubility of low solubility drugs and the oil phases are modified by vegetable oils, digestible or non-digestible oils and fats such as olive oil, palm oil, corn oil, oleic acid, sesame oil, soybean oil, hydrogenated oil for better solubility.

2) Surfactant

Surfactant is defined as molecules and ions are adsorbed into the interface, i.e. surfactant. It has the ability to prevent interfacial voltages and provide interfacial area. It is an important component for the preparation of Nano emulsion. It acts has self-Nanoemulsifying, self-emulsifying and micro emulsifying self-agent is the ability to solubilize soluble small water-soluble drug. Most compounds may exist the properties of surfactants for the design of the emulsification system. The limited surfactant unit is acceptable orally. Mainly non-ionic surfactants have a high hydrophilic and lipophilic balance (HLB). The most commonly used surfactants are several solid or liquid ethoxylated glycerides and oleates 20. The optimal amount of surfactant unit is used for the preparation of the Nano emulsion, but a large

amount of surfactant can toxicity chemicals. Therefore, safety is a very important parameter for the selection of molecules. The surfactant molecule is obtained in natural and synthetic origin. Simpident with limited automatic emulsion capacity. The non-ionic surfactant more stable than the Ionic surfactant molecule and are non-toxic and thermodynamically stable molecules. Lipid mixtures of molecules with increased surfactant and co-surfactant ratios and oil lead to the formation of SMEDDS and SNEDDS is responsible for improving the oral bioavailability of water-soluble drugs. The concentration of surfactants is mainly based on the size of the droplet molecule for the preparation of emulsion and nanoemulsion. This is important to stabilize the oil drop under part of the surrogate system. The concentration of surfactants mainly depends on the size of the droplets that the concentration of surfactants was ultimately increasing the size of the droplets. It is important component of the preparation of the nanoemulsion system to improve the solubility of drugs that are not soluble in water.

Classification surfactant molecule

Surfactant molecule is mainly classified has four types; 1) Anionic surfactants

2) Cationic surfactants 3) Ampholytic surfactants 4) Non-ionic surfactants

Anionic Surfactants

The hydrophilic group carries a negative charge is known as Anionic Surfactant. The negative charged group such as carboxyl (RCOO-), sulphonate (RSO3 -) or sulphate (ROSO3-).

Examples - Potassium laurate, sodium lauryl sulphate.

Cationic surfactants

The hydrophilic group carries a positive charge is known has cationic Surfactant.

Example - quaternary ammonium halide.

Ampholytic surfactants / Zwitter or Zwitterionic surfactants

The surfactant unit consist of both charges Positive as well as negative Charge.

Example - sulfobetaines.

Non-ionic surfactants

The hydrophilic group carries no charge but derives its water solubility because it can contain strong polar functional groups such as hydroxyl or polyoxyethylene (OCH2CH2O).

Examples - Sorbitan esters (Spans), polysorbates (Tween 20).

3) Co-surfactant

Co-surfactant is a function similar to the surrogate unit. Co-surfactant was added together with the combination of surfactant units or surfactant units to increase the surfactant capacity to improve the water solubility of water-soluble drugs. Co-surfactant is a single unit of chain surfactants are capable of preventing interfacial fluidity. The co-surfactant molecule comes into contact with surfactant, oil and water which can separate from monomolecular layer of surfactant molecule. The monomolecular layer of the surfactant molecule is known as the liquid crystal formation layer. The most important application of cosurfacactant in the automatic administration system of nanoemulse drugs (SNEDDS) is to prevent interfacial tension between the oil and the water interface.

Co-surfactant like Ethanol, Methanol, Pentanol, Glycol, Propylene Glycol.

Co-solvent

Co-solvent is important to prevent interfacial tension and provide the larger Surface area. It is important to increasing oral bioavailability of poorly water-soluble drugs.

Factors

The Nature or Type of drug is important factor for preparation of nanoemulsion and Concentration of surfactant is always optimum because larger quantity of surfactant can show toxicity.

Mechanism

Auto nanoemulsion occurs, Entropy is changes which favours the dispersion is greater than energy needed to increase the dispersion surface so the free energy of conventional emulsion is the direct function the energy is needed to create new surface between oil and water phase and stabilized emulsion.

The free energy of conventional emulsion is associated with ΔG,

$$\Delta G = \sum_{i} N_i \pi r_i^2 \sigma$$

Where,

ΔG = free energy associated with the process

N = number of droplets **r** = Radius of droplets **б** = interfacial energy

The Two phases of emulsion tend to separate with time to reduce the interfacial area, and subsequently, the emulsion is stabilized by emulsifying agents.

PREPARATION OF SELF NANO EMULSIFYING DRUG DELIVERY SYSTEM (SNEDDS)

The Preparation of Self Nanoemulsifying drug delivery system (SNEDDS) is Prepared by two ways

1) Preparation of Liquid SNEDDS

This is an important method for the preparation of the automatic Drug Administration system that has the surfactant/co-surfactant ratio and the oil/S/CoS ratio has been selected from the psedoternary phase diagram. A number of forms have been prepared from different concentrations of oil, surfactant and cosurfactant. The oil and surfactant were weighed in appropriate properties and the drug was dissolved in this mixture and the mixture was dissolved at room temperature.

2) Preparation of Solid SNEDDS

It is the second most important method for the preparation of the automatic system of automatic administration of drugs by nano-evocation (SNEDDS) prepared by mixing Sant 'absence of selected SNEDDS it was by mixing in a small mortar and plague. The resulting wet mass is passed through sieve No. 120 and dried at room temperature.

Methods For Preparation of Self Nanoemulsifying Drug Delivery System (Snedds)

1) High energy approach

The formation of the nanoemulsion method is a high-energy is based on the selected composition of the mixture, the mixture containing the surfactant, cosurfactant, cosolvents and other functional compounds and for the preparation of the mixture is applied energy. The emulsion is mechanically processed from the nanoemulsion.

2) High Pressure Homogenizer

The high-pressure homogenizer is one of the important devices for the detection and preparation of nanoemulsion. It is an important device for the production of fine emulsions. This method is important in that the oil in the mixture of surfactants water under very high pressure and the mixture was pumped by resistive valve. The very high cutting tension is responsible for the formation of very fine emulsion droplets. The combination of two theories, turbulence and cavitation, explain the reduction in the size of droplets during the

homogenization process.

The high speed of the resulting mixture gives the high energy liquid in the homogenization valve generates intense turbulent vortices of the same size as the average diameter drop (MDD). The drops were separated from Eddie's currents, resulting in a reduction in the size of the droplets. At the same time, the pressure drops through the valve, cavitation occurs and generates multiple vortex interruption droplets. The decrease in the size of the gap ultimately increases the pressure of the drop, responsible for a higher degree of cavitation. Emulsion droplets with diameters up to 100 nm can be produced using this method if the sufficient amount of surfactant present to completely cover the oil-water interface mixture formed and the adsorption Kinetics was high, it is important to avoid the coalescence of the droplets**.**

3) Micro fluidization

It is an important device for detecting and preparing nanoemulsion. The micro fluidization technology makes use of a device called "Micro Fluidizer". This type of device is used in high pressure positive displacement pump (500-300 PSI) which forces the product through the interaction chamber, which can consist of small drop channels is called as micro channels. The product crossed the microcar channels in the impingements area, which resulted in very fine particles of submicron gamma, i.e. nanoemulsion.

The two solutions containing the aqueous phase mixture and the oil phase system are in combination and are formed in the inline homogenizer for emulsion performance, of course. The emulsion of the course was formed in the processing of a micro fluidizer and subjected to further processing by homogeneous, transparent and stable nanoemulsion.

4) Sonication Method

This type of method is important for determination of size of droplet and it is important for reduced size droplet of conventional emulsion with the help of sonication mechanism. It is only applicable for small batches of Nanoemulsion.

5) Phase inversion Method

The phase reversal method is important for the preparation of microemulsion and nanoemulsion. The method is mainly based on the temperature response. In this type of method there are many physical changes that may include physicochemical changes, particle size and in vivo-in-Time Trumpet release rate. These methods make use of changing the

spontaneous formation of the emulsion. Non-ionic surfactant can be obtained by changing the temperature of the system. The forcing of an O/W nanoemulsion transition formed at a low temperature and W/O Nanoemulsion formed at a higher temperature.

6) Psedoternary Phase Diagram

The spectral phase diagram is important for the determination of the Self Nanoemulsifying drug delivery system (SNEDDS). It is the schematic representation of Petroleum, surfactants and co-surfactant (S mix), water is known as Psedoternary phase scheme. The Psedoternary phase diagram was created using the phase evaluation method and the phase reversal method. The procedure consisted in the preparation of solutions containing oil and the different ratio of surfactant and co-surfactant by weight as 1: 1, 2; 1, 3:1 etc., these solutions then vortex for 5 minutes and the isotropic mixture was obtained. Observed by its appearance (cloudy or clear). The turbidity of the samples would indicate the formation of a thick emulsion, while a clear isotropic solution would indicate the formation of a percentage of nanoemulsion oil, mixture and water (SNEDDS). The values were used to prepare the pseudoternary phase diagram. This angle of the diagram can represent the 100% concentration of the content of each phase. The diagram is important to provide information related to the binary mixing of two components such as surfactant / cosurfactant, water / drug or oil / drug. The Psedoternary phase diagram is represent mixture of surfactant, co-surfactant, oil, and water phase is shown in Figure No.3

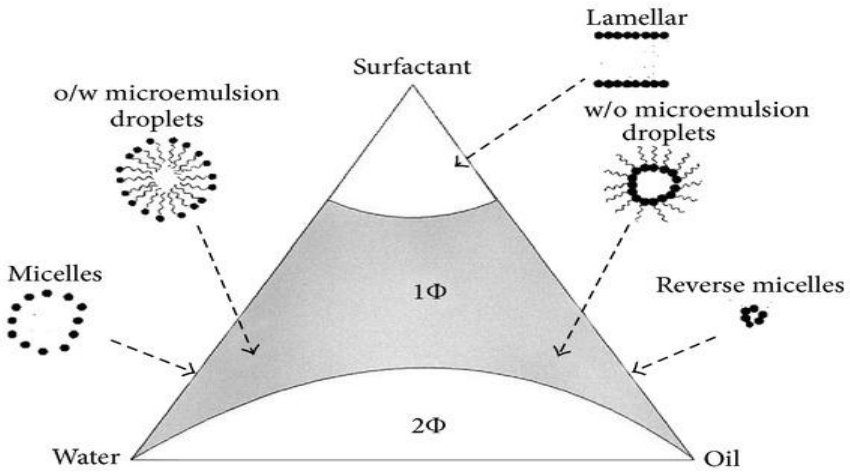

Figure No. 3: Psedoternary Phase diagram.

EVALUATION OF SELF NANO EMULSIFYING DRUG DELIVERY SYSTEM (SNEDDS)

1) Thermodynamic stability of emulsion

The thermodynamic stability of the lipid-based formulation is also crucial for its performance, which can be adversely affected by the precipitation of the drug in the matrix of excipients. In addition to poor formulation thermodynamic stability can lead to phase separation of excipients that affect not only formulation performance and visual performance.

2) Centrifugation study

The formulations were centrifuged using laboratory centrifuge at 5000 rpm for 30 min. The resulting formulations were examined for possible instability problems, such as phase separation or cracking cremation. Stable formulation selected for subsequent studies.

3) Heating and cooling cycle

Three heating / cooling cycles between 4 ºC and 40 ºC with storage at each temperature for not less than 24 hours. The resulting formulations were evaluated for their thermodynamic instability such as phase separation and precipitation. Formulation that passes this test subjected to further testing.

4) Freeze thaw cycle

Freezing freezing was used to assess the stability of the SNEDDS. The formulations underwent 3 freezing cycles of freezing, which included freezing at 4 ºC for 24 hours, followed by thawing at 40 ºC for 24 hours. Centrifugation was performed at 3000 rpm for 5 min. Phase separation formulations were then observed. S mix concentrations have been optimized for formulation.

5) Droplet Size

The size of the drops (SNEDDS) was determined by Photon correlation spectroscopy that analyses fluctuations in light diffusion due to Brownian motion of the particle, using a zetasizer 1000hs (Malvern Instruments, UK). The light dispersion was monitored at 25 ºC at an angle of 90 ºangle. The optimized sample of nanoemulsion was diluted with distilled water, placed in the Quartz Corvette and subjected to droplet size analysis.

6) Viscosity

The viscosity (rheological property) of the self-nanoemulsifying drug delivery system

(SNEDDS) was evaluated by Brookfield Viscometer for the determination of the consistency of the nanoemulsion formulation.

7) Stability study

The study of stability is important for determining the quality and purity of the nanoemulsion system. Stability is determining the formulation tolerance. The different formulations of nanoemulsion were determined by their stability by subjecting them to conditions of mechanical stress (centrifugation at 2000-4000 rpm), as well as the formulation has been stored at different temperatures ranging from 4 ± 1 ºC to 40 ± 1 ºC in different time intervals. The effect of mechanical stress conditions on the stability of the nanoemulsion was observed by determining the percentage of phase separation, the distribution of the nanoemulsion or any physical changes. Studies have no significant changes in formulations after 60 min centrifugation at 2000 rpm.

7) Drug Content

It is important to determine the percentage of pharmaceutical content, as well as the percentage of purity of the nanoemulsion system. Twenty tablets were weighed individually in this evaluation and the average weight was observed. So, the twenty tablets were crushed together. After that, the average weight of the sample was taken and diluted, then further analysed using HPLC as in the dissolution test, and determining the percentage of content of drug present in the system nanoemulsione.

8) Dispersibility test

The efficiency of self-emulsification of oral nano or micro emulsion is determined by the use of a USP XXII standard dissolving apparatus II. One millilitre of each formulation is added to 500 ml of water at 37oC. 50 rpm stainless steel Rotary dissolving paddle provided easy shaking. The performance of the in vitro formulation is determined visually using the following classification system.

Grade A: Rapidly forming (less than 1 min) nanoemulsion, having a Transparent or bluish appearance.

Grade B: Rapidly forming, slightly less transparent emulsion, having a bluish white appearance.

Grade C: It is a Fine Whitish milky emulsion that formed within 2 min.

Grade D: Dull, grayish white emulsion having slightly oily appearance that is slow to emulsification process.

Grade E: Formulation, exhibiting either less or minimal Emulsification with large oil globules present on the surface.

Grade A and Grade B formulation will remain as nanoemulsion was dispersed in GIT. While formulation was falling in Grade C could be recommend for SNEDDS as well as SEDDS of formulation.

9) Morphological study

Morphological Study is important to give information related to the external appearance of the formulation such as color, smell, consistency, density, appearance was determined by the Morphological Study. In the system of administration of self-nano-emulsifying drugs (SNEDDS) buttocks were observed by the transmission electron microscope (TEM) the sample was displayed and detected.

10) pH Measurements

The PH nanoemulsion formulations were measured by a pH meter or potentiometer. The electrodes were completely immersed in semi-solid or liquid formulations and the pH was observed.

11) Percent Transmittance

The transmission rate of the nanoemulsion formulation (SNEDDS) was measured using the UV Visible dual-beam spectrophotometer or the single-beam spectrophotometer while keeping the distilled water empty at 560 nm.

APPLICATION

1) Improving water solubility of poorly water-soluble drug

The Auto Nano emulsification Drug Administration System (SNEDDS) is important for improving the water solubility of water-based drugs and increases the oral bioavailability of water-soluble drugs.

2) Applications of nanoemulsion in drug delivery

The nanoemulsione (SNEDDS) has been applied in various aspects of the administration of medications, including cosmetics and transdermal drug delivery system drug delivery, cancer therapy, administration of vaccines, the technology of cell culture, the formulations are important for increasing the oral administration of the drugs soluble, it is the system of administration eye optic, administration of medications intranasal administration of

medications for parenteral administration and pulmonary medicines, as well as the system of administration of intranasal drugs.

3) Protection against biodegradation

SNEDDS, SMEDDS and SEDDS is an important ability to provide macromolecules as peptides, hormones, enzyme substrates are inhibitors and it is important to protect yourself from enzyme degradation.

CONCLUSION

Self-Nanoemulsifying Drug delivery system (SNEDDS) is a novel approach to the formulation of pharmacological molecules with low water solubility. The Self Nanoemulsifying Drug delivery system (SNEDDS) is an isotropic mixture of oils, surfactants, cosurfactant (S mix) and co-solvent.

When introduced into an aqueous phase, it spontaneously emulsifies to produce fine o / w nanoemulsion under gentle stirring. SNEDDS represents a good alternative for the formulation of water-soluble drugs. SNEDDS improves the dissolution of drugs due to the increase in the surface area in the dispersion and the rate of absorption of pharmacological molecules.

Oral administration of lipophilic drugs may be possible by SNEDDS, it is important to improve oral bioavailability. According to this approach it is possible to prolong the release of the drug through the incorporation of polymer into the composition. SNEDDS seems to appear as a unique and industrial approach to survival with future development.

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