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REVIEW OF HERBAL NOVEL DRUG DELIVERY SYSTEM:-

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Abstract-
Natural or herbal excipients are preferred over their synthetic counterparts because they are widely available, inexpensive, and non-toxic. The quality of the drug is partly affected by the quality of the excipients.The plant uses excipients, carrageenan, thaumatin, lard, stirax, agar, acacia and tragacanth as natural sources of its gum and mucilage. Additionally, they can be easily modified to meet specific needs, making them useful in providing standard pharmaceutical ingredients while complying with other pharmaceutical standards. The aim of this study is to reveal the potential of natural materials such as diluents, binders, disintegrants and lubricants in various formulation agents that are biocompatible and can provide additional nutrients to production materials. This article provides an overview of natural products used in new procedures and pharmaceuticals.This article gives an overview of natural Excipients used in drug distribution processes and prescriptions. Drug delivery is the process of administering drugs to humans or animals to produce therapeutic effects. The use of pulmonary and nasal delivery systems to treat human diseases has become important. Particularly for peptide and protein therapy, these delivery systems respect parental control. As a result, various drug delivery systems were developed and research on lung and nose diseases continued. Stringent requirements for this delivery system are demonstrated by biodegradable polymeric nanoparticles.

Keyword-
Herbal binders, natural polymers, herbal excipients, and natural pharmaceutical aids Targeting the brain, infectious disorders, pulmonary conditions, liposomal, micelles, transdermal.

INTRODUCTION

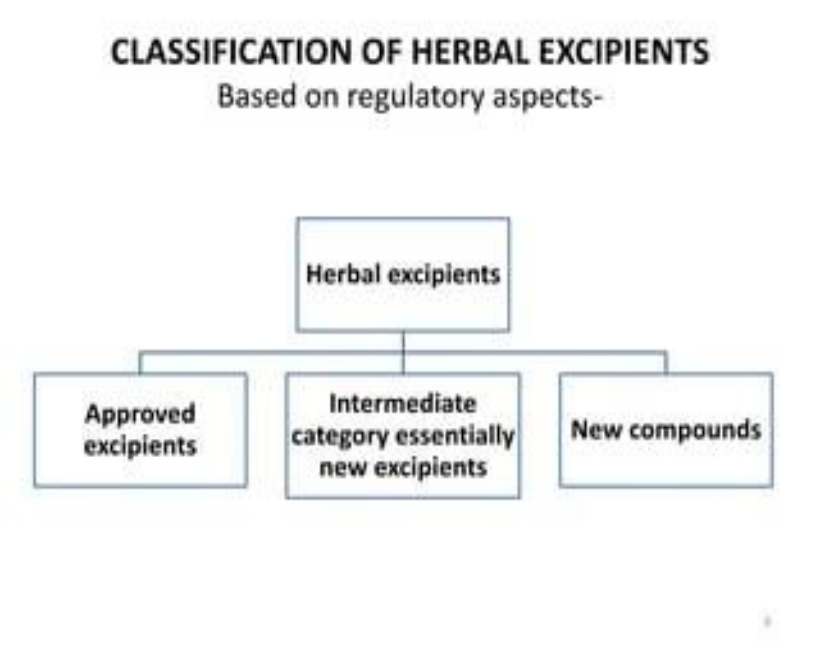
By definition, an excipient is a substance that serves only as a support for the active ingredient when used as a medicine [1]. The English word "excipient" comes from the Latin excipients, meaning to accept and separate things together. Product quality is affected by the manufacturing process, active pharmaceutical ingredient (API) and manufacturing process. These excipients greatly increase the potency of the API and increase product safety and effectiveness Because excipients contain active ingredients that cannot be controlled alone, additives have historically been used to add volume to the formula and differentiate the drug in dosage form[3].The amount of information is considered according to the different delivery methods, the formulation and the content of excipients included in the formulation. Because farms are renewable and sustainable, they can be built or harvested to provide sustainable

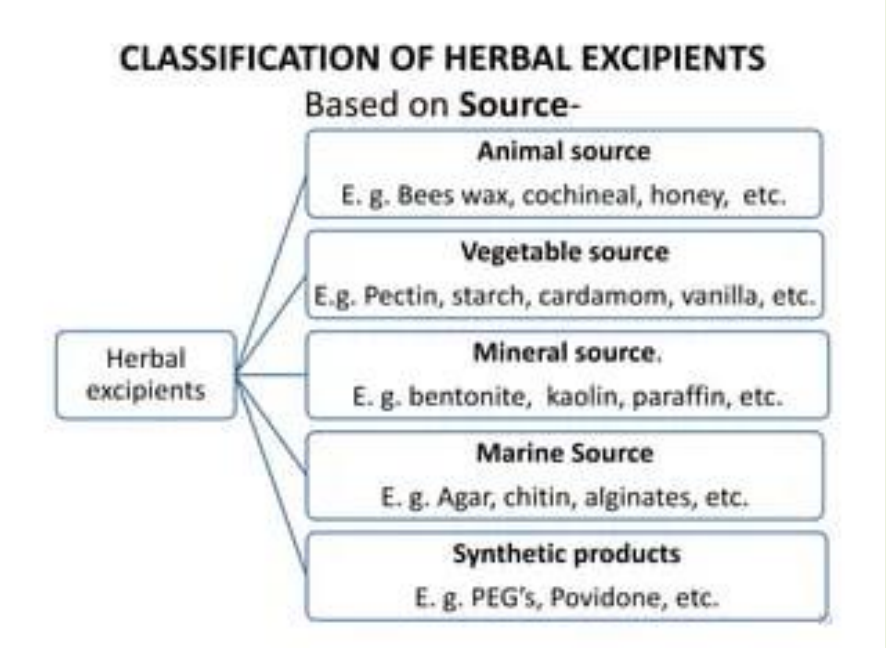
food. Herbal excipients can be obtained from food waste as a simple material.These excipients increase the effectiveness of the API, increasing the safety and effectiveness of the product [4]. Because excipients contain active ingredients that cannot be administered alone, additives have historically been used to add volume to the formula and differentiate the drug in dosage form. Herbal excipients are inexpensive, non-toxic, biocompatible, environmentally friendly and rarely biodegradable due to their natural state. They can also make chemical changes that will attract buyers. Given the quality of the plants, sustainable farming or harvesting that ensures regular supply can be achieved.[5]

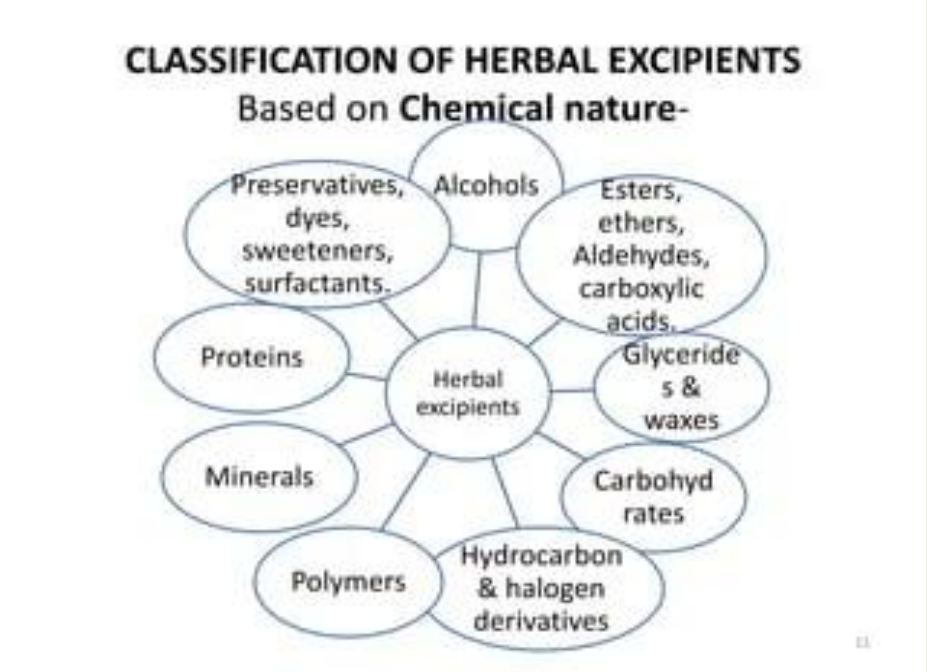
HERBAL EXCIPIENTS DEFINITION:

The World Health Organization defines supplements as "substances, other than active ingredients, that have been evaluated for safety and/or effectiveness in drug delivery to assist in product identification, to prevent, promote or improve safety, to ensure bioavailability or patient acceptance, to assist in drug delivery." During production."

Classification of Herbal Excipients-







ADVANTAGES OF HERBAL EXCIPIENTS:

1)Natural resources are the source of all natural excipients. They are safe and biodegradable as a result.

2)They have little impact on the surroundings.

3)All of these organic/herbal excipients are naturally occurring carbohydrates chemically. Natural excipients are therefore non-toxic substances.

4)Natural excipients are less expensive to produce than synthetic ones, making them a cost-effective option.

5)Given that natural excipients are derived from natural sources, they have no negative or side effects on people.

6)Natural excipients are widely accessible and come from several natural sources.

7)Certain naturally occurring medications may function as excipients in addition to having therapeutic properties.'

•Disadvantage Of Herbal Excipients

1.Microbial contamination: They are exposed to the external environment during production, increasing the risk of microbial diseases.

2Variation: While the environment and other physical factors affect the production of electronic products, the production of synthetic products is a controlled process using raw materials.

3.Cost of uncontrolled hydration: The cost of the different chemicals that make up the product can vary depending on the type of product, climate, location, and how natural resources are harvested.

4.Slow Process: The production pace is unchangeable due to its dependence on several elements, including the environment. Thus, the pace of formation of natural polymers is modest.

5.Heavy metal pollution: There's a potential Thick metalproduced in many different nations .

6Heavy metal contamination: Herbal excipients may contain heavy metals.

•Application of herbal excipient

1.Tamarind Gum:

The tamarind tree species Tamarindus indica belongs to one of 21 regular families. Tamarind seed powder (TKP) is produced by extracting tamarind xylan from the endosperm of the seeds of the tamarind gum plant. The resulting microspheres vary in size from 230 to 460 µm. Another study examined diclofenac sodium matrix tablets containing TSP. We evaluated the drug release properties of tablets with wet granulation technology.

2.Guar gum:

Guar gum comes from the endosperm of the fruit of the legume plant Cyamopsis tetragonolobus. Refined guar pods are made by polishing the two halves of the endosperm away from the thin layer of fibrous material that forms the outer husk. The size of the base also reduces viscosity, while strong acids will promote hydrolysis and ignore viscosity. It is insoluble in most hydrocarbon solvents[8].

3.. Carob thaum gum:

Gum made from the refined gum of carob seeds is called carob gum (LBG) or carob gum. This tree is evergreen and a member of the Fabaceae family. Solid bean gum is produced by removing and processing the endosperm of carob seeds [9].

4. Sweet locust gum:

Botanically speaking, it is known as Gleditsia triacanthos and is a member of the Leguminosea order (suborder Mimoseae).The seeds are where the gum is produced [10,11].

5.Khaya gum:

Rock gum" is a polysaccharide obtained from the hollow stem of the Meliaceae plant. The fact that chewing gum is easy, cheap and non-toxic has led to attempts to cultivate it for medical use. Further studies have shown the promise of direct electronic technology in the development of 61 controlled-release drugs [12]

6.**Aloe mucilage:**

Aloe Vera This product is obtained from Miller leaves. Aloe vera parenchyma or pulp has been found to contain proteins, lipids, amino acids, vitamins, enzymes, inorganic compounds and small organic molecules, in addition to various carbohydrates. Many studies have shown that partially acetylated mannans, also known as acetyl mannans, are the main polysaccharides in gels [13]. They also showed that pectic substances are large polysaccharides.

7. Hakea gibbosa:

The source of this dry ooze is Hakea gibbosa, a plant from the Proteaceae family. It is made of gum arabic and galactan and has an acidic pH (Type A). The molar percentages (%) of galactose, xylose, mannose, arabinose and glucuronic acid in sugar are as follows: 12:43:32:5:8 [14].

8. Pectin:

Pectin is produced by plant walls and is a linear polysaccharide that does not contain starch [30]. Microcapsules containing folic acid are prepared using alginate and a mixture of alginate and pectin polymers to ensure the stability of folic acid during food preparation. Capsules containing alginate and pectin polymer matrix increased folic acid encapsulation efficiency and reduced leakage compared with capsules containing alginate alone; Folic acid retention is higher after freeze drying [15].

9.Alginate:

Brown algae (Phaeophyceae) contain naturally occurring polymeric polysaccharides called alginates. It can be converted into alginic acid salts; Sodium alginate is by far the most commonly used form. Alginates have many applications in medicine; these include providing biomolecules for cosmetics, tissue engineering applications, controlling the time required for intestinal absorption, and encapsulating drugs in liposomes and matrix-based alginate coagulation glue beads [16].

•Different types of novel herbal formulations currently available in market:

- 1.Tincture

Figure No.1

.It is a hydroalcoholic or alcoholic extract made from herbal materials with one part plant and five to ten parts ethanol.
.Can be kept for two years in a dark, cool area.
.Dosage: two to three times a day, 5 milliliters diluted to 25 milliliters.
.Examples include tinctures of iodine, benzoin, and cannabis.

2.Oral Emulsion:

Figure No.2

These are liquid materials with two immiscible phases that are stabilized by the addition of emulsifiers. A liquid can be emulsified into small droplets that cannot be emulsified in another liquid using mixers, homogenizers, colloid mills and ultrasonic device[24].

Example: Nesifin

2.Aromatic Water:

Figure No.3

These are examples of water based on essential saturated fats.

These are prepared by mixing distilled water with one part essential oil and ten essential oils. talcum powder.

Shake well, leave for 12 hours, filter and dilute to volume.

Prepare small to prevent decomposition.

For example: cardamom water, mint water, camphor water.

2. Herbal glycerites

Figure No.4

These are tincture-like ingredients made by extracting herbs using 50-60% glycerol as the extraction medium.

The shelf life of glycerin is approximately 6 months to 2 years. This form is suitable for preparing medicines for children.

Glycerin should not be used in medicines containing gum or resin.

Example:

goldenrod extract, echinacea herbal extract, rhodiola rosea extract

3. Oxymels

Figure No.5

These are sour and sweet concoctions that use honey and a tiny bit of vinegar as a carrier.

Lobelia oxymels; garlic; cayenne, etc.

4.Solid Herbal Dosage Forms:

A) HERBAL TEA BAGS :-

Figure No.6

Paper or cloth bags are used to contain herbal items, such as dried roots, leaves, or flowers. Bags must to be devoid of dioxin, gluten, and bleach.
In order to make infusion, the boiling should be done on bags[25]

(B)DRIED POWDER :-

Figure NO.7

To create coarse or fine powder, herbs are dried and ground.
it comes in capsule or sachet form and may be taken straight by mixing with warm water.

C)DRY EXRACT POWDER :-

Figure No.8

These can be created by grinding and drying to create a powder, or they can be formed by spray drying or freeze drying a fluid extract with or without the use of an adsorbent.

Excipients, stabilizers, and preservatives could be present.It is possible to combine dry extracts into granules, pills, or capsule.

D)HERBAL MIXTURE:-

Figure No.9

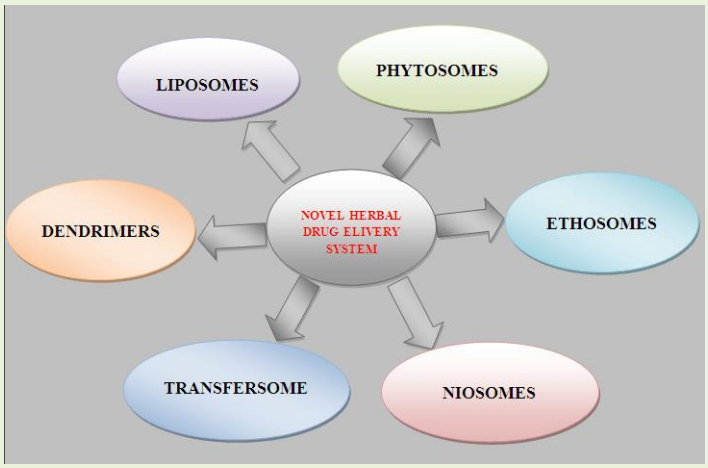
These are mixes of two or more different plants. Herbal mixes are made by pulverizing, drying, and mixing plants in certain amounts.

E)GRANULE :-

Figure No.10

These are collections of tiny, spherical particles formed from fluid extracts that have been dried. can be given as a suspension or solution following
reconstitution with water. might be utilized to create capsules or tablets.
For example, granules, oral dispersible chyavanprash granules from Vasawlehachurna, and Gastrobeet granules .

•TYPE OF NOVEL HERBAL DRUG DELIVERY SYSTEM :-



1) Liposome
2) Nanoparticles
3)Ethosome
4) Niosomes
5) Proniosomes
6) Transdermal drug delivery system
7) Emulsion
8)Phytosomes
9) Microsphere
10) Transferosomes

(A)LIPOSOME :-

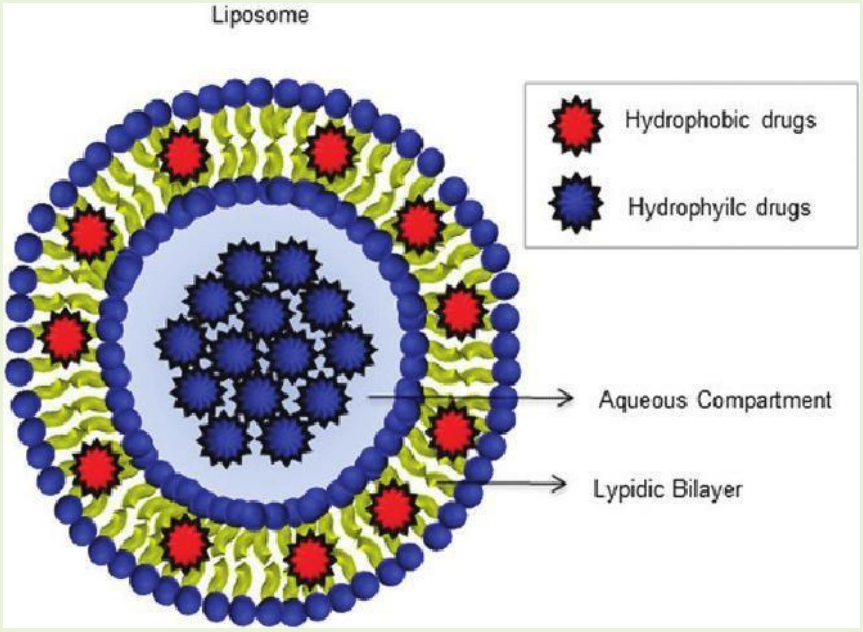


Figure No.11

INTRODUCTION OF LIPOSOME :-

Liposomes are solid or colloidal particles with a diameter of 0.05 to 5.0 µm. Liposomes are hydrophilic and lipophilic polar liquid particles. Liposomes are synthetic, tiny vesicles with an aqueous center and one or more phospholipid layers surrounding it. Liposomes form a bilayer because their

hydrophilic heads point in the direction of the water compartment and their lipophilic tails point in the direction of the vesicle's core. They are employed in the delivery of medications, vaccinations, enzymes, and other materials to

specific cells or organs.[17]

PREPRATION OF LIPOSOMES :-

It is ready by following simple procedures like:

Organic solvent is used in the isolation of lipids.

In the watery medium, lipids are spreading. Both active and passive loading methods are used to load drugs.

.Liposome purification and assessment

ADVANDAGES OF LIPOSOMES :-

1.Their biocompatibility is quite excellent.

2.They are not immunogenic, biodegradable, and physiologically inert. 3.simple to get ready.

4.Transports hydrophilic, amphiphilic, and lipophilic substances. The pharmacokinetic characteristics of them are readily manipulated.

5.Formulations with prolonged release or controlled release can be made with it.

EXAMPLES OF LIPOSOMES:-

1) Ampelopsin, an anticancer medication, has better therapeutic effectiveness.

2) The anticancer medication liposome paclitaxel has enhanced entrapment efficiency and pH sensitivity. Catechins, which are antioxidants and

chemopreventives, exhibit greater skin penetration.
3) Liposomes containing quercetin and rutin have improved hemoglobin binding capabilities.
4) Capsaicin liposomes exhibit improved penetration and prolonged activity. Usnic acid liposomes have improved solubility and extended duration of action.

(B) PHYTOSOME:-

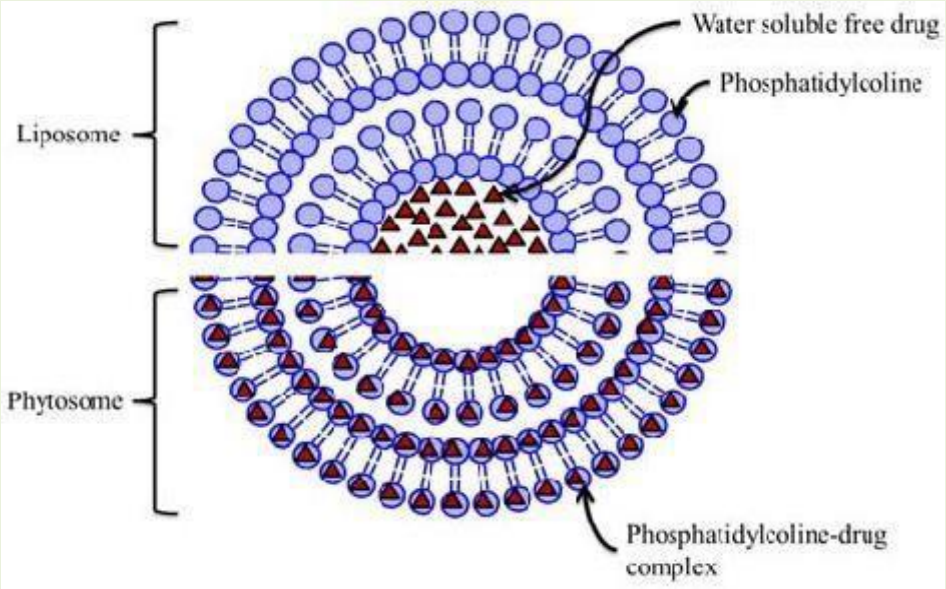


Figure no 12

INTRODUCTION OF PHYTOSOME:-

Some definitions of phyto include "plant" and "cell-like." In order to create lipid-compatible molecular complexes, standardized plant extracts or water-soluble phytoconstituents are entrapped into unique dosage forms called phytosomes. It exhibits improved bioavailability and absorption.[18]

PREPARATION OF PHYTOSOME

Phospholipids are dissolved in an organic solvent to create phytosomes. Next, a mixture of phytoconstituent extracts, such as terpenoids or flavonoids, is added to the solution above. The phytosomal complex can be isolated by spray drying, lyophilization, or precipitation using solvents containing aliphatic hydrocarbons. When making phytosomes, phospholipids such as phosphatidylcholine that have been isolated from soybeans are frequently utilized. Phytoconstituents create a chemical bond with phospholipid.

ADVANTAGES OF PHYTOSOMES:-

1.Phytosomes can shield herbs from being destroyed by gut bacteria and digestive secretions.
2.drug delivery done right at the action site.
3.The herbal medications continue to be safe for nutrients.
4.Dosage reduction, improved active principle absorption, and increased bioavailability.
5.The efficiency of entrapment is high and predefined.
6.improved stability as a result of chemical bond formation.

7.When used in a process, phosphatidylcholine serves as a nutrient, hepatoprotectant, and carrier.
8.Possess more clinical value.

Examples:
1.Phytosomes containing quercetin showed enhanced hepatoprotective properties. Improved cardioprotective and antioxidant properties were demonstrated by grape seed phytosomes.
2.Cucumin phytosomes had increased antioxidant activity.
3.Compared to pure medication alone, naringin phytosomes have superior antioxidant activity and a longer duration of action because of a slower rate of rapid elimination.
4.Ginkgo phytosomes have more effective anti-asthma properties.

(C) NANOPARTICAL:

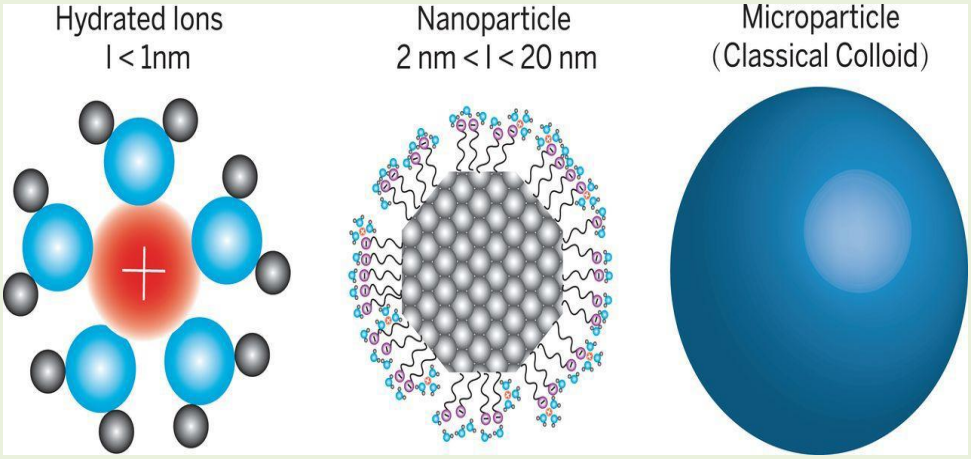


Figure No.13

INTRODUCTION OF NANOPARTICLES:-
Nanoparticles are nanoscale particles with a size range of 10-1000 nm that contain synthetic, semi-synthetic, or herbal medications. Drugs that are hydrophilic or hydrophobic are transported by these. The active component of nano-spheres is distributed in a matrix-like structure, whereas the drug in nanocapsules is protected by a polymeric membrane. The preparation of nanoparticles aims to regulate the drug surface characteristics ,partical size ,and site- specific action .[19]

PREPARATION :-
The preparation of nanoparticle dispersion of polymers through various techniques such as solvent diffusion, salting out dialysis, emulsification, nanoprecipitation, and supercritical fluid technology, among others.

ADVANTAGES OF NANOPARTICLES:-
1. The herbal formulation is delivered straight to the site of action by the nanoparticulate system.
2. Enhanced therapeutic index and efficacy.
3. Encapsulation results in increased stability.
4.Abetterpharmacokineticoutcome.
5. Producible with a range of complex surface characteristics. dimensions

EXAMPLE OF NANOPARTICLES:-

1. Anticancer activity of artemisinin nanocapsules with sustained drug release was demonstrated.
2. Solid lipid nanoparticles containing curcuminoids have demonstrated antioxidant and anticancer properties.
3. Prolonged curcuminoids' release.

was noted in naringenin and glycolic acid nanoparticles.

4. Long-term blood flow and significant tumor accumulation were noted in camptothecin-encapsulated nanoparticles.
5. In the case of the anticancer taxel nanoparticle, enhanced bioavailability and sustained drug release were noted.

(4) MICROSPHERES:

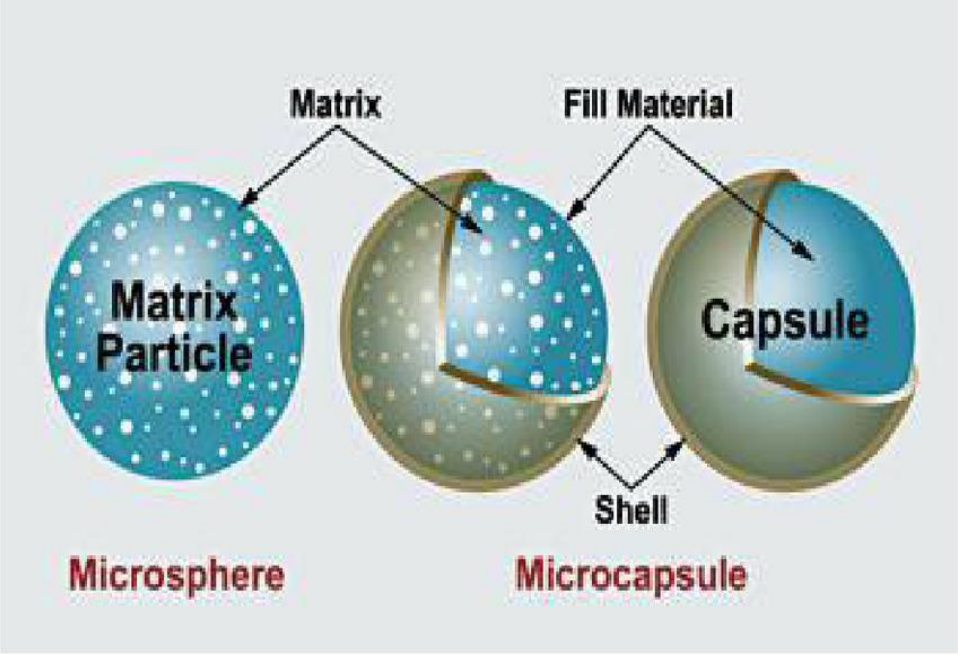


Figure No.14

INTRODUCTION OF MICROSPHERES:

Microspheres are tiny, spherical particles with a diameter ranging from 1 to 1000 mm. They consist of biodegradable polymers such as fibrinogen, albumin, dextran sulfate, copolymer of lactic acid, and polylactic acid. [20]

PREPARATION OF MICROSPHERES:-

Microspheres have been prepared using various techniques such as phase separation coacervation, solvent evaporation, spray drying, and single and double emulsions. Solvent extraction and diffusion in semi-emulsions.

ADVANTAGES OFMICROSPHERES:-

It is possible to inject or swallow microspheres. Therefore, using a micro-particulate system to

administer medication has more benefits.
Obtaining the required release profiles and drug delivery tailored to the specific site is simple.
Simple medication release from the mixture.
Don't interfere with the drug's action.

EXAMPLE OF MICROSPHERES:-

Microcapsules containing rutin, alginate, and chitosan that can target the cerebral and cardiovascular systems.
The dose of quercetin microspheres was significantly reduced.
Zedoary oil microspheres exhibited longer release duration and increased bioavailability.
Microspheres loaded with camptothesin demonstrated prolonged drug action.

(5) ETHOSOMES:

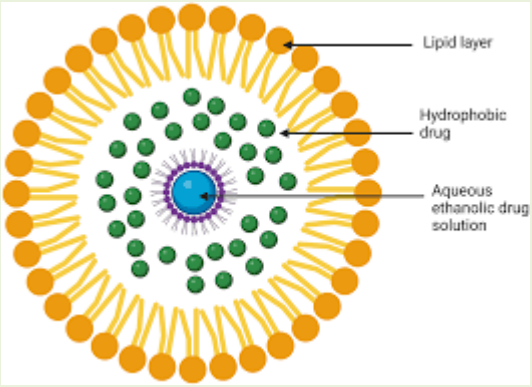


Figure No.15

INTRODUCTION OF ETHOSOME:

Ethosomes are phospholipid-based nanovesicles with a high ethanol content of 20% to 45%. These are for drug delivery transdermally. Because ethosomes have a high ethanol content, they can penetrate deeper layers of the skin and disrupt the skin's membrane barrier, which increases the drug's permeability and solubility.[21]

PREPARATION OF ETHOSOMES:-

The most popular and extensively utilized technique for ethosomal preparation is this one. In a covered vessel at room temperature, the drug, phospholipids, and other lipid materials are dissolved with vigorous stirring in ethanol. In a water bath, the mixture is heated to 30°C.

Applications:

They aid in enhancing the drug's transdermal penetration through the skin. A large range of medications can be delivered via etheromes.
Because it is semisolid, it improves patient adherence.

EXAMPLES OF ETHOSOMES:-

1. Liquorice ethosomes demonstrated enhanced sustained release action and anti-inflammatory activity.
2.Cannabis ethosomes demonstrated higher skin penetration and better patient compliance.
3.An increase in bioavailability was noted for curcumin ethosomes.
The ethosomes of Sophora alopecuerides exhibit improved permeability.

(6)NIOSOMES:

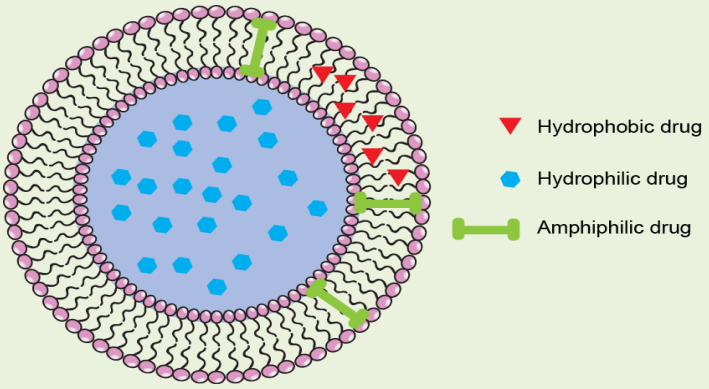


Figure No.16

INTRODUCTION OF NIOSOMES:-

Like liposomes, niosomes are multilamellar vesicles composed of cholesterol and non-ionic surfactants such as alkyl dialkylpolyglycerol ether group. The cost of liposomes, the chemical instability of their ingredients, the need for specialized handling skills, and the challenge of purification are some of their drawbacks. Niosomes don't display these issues. [22]

PREPARATION OF NIOSOMES:-

A straightforward method that's frequently used to prepare niosomes is the thin-film hydration method. This method involves dissolving cholesterol and surfactant, which are materials that form membranes, in an organic solvent in a flask with a circular bottom that is part of a rotating evaporator.

ADVANTAGES OF NIOSOMES:-

1.Niosomes are immuneogenic, non-toxic, biodegradable, and biocompatible.

2. A lot of material can be contained in a tiny volume of vesicles by niosomes.

3. Niosomes outperform traditional oily formulations in terms of efficacy, patient adherence, and satisfaction.

4. Because of its special structure, it can entrap a variety of chemicals, including lipophilic, hydrophilic, and amphiphilic drugs.

5. The structural makeup and production process of niosomes can be readily altered to control their size, shape, and fluidity.

6. Niosomes can be prescribed in semisolids, powders, suspensions, and other dosage forms, and can be administered orally, parenterally, topically, etc.

7. The niosome stores easily because of the structural composition's chemical stability.

(7)EMULSION:

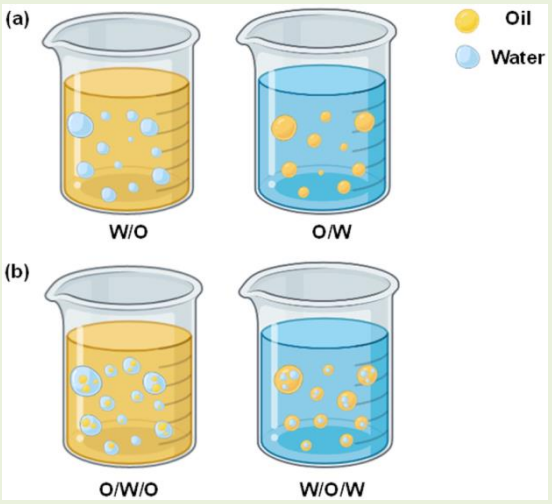


Figure No.17

INTRODUCTIONS OF EMULSION:

Emulsions are two-phase systems because they contain an oil phase and a water phase. When one phase splits into another phase, droplets as small as 0.1 µm to 100 µm in diameter are formed. There are three types of emulsions: microemulsions (10-100 nm), normal emulsions (0.1-100 µm) and sub-micro emulsions (100-600 nm). Lipophilic drugs form o/w or w/o/w emulsions, whereas water-soluble drugs form o/w or w/o/w emulsion.[23]

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PREPARATION OF EMULSIONS:-

Emulsions are made using a variety of methods, including high amplitude ultrasound, phase inversion method, sonication, high pressure homogenizer, and micro fluidization.

ADVANTAGES OF EMULSION:-

Emulsions are designed to achieve easy intramuscular or subcutaneous drug delivery, sustained release action, improved stability, improved penetration, and a reduction in the stimulus that drugs provide to tissues.

EXAMPLES OF EMULSION:-

1.Silibummarianum demonstrated improved drug solubility and an increase in therapeutic effect.

2.Berberis absorption and residence time were enhanced during the emulsion formulation process. Colchicum-containing emulsion had improved oral bioavailability.

3.The curcuma zedooria emulsion exhibited enhanced oral bioavailability, stability, and aqueous dispersibility.

4.Genistatinctoria showed enhanced penetration of the skin.

(7) TRANSDERMAL DRUG DELIVERY SYSTEM:

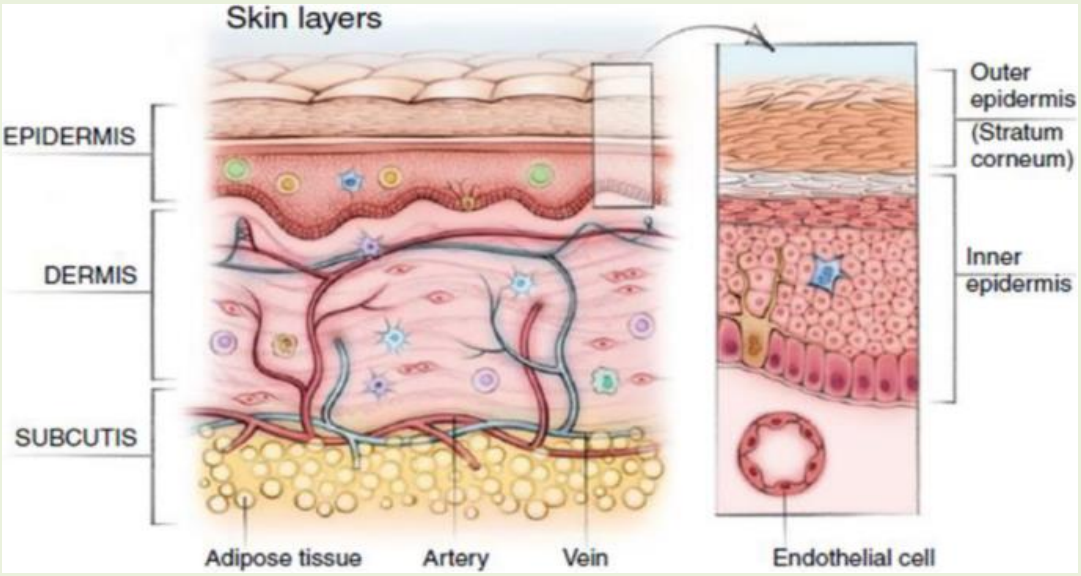

Figure No.18

INTRODUCTION OF TDDS:

Tis a cutting-edge method of drug delivery where the medication is absorbed through the skin as patches. Drugs can be injected into the systemic circulation via TDDS at a predefined rate and for an extended amount of time.

PREPARATION OF TDDS:

The main components of TDDS include a polymer matrix (sometimes called a reservoir), chemicals, penetrants, adhesives, back laminate, release liner, and additives such as plasticizers and solvents. The following techniques can be used to create this:(a) Polymer Thin Film Permeability Controlled TDDS: In this arrangement, the chemical solution is packed into an impermeable backlayer and exposed to the membrane at a controlled rate. Medicines can only be brought to market through cost-controlled procedures. (a) The matrix diffusion controlled total drug dispersion (TDDS) process requires the separation of drugs in a hydrophilic or lipophilic polymer matrix. Micro reservoir management is achieved by combining TDDS, matrix distribution and reservoir systems.

ADVANTAGES OF TDDS:-

1.First pass metabolism is removed.
2.increased effectiveness of treatment.
3.It is possible to administer drugs less frequently.
4.reduced adverse effects and increased adherence from patients.
5.There is less strain on the liver and digestive system.
easy to manage.

(8)PRONIOSOMES:

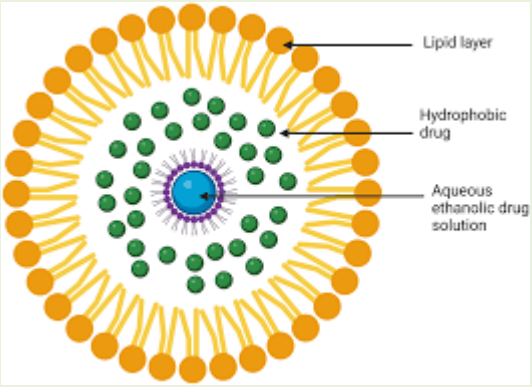

Figure No.19

INTRODUCTION OF PRONIOSOME:-

Proniosomes are surfactant-coated carrier particles that dissolve in water. These are agitated and hydrated to form niosomes prior to use. These have a gel-like consistency.

PREPARATION OF PRONIOSOME:-

The rotary evaporator was connected to a 100 ml round-bottom flask that held 1 g of sorbitol. In order to achieve the required ratio of Span 60, cholesterol, and dicetyl phosphate with a total concentration of 100 mM, a surfactant mixture was prepared from stock solutions as previously mentioned.

EXAMPLES OF PRONIOSOMES:-

Oral proniosomes of Indomethacin, gel or patch containing levonorgestrel.

(9)TRANSFEROSOMES:

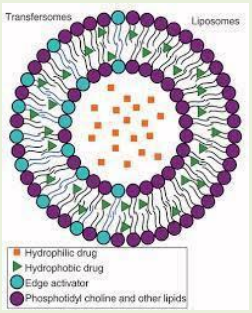

Figure No.20

INTRODUCTION OF TRANSFEROSOMES:-

These are vesicular systems made up of three ingredients: ethanol, 10–25% surfactant, and phospholipids. applying the mosomes. can administer medication to the skin's outer layers. It displays the osmotic and hydration characteristics of skin. It offers benefits akin to those of ethosomes.

PREPARATION OF TRANSFEROSOMES:-

Lipid film hydration with a modified hand shake and the thin film hydration method are used to prepare transfersomes.

EXAMPLES OF TRANSFEROSOMES

1.Transfersomes of capsicum demonstrated improved skin penetration.
2.In the case of vinca and turmeric transfersomes, an increase in permeability was seen.
3.Transfersomes containing colchicum showed less GIT effects**.**

CONCLUSION:

Herbal excipients are preferred over synthetic ones as they solve the problems of synthetic drugs and provide additional health benefits to achieve the purpose of the formulation. Plant materials should be further investigated to identify novel, safe, biocompatible, patient-acceptable, inexpensive, matrix-type controlled-release materials of plant polysaccharides (e.g., microparticles, beads, tablets, and cross-linked hydrogels). gum) shows. Carob gum, alginate, konjac have good potential as glucomannan and many Indian laboratories are seeking to develop drugs for drug delivery. These drugs have been evaluated for their pharmacokinetics and, to a lesser extent, their effectiveness in animals. In vitro studies on release patterns are still ongoing. medical records

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