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FORMULATION AND EVALUATION OF MICROSPONGE DRUG DELIVERY SYSTEM

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ABSTRACT: One innovative method of delivering medication is the Microsponge Delivery System (MDS). Topical medicine solutions have included MDS technology to allow the controlled release of the active component into the skin, reducing systemic exposure and local cutaneous responses. Microsponge technology has been used in clinical trials. active ingredients in full formulations, substantiating strong claims about the product. The word "microsponge" describes a class of medication delivery devices that regulate the kind or pace of drug release to specific bodily regions . for determination of particle size we find out the calibration factor in that 6 division of eyepiece micrometer and 5division of stage micrometer then we find out particle size of the 10 particle for width we use the width summation formula and for lenth we use lenth summation formula . Thin layer chromatography was performed in that we mobile phase i.e. benzene : chloroform : ethyl acetate (4:3:3) . the gel has pH is about 5 and concluded that acidic. Drug release was performed in that we take 6 sample of drug for drug release determination observation i.e. drug release are in the range of 80 to 90. Drugs are administered transdermally, using the skin as a route of entrance. By attaching pharmaceuticals to a carrier, microsponge technology modifies the parameters of drug release and absorption. A package of ingredients is delivered with the microsponge medication.

KEYWORDS: Microsponge, TDDS, microsponge delivery system, medicine, gel

INTRODUCTION

TDDS:

Healthcare systems are greatly influenced by drug delivery systems (DDS) that can control the rate or type of release. Medicine to certain parts of the body. The technology, which changes the release and absorption properties of the drug by binding it to the carrier (liposome, nanoparticle, microsphere, etc.), intelligently enables drug delivery. Healthcare systems are greatly influenced by drug delivery systems (DDS), which can control the rate of drug release or drug utilization for a particular body. Technology that changes the release and absorption properties of the drug by binding the drug to the carrier (microspheres, nanoparticles, liposomes, etc.) provides a smart drug delivery method. Controlling the amount of active drug delivered to a specific area of the body has always been one of the key challenges of the pharmaceutical industry. Several reliable and predictable methods for systemic drug delivery have been developed under the umbrella of transdermal drug delivery (TDDS), which uses the skin as a portal of entry. TDDS is not ideal for administering drugs whose ultimate target is the skin, but it has improved the safety and effectiveness of many drugs that can be more effectively delivered through the skin. Studies of topical agents in the strum corneum and subcutaneous layer of the skin (but not beyond the epidermis) have only recently addressed the issue of controlling drug release by the epidermis to ensure that the drug remains local and does not build up in large amounts Entering the body. Most drugs are poorly soluble in water, which causes many difficulties when creating them in prescriptions. This is the main problem of TDDS. A major problem with poorly water-soluble drugs is their low bioavailability and poor absorption. [1, 2, 3]

Microsponge Delivery System: A polymer system called a Microsponge Delivery System (MDS) is made up of porous microspheres that have the ability to absorb different active chemicals and release them gradually into the surrounding environment. Put it on your skin, then react to the outcome. It is a novel approach to alter the local release of medications and consists of active ingredient-loaded microporous beads, typically with a diameter of 10–25 microns. When applied topically, MDS releases its active components in response to a variety of stimuli, such as temperature, pH, friction, etc. MDS technology is used in sunscreens, over-the-counter (OTC) skin care products, prescription drugs, andcosmetics.[2]

The porous microspheres used in the patented sponge delivery system (MDS) are composed of polymeric components. These tiny, sponge-like spheres have a non-collapsible structure made up of several interconnected pieces.

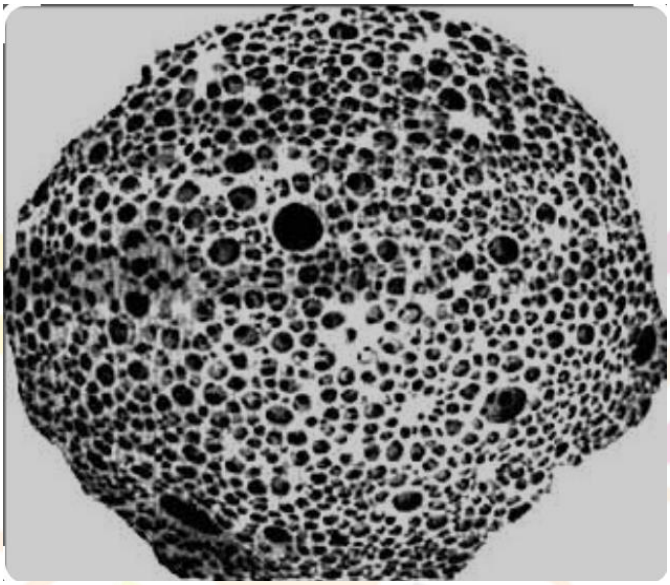


fig.-1 microsponge [4]

Since many conventional drug delivery systems are ineffective at delivering medications and necessitate high concentrations of active agents for effective therapy, innovative drug delivery systems are being researched more and more to provide targeted and controlled drug release. Microsponges are porous, polymeric microspheres that are patented, highly cross-linked, and flexible enough to entrap a wide range of active substances. These microspheres are mostly employed for extended topical administration, but they have also recently been used for oral administration. Microsponges are intended to reduce side effects, improve stability, elegance, and flexibility in formulation, as well as to effectively administer a pharmaceutically active substance at the lowest possible dose. They can also be used to alter the drug release profile.[11, 12, 13]

Too much of a component can be prevented from accumulating in the dermis and epidermis via the microsponge system. These products often have a reasonably high concentration of active ingredients and are packaged in traditional forms like lotions, gels, or creams. Microsponges are polymeric delivery systems composed of porous microspheres that can carry a wide range of active compounds, such as anti-infective, anti-fungal, and anti-inflammatory medications, as well as sunscreens, emollients, fragrances, and essential oils.[14]

The way that medications disperse or release from the carrier and penetrate the skin has been questioned in relation to the conventional topical dosage forms, which include creams, lotions, ointments, and powders. Because creams and lotions are quickly removed from the skin and release the medication from their base poorly, they frequently have poor bioavailability. In addition to being greasy and oleaginous, non-hydrophilic ointments are inconvenient for patients. Medicated powders intended for topical application also have a brief ski n residence period. Gels are semisolid systems where solvated macromolecules of the dispersed phase or an interlacing three-dimensional network of particles

limit the movement of the dispersion medium. The semisolid condition results from increased viscosity brought on by interlacing and internal friction. Additionally, a gel could be made up of matted, twisted strands that are frequently joined by stronger Vander Waals forces to create crystalline and amorphous areas all across the system. Gel delivery systems have the potential to prolong the time a medicine remains on the skin, increasing bioavailability. Among their many advantages are gel delivery systems' ease of application, non-greasy texture, patient compliance, extended skin residency time, and enhanced drug release.[15]

Psidium Guajava leaves:

Indigenous communities all across the world use traditional medical practices as a major source of information about health and culture. Traditional Chinese medicine and Indian Ayurveda are two of the oldest forms of medicine still in practice. These systems make use of locally generated, organically derived pharmaceuticals as the basis for treatment, with the goal of improving overall health and quality of life. Since plants have long been used as traditional remedies, numerous techniques are currently being tried to discover new bioactive compounds.

The guava tree, or Psidium guajava L., is a tiny member of the Myrtle family (Myrtaceae). Although guava trees are native to tropical regions ranging from southern Mexico to northern South America, they have been cultivated in many other nations with tropical and subtropical temperatures, enabling global production. In numerous nations, leaf mixtures have long been utilised in traditional medicine, mostly as an anti-diarrhea treatment. Furthermore, other applications have been reported overseas on every.[16]

The application of the medicine is either topical or oral, depending on the condition. Tropical regions are home to the evergreen shrub Psidium guajava. The leaves and fruits of Psidium guajava, which has been neutralised in South East Asia, were taken from America. There have been reports of guava's broad variety of therapeutic effects against human illnesses. More than 20 chemicals have been shown to be present in P. guajava's leaves, stems, bark, and roots. Guava leaves were used to heal stomach ailments and diarrhoea.

The leaves were employed by TSA as an antibiotic for wounds, ulcers, and toothaches in the form of a poultice or infusion. Iron, calcium, phosphorus, and vitamin C are also included in guava fruits. Emulgel is a novel method of topical medication delivery that combines emulsion and gel. Similar to emulsion and gel, it features a twofold control release.[17]

Gel is a novel sort of formulation; compared to ointment, cream, and lotion, it releases the medicine more quickly. Drugs can be added to emulgel formulations to treat skin conditions.[18] When compared to alternative administration routes, topical application of medicinal medicines offers a number of advantages. An aqueous phase with a gelling agent transforms a conventional emulsion into an emulgel. The use of translucent gels, one of the main categories of semisolid preparations, has grown in both the pharmaceutical and cosmetic industries .[19] with its thixotropic, greaseless, readily spreadable, easily removable, emollient, non-staining, long shelf life, bio-friendly, transparent, and aesthetically pleasant qualities, emulgels are a great choice for dermatological application.[20]

Fig.-2 Psidium Guajava

Classification in Science:

- **Kingdom:** Plantae
- **Clade:** Angiosperms
- **Order:** Myrtales
- **Family:** Myrtaceae
- **Genus:** Psidium
- **Species:** P. Guajava [21]

Botanical Name: Psidium guajava [21]

Synonyms: Guava, Guajava pyrifera. [21]

Synopsis: The leaves are oblong to elliptic, 5-15 x 4-6 cm, with apex obtuse to bluntly acuminate, base rounded to sub cuneate, margins entire, somewhat thick and leathery, dull grey to yellow-green above, slightly downy below, veins prominent, gland dotted. Simple, opposite leaves lack stipules, and the petiole is short, 3-10 mm long. [22]

Habitat: Its native region is central America, spanning from northern South America to Mexico.[23]

Used portion: Leaves.[21]

Traditional use: powdered leaves were employed as an antifungal and antidiarrhea agent. Gastroenteritis, dysentery, stomach, and antibacterial colic harmful microorganisms of the gut are among the other documented uses. It's been used medicinally. The leaves are infused and used for eruptions, eczema, and bilious fever.[24]

Pharmacognostic Study:

Macroscopy:

Size: Leaves, 5–15 cm long.

Shape: The leaf has an oblong to elliptic shape.

Color: Dark-green in colour

Smell: Myrtles

Taste: A little bit harsh

Advantages of microsponge

1) Microsponge is non-toxic, non-mutagenic, non-irritating or non-allergic
2) Continuous drug release up to 12 hours.
3) Reduce anxiety and improve patient compliance.
4) Microsponge dispersion has excellentstability, physical stability, and chemicalstability.
5) some products cannot be sold.
6) Improve drug bioavailability.
7) Improve fuel management.
8) Easy to create.
9) Improved stability, including physical, chemical, and thermal stability, allows active
10) materials to be added to the material by converting the liquid into powder.

11) Improve the healing effect
12) Improve compliance standards. [5]

Disadvantages of Microsponges:

1) A microsponge system is used to bind different particles, Particles of size 10 to 25 microns are released at a reasonable rate.
2) Patients who do not comply with cosmetic rules encounter problems such as oiliness, odor, and irritation. More negative.[6]

Limitations of Microsponges:

1) The preparation process is often characterized by organic solvents, some of which pose risks to the environment and public safety as they cause a lot of fire.
2) The remainder of the monomer can be seen in some areas; These residues may be harmful to health. [5]

Characteristics of Microsponges:

1) Microsponge milk is stable in the pH range of 1 to 11.
2) Micro sponge milk remains stable at temperatures up to 130 0C.
3) Suitable for most car and venue microsponge products.
4) Since the microsponge structure has a pore size of 0.25µm, it can sterilize itself thanks to the ability of bacteria to grow.
5) Microsponge formulations are cost-effective, have a large carrying capacity (50-60%), and are also free-flowing Practical. [7]

Mechanism of Releasing:

Microsponges can be designed to slowly release active substances in response to one or more external triggers

a) Temperature change: A small portion of the captured material can be adhered to the skin via microsponge at room temperature. As the skin temperature increases, the flow rate increases, thus improving the discharge.

b) Pressure: The active ingredients in microsponges can settle on the skin by friction or pressure.

c) Solubility: Microsponges containing water-miscible drugs such as antibiotics and antibiotics will release the drugs when there is water. Diffusion is another way to let go; However, this method requires taking into account the distribution coefficient between the microsponge and the outside.

d)P^H trigger system: The release of pH-dependent active substances can be initiated by changing the layer of the microsponge. [7]

Material and Method:

Material:[8]

Potato starch, Modified starch (corn), Calcium hydroxide, Honey, Curcumin, Guava leaf, Ethyl cellulose, aloe vera, Maize starch.

(a)Thickening agent:

Potato -The potato is a starchy root vegetable native to the Americas that is consumed as a staple food in many parts of the world. Potatoes are tubers of the plant Solanum tuberosum, a perennial in the nightshade family Solanaceae. Wild potato species can be found from the southern United States to southern Chile. Which is obtained from Boratwadi.

Scientific name: Solanum tuberosum

Family: Solanaceae

Genus: Solanum

Kingdom: Plantae

Order: Solanales

Potato starch: To make potato starch, take eight or ten fresh potatoes, peel them, and put them in a bowl of water. After that, given the potatoes a quick rinse in the water once or twice before chopping them into little pieces. Add the same amount of water to a big jar containing the potato chunks. Potatoes should be stirred until smooth. Gradually transfer the potato mixture into the strainers. After covering the jar and letting the mixture sit for one to two hours, the starch will start to separate from the water. Allow the thick starch to sink to the bottom of the container as you carefully drain the water from it. Distribute moist starch. on a sizable platter, level it out, and allow it to cure for the entire day. Once it is totally dry, remove the potato starch and place it in the jar used for grinding the combination. Use a mixer to crush the potato starch until it is smooth and fine. Potato starch is used to thicken and enhance the texture of meals, and it helps promote colon and digestive health.[25]

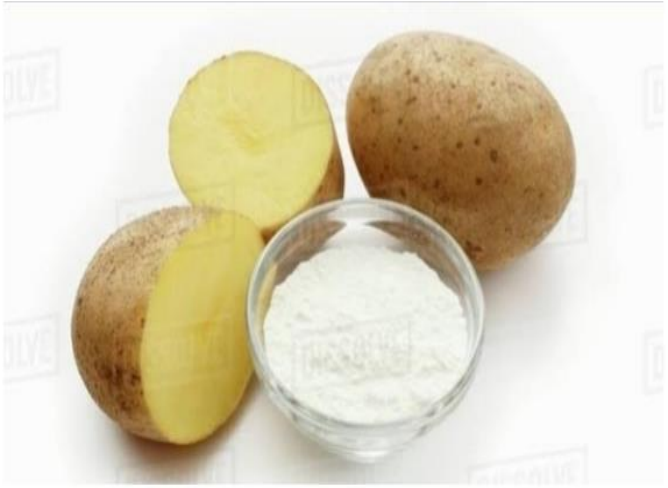


Fig.-3 Potato starch

(b) Preservative:

Honey, sweet, viscous liquid food, dark golden in colour, produced in the honey sacs of various bees from the nectar of flowers. Flavour and colour are determined by the flowers from which the nectar is gathered. Some of the most commercially desirable honeys are produced from clover by the domestic honeybee. which is obtained from Akluj.

Honey: Honey starts as flower nectar collected by bees, which gets broken down into simple sugars stored inside the honeycomb. The design of the honeycomb and constant fanning of the bees' wings causes evaporation, creating sweet liquid honey. Honey's color and flavor vary based on the nectar collected by the bees. For example, honey made from orange blossom nectar might be light in color, whereas honey from avocado or wildflowers might have a dark amber color.[26]

Fig.-4 Honey

(c) Anti-Fungal and Anti-Microbial Agents:

Curcumin is the major and most active component of turmeric, a golden spice derived from the rhizome of the plant C. longa. Traditionally, the spice has been employed to treat numerous human ailments (and as a spice, flavoring agent, and colorant). Which is obtained from Lakhewadi.

Curcumin (Turmeric): Clean the root, cut them into pieces, add to linear, add 1.5 cup water, pressur cook 5 minutes and quick release. Drain the water, keep parchment paper, so when root are dried doesn't fall down, place them on drying rack, keep in sunlight for 3 days, they are dry and shrunk. Add to the blender, make fine powder, Sieve the powder, store in dry Container. Curcumin, the anti-inflammatory agent. Pancreatitis, arthritis, and inflammatory bowel disease are among the conditions that curcumin may be used to treat. A lot of chronic disorders are influenced by chronic inflammation.[27]

Fig.-5 Curcumin (Turmeric) Powder

(d) Active Pharmaceutical Ingredient:

P. guajava leaf extract contains several active substances that act as an anti-inflammatory, such as flavonoids, phenols, tannins, and terpenoids.which is obtained from Boratwadi.

Guava Leaf (Psidium Guajava): The newly picked guava leaves were kept for shade drying for three to four weeks at room temperature after being cleaned to remove any debris under running tap water. The dried guava leaves were ground into a coarse powder and sieved through a number forty after being dried using a mechanical grinder. In a conical flask, 100 g of powdered dried guava leaf was macerated in 250 ml of ethanol, chloroform, and water for 24 hours while being periodically shaken at room temperature. The combination was filtered out using a straightforward filtration technique after 24 hours, and the filtrates were gathered in different vessels. Using a rotatory vacuum evaporator set to 45–50°C, the solvent was extracted at compact pressure from the filtrate in order to get the extract. Guava leaves have anti-inflammatory action and antibacterial ability that fight infections and kill germs and people consuming guava leaves at home will help curb toothaches. guava leaf extract can help reduce the intensity and duration of diarrhea. Helps in stopping diarrhea. Hells reduce cholesterol levels. Helps in losing weight. Helps to manage blood sugar levels. Helps to fight cancer. Helps in losing weight. [28]

Fig.-6 Guava leaf (Psidium Guajava)

(f) Gelling Agent :

starch derived from corn (maize) grain. The starch is obtained from the endosperm of the kernel. Corn starch is a common food ingredient, often used to thicken sauces or soups, and to make corn syrup and other sugars.

Modified starch (Maize): 2 to 3 fresh corn, remove.the corn kernels, place the corn in a bowl, cover with water, and shake. Let the corn soak for one to two hours. After that, remove it from the water. Pour the soaked corn into the grinding jar and grind it in batches. This will release more starch. Add the same amount of water and grind the corn until it is very smooth. Sieve the corn mixture into a bowl and let it rest for one to two hours. such that, after two hours, the starch separates from the water. After the water is entirely drained, the thick starch settles at the bottom of the bowl, the yellow liquid is poured out, and the sediment is spread out in a thin layer on a large plate. The wet starch is then sun

dried for a full day, after four hours. After the starch has developed cracks from sun drying, gather the corn and crush it in a mixer grinder until it is extremely smooth and fine. Maize starch is used in many agro-food applications (soups, delicatessen meats, sauces, pastas, and creams) because of its gelling or thickening properties. utilised as a covering for pastries, cream, desserts, etc. Flour is sometimes better than flour alone since it produces a translucent mixture rather than an opaque one.[29]

Fig.-7 Modified starch (maize)

Preparation method of Microsponge:

1) Liquid-liquid suspension polymerization

2) Quasi-emulsion solvent diffusion method

● **Quasi-emulsion solvent diffusion:** One-step and two-step techniques are the two ways that medications can be loaded into microsponges. Dumb process. The medicine has some armed physical and chemical power. Nonpolar compounds that generate holes are known as pyrogens, even though the majority of chemicals are inert. In addition to offering protection against free radicals, the medication Porogen does not obstruct polymerization or activation.

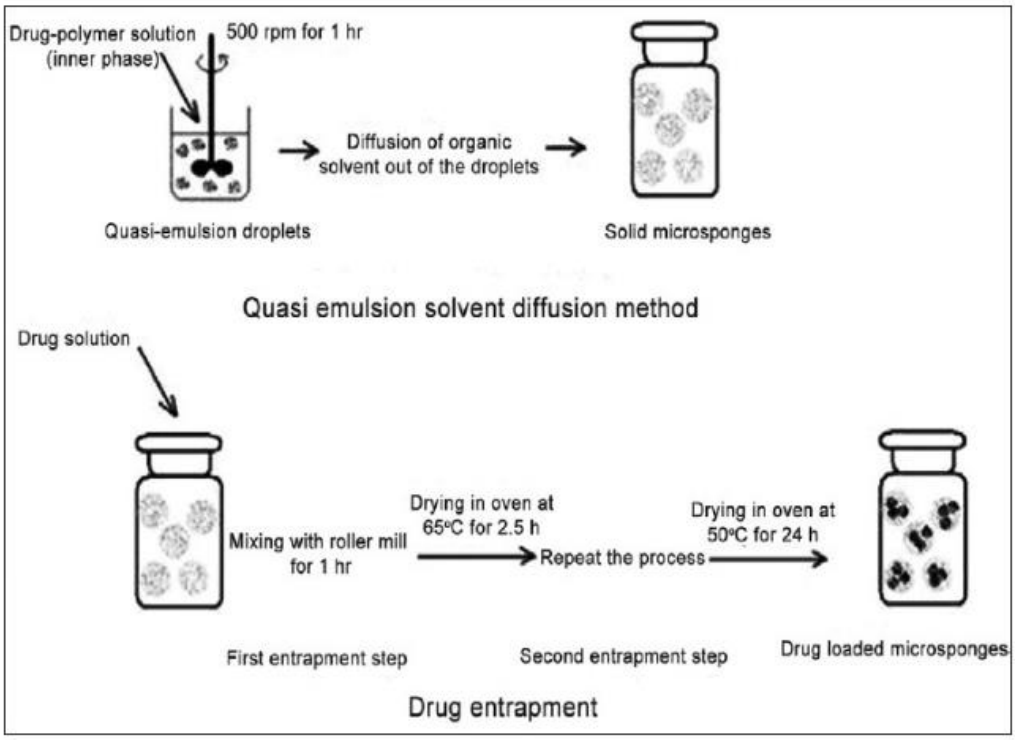


Fig.-8 Quasi-emulsion solvent diffusion method [9]

● **Formulation of Microspongial Gel:**

Gel was created using a combination of gelling ingredients using cold mechanical techniques.

⇩

Fill a different container with adequate water.

⇩

Repeatedly mix the polymer using a mechanical mixer after it has been submerged entirely in water.

⇩

Give it a day to settle at room temperature.

⇩

There's still more to do this season.

⇩

Include disinfectants, antibiotics, and preservatives.

⇩

Put some neutralizer in there. The end includes a quote.

⇩

Construct, shut off, and gather collapsible metal tubes [8]

Extraction Method of Guava leaf Powder:

In a sterile 150 mL Erlenmeyer flask, 20 g of guava leaf powder was boiled for 30 minutes at 90 °C in 100 mL of double-distilled water.

⇩

In a sterile 150 mL Erlenmeyer flask, 20 g of guava leaf powder was boiled for 30 minutes at 90 °C in 100 mL of double-distilledwater.

⇩

The mixture was centrifuged at 4000 rpm for 10 minutes. The supernatant was separated and stored at 4 °C for later study. [30]

Evaluation of Microsponges:

1) Determination of Particle Size: Particle size analysis of loaded and unloaded microsponges is performed by laser diffraction or other suitable methods. Each recipe and size has a numerical indicator. To examine the effect of the size of the drug released, the percentage of drugs released by microsponges of different sizes will be plotted over time. Particles larger than 30 µm have the potential to create negative reflection; therefore, particles between 10 and 25 µm are preferred when used in final gel.[7] The Motic digital microscope particle size analyzer [B1 advanced series] was used to analyse the particle sizes of the prepared microsponges. Before putting the sample through the equipment, microsponges were distributed throughout the slide to make sure the particle size and light scattering signal were measured within the sensitivity range of the device.[32] The analysis of particle size is carried out using laser light diffractometry or any other appropriate technique. For any formulation, the values (d50) can be stated as the mean size range. To investigate the impact of particle size on drug release, the cumulative percentage of drug released from microsponges with varying particle sizes will be plotted versus time. Particles bigger than 30 µm have the potential to produce a grainy texture, so in the final topical formulation, particles between 10 and 25 µm are ideal.[40]

2) Thin layer chromatographic studies: Thin layer chromatography (TLC) was applied to each solvent extract using silica gel G as the stationary phase in accordance with the traditional one-dimensional ascending approach. The chromatograms, results, and mobile phases are shown in [31].

TLC profile of the pet. ether extract of P. guajava leaf. Solvent system: benzene: chloroform: ethyl acetate (4: 3: 3). 0.69, 0.66.

3)P^H measurement: A digital pH metre was utilised to ascertain the pH of the gel composition. After dissolving one gramme of gel in 100 millilitres of distilled water, it was kept for two hours. It was measured what the formulation's P^H was. (5 – Acidic)

4) Spreadability Studies: Good spread ability is one of the requirements for a gel to satisfy the ideal attributes. This phrase refers to the area that gel spreads out easily when applied to the skin or other affected area. The spreading value of a formulation affects its medicinal efficacy as well. Spreadability is measured in terms of the number of seconds it takes for two slides to separate from gel that has been positioned between them when a specific stress is applied. Improved spreadability results from separating two slides faster. With a pulley at one end, a wooden block and glass slides were used to measure spreadability. This approach measured spreadability based on the gels' Slip and Drag properties. This block has a permanent ground glass slide. On the ground slide, an excess of gel (about 1 gramme) in various formulations was applied. After that, the gel was positioned between this glass slide and a second one that had a fixed ground slide's dimensions. The excess gel was removed by scraping off the edges. After then, the top plate was pulled for 20 grammes; the faster two slides can be separated, the greater the spreadability.

The formula below was then utilised to determine spreadability:

$$S = M \times L/T$$

Where,

L is the length that the glass slide moves,

M is the weight in the pan that is attached to the upper slide,

S is the spread ability.

T is the amount of time it takes to fully isolate each slide from the other. [33 - 37]

5) Visual inspection: The colour, texture, and appearance of the microsponges made from the produced gel formulation were examined visually.[32]

6) Drug release from the semi solid dosage forms and drug deposition studies: Drug release from the semi solid dosage forms are performed by the Franz- type static diffusion cells. In this epidermal side of the skin was exposed to ambient condition. While dermal side was kept facing the receptor solution. Receptor compartment containing 20 mL phosphate buffer pH 5.8 was thermostated at 32±0.5°C and stirred at 600 rpm. Skin was saturated with diffusion medium for 1 h before the application of sample. A 200-mg of sample was applied on the donor compartment. For determination of drug deposited in the skin, the diffusion cell was dismantled after a period of 4, 8, 16, and 24 h. The skin was carefully removed, and drug present on the skin surface was cleaned with distilled water.[38 -39]

7) Study using a Scanning Electron Microscope (SEM): Prepared microsponges can be coated with gold–palladium for surface topography and morphology at room temperature in an argon environment. Scanning electron microscopy (SEM) can then be used to examine the microsponges' surface morphology. A fractured microsponge particle's ultra structure can also be illustrated via SEM.[41]

Applications of microsponges:

1) Anti-inflammatory drugs, such as hydrocortisone: Prolonged action that lowers the skin's allergic reaction and skin tissue.
2) Antifungal: Active ingredients released gradually.
3) Antidandruff products, such as zinc pyrithione and selenium sulfide: Less offensive odor with decreased irritability with prolonged efficacy and safety.
4) Improved and prolonged activity in antipruritics.
5) Skin-depigmenting agents: enhanced stability against oxidation when using hydroquinone, for example, enhanced attractiveness and effectiveness
6) Rubefacients: Extended use with less irritation, oiliness, and smell. [4]

RESULT AND DISCUSSION:

1) Determination of Particle Size:

6 division of eyepiece = 5 division of stage micrometer

5 division of stage micrometer = 50µ (10×5)

1 division of eyepiece = 50/6 = 8.33 µ

Calibration factor = 8.33 µ

Sr. no	Width	width×c.f	length	length×c.f
1.	2	2× 8.33= 16.66	3	3× 8.33= 24.99
2.	3	3× 8.33= 24.99	2	2× 8.33= 16.66
3.	4	4× 8.33= 33.32	1	1× 8.33= 8.33
4.	2	2× 8.33= 16.66	4	4× 8.33= 33.32
5.	5	5× 8.33= 41.65	2	2× 8.33= 16.66
6.	6	6× 8.33= 49.98	3	3× 8.33= 24.99
7.	5	5× 8.33= 41.65	1	1× 8.33= 8.33
8.	5	5× 8.33= 41.65	4	4× 8.33= 33.32
9.	2	2× 8.33= 16.66	5	5× 8.33= 41.62
10.	3	3× 8.33= 24.99	2	2× 8.33= 16.66

FORMULA:

a) **Width (∑) = sum of width × C.F**

Number of particles

= 266.56

10

= 26.65µ

b) **Lenth (∑) = sum of lenth × C.F**

Number of particles

= 224.88

10

= 22.48µ

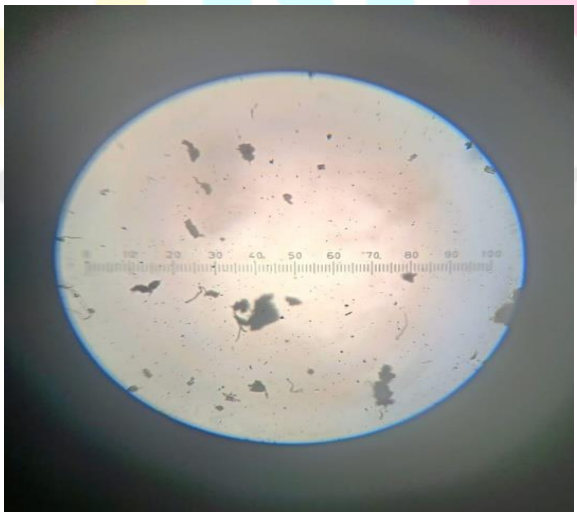


Fig: 9 particle size

2) Thin layer chromatographic studies: TLC profile of the petroleum ether extract of P. guajava leaf. Solvent system: benzene: chloroform: ethyl acetate (4: 3: 3). 0.69, 0.66.

Fig:10 TLC Plate

2. pH measurement: A digital pH metre was utilised to ascertain the pH of the gel composition. After dissolving one gramme of gel in 100 millilitres of distilled water, it was kept for two hours. It was measured what the formulation's pH was. (5 – Acidic)

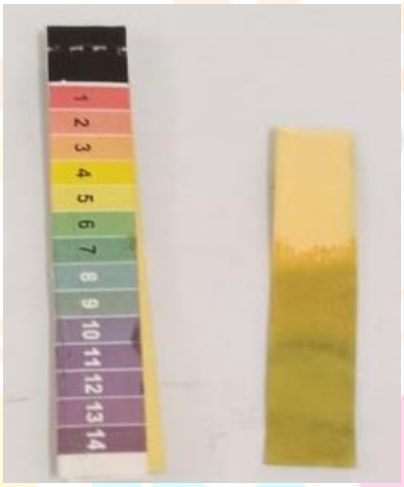
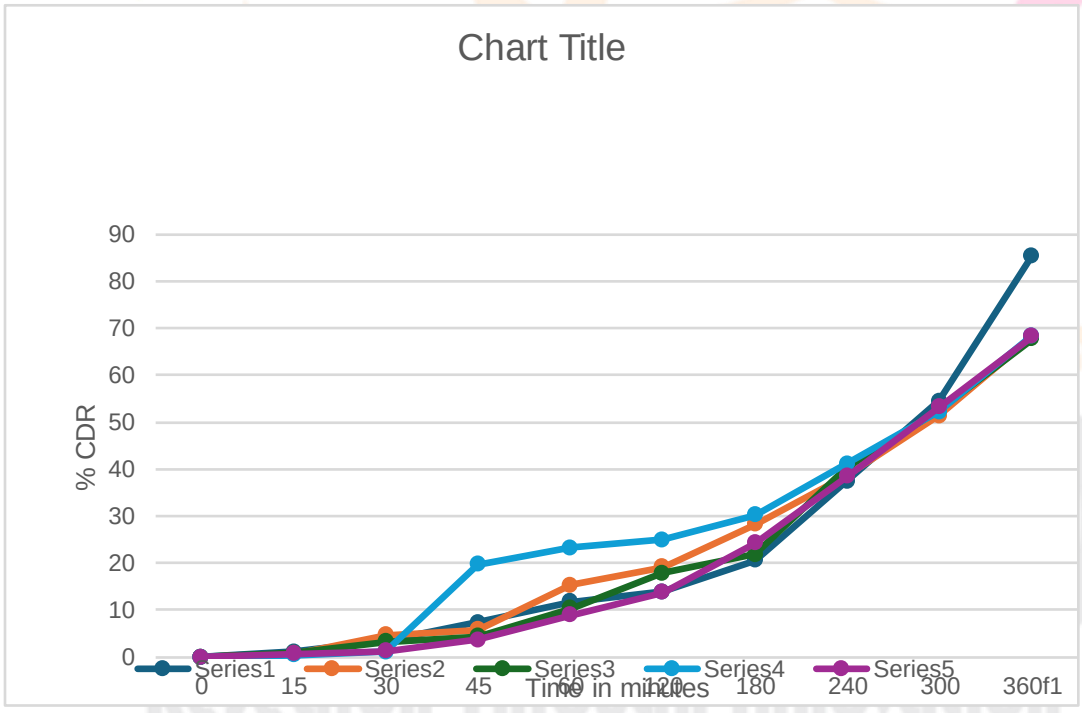


Fig:11 P^H measurement

3 Drug release from the semi solid dosage forms and drug deposition studies:

cumulative drug release

Time in minutes	F1	F2	F3	F4	F5
0	0	0	0	0	0
15	1.1208	0.6543	0.7876	0.398	0.696
30	3.6016	4.7346	3.3078	1.147	1.234
45	7.4085	5.7806	4.3387	19.743	3.654
60	11.8057	15.3045	10.342	23.312	8.965
120	13.9017	19.2054	17.854	24.996	13.686
180	20.5755	28.2341	21.807	30.243	24.325
240	37.4161	38.8065	40.345	41.205	38.465
300	54.5558	51.3457	52.543	52.254	53.196
360	85.4567	68.1345	67.645	68.388	68.234



Drug release rang are between 80 to 90.

CONCLUSION:

Herbal microspongial gel mainly act as anti inflammatory agent ,which reduces inflammation , swelling, redness. The microsponges are group of extremely small drug delivery system control the rate of or type of release of drug to certain part of body. Microsponges are non-toxic and non-allergic . Microsponges are prepared by using extraction method of decoction process. For preparation of herbal microspongial gel we use the material i.e. guava leaf shows anti inflammatory action potato as a thickening agent ,modified starch (maize) act as a gelling agent ,honey as a preservative , curcumin as a anti fungal and anti microbial agent .Microsponges are spherical particle with porous surface having valuable and attractive effect on topical delivery. Microsponges can be used in different bases like gel, lotion, ointment, and even in powder

form . Microsponges are provides extended release of drug ,decrease inflammation ,swelling,redness and improve the patient compliance . microspongial gel are easily available and cost effective.

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