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NOVEL FORMULATION POLYHERB TRANSDERMAL PATCHES FOR WOUND HEALING

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Abstract:- This Research Investigate the uses of polyherb transdermal patches for wound healing, Wound healing is a complex biological process that consists of hemostasis, inflammation, proliferation, and remodeling. The in-vivo wound healing efficacy of the polyherb patch was observed to perform better in terms of wound closure after 14 days as compared to conventional cotton gauze. Methodology includes the combination of tulsi, neem& alove vera extract with Excipients methanol, PEG, HPMC, Chloroform, propylene glycol etc. are steer with the help of magnetic stirrer. And then dry the mixture in hot air oven at 50 degree Celsius. neem showed significant changes in the healing process by enhancing the proliferation phase. The anti-bacterial, anti-inflammatory, anti-fungal, and anti-viral characteristics of neem's active components, such as nimbidin, nimbin, and nimbidol, aid in promoting the healing of wounds. We also find out that Aloe Vera is effective In inhibiting inflammatory reaction by inhibition of IL-6 and IL-8, it reduces the adhesion of WBC and also decrease TNF alpha Levels. Aloe Vera increases amount of collagen in wound and also tends to change composition of collagen. It Also increases the cross linking then hence it promotes wound healing. Various Research Study and Surveys States that there are Topical and Transdermal Medicated Formulation for Dealing with Treatment of Skin Infections but this Study States the Transdermal Drug Delivery System Has wide range of Advantages over Topical Formulation. This TDDS has wide scope in future so it involves various New Approaches like Iontophoresis, Photomechanical waves etc.

KEYWORDS:- Ocimum sanctum, Azadirachta indica, Transdermal patches, wound healing

1] INTRODUCTION :-

Wound Healing – Wound is defined as the lesions or skin rupture which is caused by various physical or thermal trauma.

Skin wound are 2 types acute and chronic.

ACUTE skin wounds are traumatic or surgical wounds that usually heal over time according to normal healing process.

CHRONIC wound that do not heal within 3 months often considered chronic wound healing

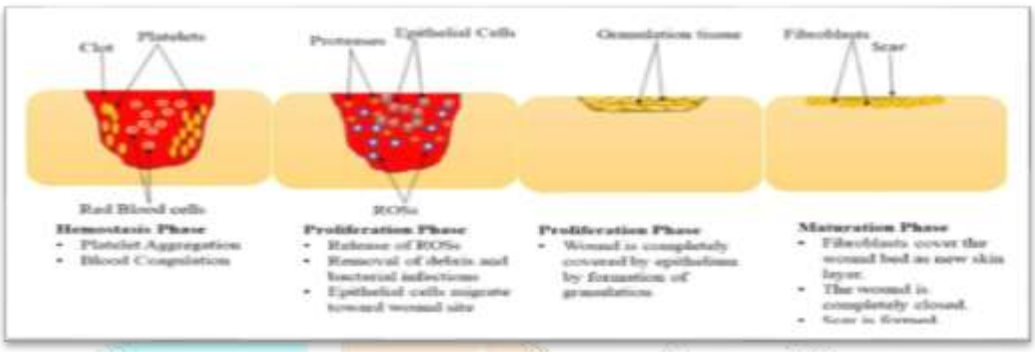

Fig no. 1 Process of wound healing

Transdermal Drug Delivery:-

- TDDS is a system having more scope having now a days because it is a type of novel drug delivery system
- TDDS is developing drug delivery system which is now more explored in last one to two decades.
- In TDDS drug is transported into the epidermal and dermal tissues present in the skin for local and systemic effect therapeutic effect.
- TDDS has competed with oral routs as most successful innovative research area in drug delivery.
- TDDS includes different formulations like ointments , patches , and gels etc.

General Procedure of Transdermal Drug Delivery System:-

- Sorption of drug through stratum cornium
- Uptake of drug by capillary network.
- Activation of pharmacological response
- Release of medicament from vehicle
- Penetration through Skin barriers
- Penetration of drug through viable epidermis.

1] Tusli & its role in wound healing:-

Fig. No. 2 Tulsi

- Tulsi shows anti- oxidant property which is helpful in wound healing. Leaves of ocimum sanctum have anti-inflammatory, analgesic action.
- The free radical scavenging action of the plant helps in healing of wound. Free radical scavenging activity is major mechanism by which an ocimum sanctum protect against cellular damage .
- Tulsi also been shown to counter metabolic stress through normalization of blood glucose level, blood pressure , and lipid level.

Table no. 1 Botanical classification of Tulsi

Kingdom	Plantae
Family	Lamiaceae
Order	Lamiales
Genus	Ocimum

2] Aloe Vera & its Role in wound healing:-

Fig no. 2 Alove vera

- The mucopolysaccharides along with amino acids are present in aloe tends to skin integrity, moisture retention, & also helps in to prevent skin ulcer.
- Topical administration of aloe Vera enhance healing process of dermal injuries.
- Aloe Vera is effective In inhibiting inflammatory reaction by inhibition of IL-6 and IL-8, it reduces the adhesion of WBC and also decrease TNF alpha Levels. (Shedoeva, 2019)Aloe Vera increases amount of collagen in wound and also tends to change composition of collagen.
- It Also increases the cross linking then hence it promotes wound healing.

Table no. 2 Botanical classification of Alove vera

Kingdom	Plantae
Family	Asphodelaceae
Order	Asparagales
Genus	Aloe

3] Neem & its role in wound Healing-

Fig no. 4 Neem

- Neem is also an excellent wound healer that helps the body to rapidly create collagen fibers to close the wound
- Neem showed significant changes in the healing process by enhancing the proliferation phase.
- The anti-bacterial, anti-inflammatory, anti-fungal, and anti-viral characteristics of neem's active components, such as nimbidin, nimbin, and nimbidol, aid in promoting the healing of wounds.
- Neem leaf extract could help promote wound healing.

Table no. 3 Botanical classification of Neem

Kingdom	Plantae
Family	Meliaceae
Order	Sapindales
Genus	Azadirachta

Herbarium sheet of Neem & Tulsi :-

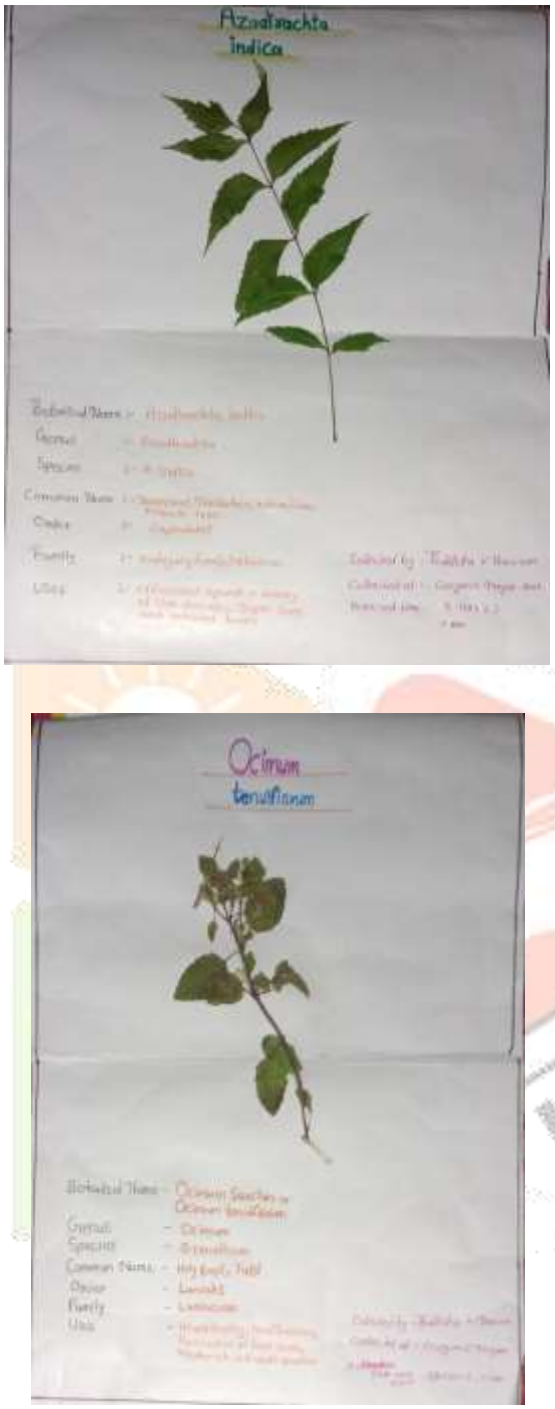

Fig no. 5 herbarium sheets

2] OBJECTIVE:-

- The Main objective of the study is to find out the effect of tulsi, neem and alove vera into wound healing process.
- Comparing the effects of polyherb patches on wound and conventional treatment.
- Understanding the new scenario in novel formulation over conventional formulation.
- To reduce the side effects of conventional treatment by formulating the novel formulation.

Requirements & materials-

Chemicals- PEG400, Propylene glycol, HPMC, Chloroform, methanol, tulsi extract , aloe vera extract, neem, extract

Apparatus- Beaker, measuring cylinder, glass rod, petri plate, slides.

Table no. 4 content for preparation of patches :-

Sr. No.	Name of The Ingredients	Quantity Required
1	Tulsi Extract	5 ml
2	Neem Extract	5 ml
3	Aloe Vera	5ml
4	PEG	2.5ml
5	Propylene glycol	2.5ml
6	HPMC	5gm
7	Chloroform	8ml
8	Methanol	4ml

Method of Preparation of Herbal Extracts-

Maceration Process:-

1] Tulsi Extract-

The leaves of ocimum sanctum were collected then the leaves were dried under sunlight& grinder into fine powder using mortar &pestle. Then add organic solvent {ethanol} macerated for 48 hr then extract was filtered.

Fig no. 6 Tulsi extract

2] Neem Extract-

The leaves of neem were collected & dried under sunlight grinder into fine powder& add ethanol , macerated for 48 hr. the extract was filtered.

Fig no. 7 neem extract

3] Aloe Vera Extract –

The Scaly Leaves of Aloe vera were collected from the plant. Then those fleshy leaves were thoroughly Washed using clean water to remove yellow latex. Then the covering was removed and the Gel like Part was collected separately.

3] METHODOLOGY:-

PROCEDURE FOR FORMULATION OF T²RANSDERMAL PTCHES:-

- Initially weigh required ingredients.
- Then add 8ml chloroform & 4ml methanol in a beaker & mix then properly using magnetic stirrer.
- Then add 2.5ml propylene glycol & 2.5 ml PEG into above solution again stir it continuously using magnetic stirrer.
- Now then add HPMC with constant stirring but add 1gm HPMC at a time interval of 1 minute.
- After time period of 10 -15 minutes when the formulation becomes viscous the was add to the petri plate which is coated with aluminum foil.
- Then the petri plate &slides was place in hot air oven at 50 degree for certain period of time.

Formulated Patches-

Fig no. 8 Formulated patches

Evaluation:-

1]Organoleptic Property-

A]color

B] Texture

C] Odor

2] surface PH determination-

In this evaluation test the pH of the surface of transdermal patch was evaluated using PH paper

3] Folding Endurance-

the folding endurance of patch is determined by repeatedly folding one patch at the same place till it broke. The folding endurance gives the mechanical property of patches. High folding endurance number indicate that the patches have high mechanical property.

4]Moisture Content-

the % moisture content was done by Initially the individual patches were weigh & then kept into hot air oven for 1 hr. then afterwards patches were reweighed.

% moisture content=[initial wt.-Final wt.]/ Initial wt. *100.

5] Uniformity of weight-

This was done by weighing different patches and calculate the average weight.

6]Drug content determination-

The patches were taken and added to a beaker containing 100 ml of D.W. The Medium was stirred magnetic bead for 5 h. The solution was later filtered and analyzed for Drug content with proper dilution at 382 nm spectrophotometrically.

7]Tensile strength-

Tensile strength is the maximum stress applied to a point at which the patch Specimen breaks. It is calculated by the applied load at rupture divided by the cross-Sectional area of the strip as given in the equation below

Percentage elongation = Load at failure /Patch thickness x Patch width X 100

4] RESULT& DISCUSSION:-

Table no. 4 Organoleptic characteristics

Sr. No.	Characteristics	Observations
1	Color	Light yellowish green
2	Texture	Smooth
3	Odor	Herbal Extract like

Table no. 5 Evaluation of Transdermal Patches

Formulation no.	Surface pH determination	Folding Endurance E(no's)	Moisture content (%)	Uniformity weight(g)	Drug contain Determination (%)	Tensile strength (Kg/mm2)
F1	6	235±0.76	2.866±0.07	0.38±0.14	85.23	5.300±0.55
F2	7	249±0.23	3.422±0.22	0.46±0.85	82.21	6.361±0.87
F3	6	254±0.36	3.79±1.03	0.49±0.10	80.13±0.40	6.7031±0.87

5] CONCLUSION:-Drug delivery essentially involved in development of controlled or site-specific delivery of drug. Controlled drug delivery improves The bioavailability of drug and prevents premature degradation, enhance the drug uptake thus maintains drug concentration. Every Drug molecule needs a delivery system to carry drug to site of the action upon administration to the patients. Delivery of drug can Be achieved using developed dosage forms like tablet, capsule, creams, ointments, liquids, aerosols etc. To reduce the fluctuation Of drug level, minimize side effects while therapeutic outcome of drug is improved. The ultimate goal of Pharmacotherapeutics is To maximize the therapeutic efficacy of drug while minimizing the related and associated adverse effects. Historically Drug delivery System were developed primarily for conventional routes of administration such as oral and intravenous. However there has been Explosion in research on delivery option like Transdermal, Nasal, and Ocular, Pulmonary etc. This system employees a variety of Rate controlling mechanism including matrix diffusion, membrane diffusion, Biodegradation and Osmosis.

In the latest research studies, it has come to see that there is a wide scope for Implementation of Novel Drug Delivery System. As we all are known to some overpowering benefits of Novel drug delivery system over the traditional drug Delivery system. As it is in concern with the drug delivery through the skin the Transdermal Drug delivery system has an Effective benefit over the topical method of drug delivery. The advancement in drug delivery system is allowing wide Range of drugs to be administered through transdermal drug delivery system. The Herbal transdermal Patches including aloe, neem and tulsi were aimed to heal the wound or any type of injury or the skin Infection like eczema etc. The Evaluation studies states that theF1 patches have the optimum drug contain 85.23, while F3 shows better tensile strength and folding endurance 6.7031±0.87 and 254±0.36 while F2 gives moderate Ph range.

The various research it's seen that transdermal drug delivery system has great scope in future for Developing drug delivery system in NDDS. Transdermal drug delivery system is widely accepted now-a-days because it Causes the drug penetration through skin layers and reach systemic circulation without causing any damage to skin or Rupturing it. TDDS also benefits for controlled release of drug for prolonged period of time. More research and innovation Will bring the wide acceptance in the use

of various other transdermal drug delivery system like iontophoresis, Ultrasound Technology, Med Tat etc.

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