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SHORT COMMUNICATION **OPEN ACCESS**

Formulation and Characterization of Transdermal Patches from Yashtimadhu Extract (*Glycerrhiza glabra* L.)

Arathi Chandran JL[1], Prasanna Mathad[2], Abhayakumar Mishra[3]
1.Final Year Post Graduate Scholar, Department of Rasa Shashtra & Bhaishajya Kalpana, Parul University, Parul Institute of Ayurved, Limda, Vadodara, Gujarat, India.
2. Professor and HOD, Department of Rasa Shashtra & Bhaishajya Kalpana, Parul University, Parul Institute of Ayurved AND Research, Limda, Vadodara, Gujarat, India.
3. Professor, Department of Rasa Shashtra& Bhaishajya Kalpana, Parul University, Parul Institute of Ayurved, Limda, Vadodara, Gujarat, India
Correspondence Email: heydisisarathi26@gmail.com

ABSTRACT
The emergence of new technologies provides unique opportunities to explore novel approaches in drug delivery. A shift from conventional drug delivery system to Novel Drug Delivery System has noticed a drastic change in pharmaceutical. Transdermal Drug Delivery System (TDDS) is defined as self-contained, discrete dosage forms which when applied to intact skin deliver the drug through the skin at a controlled rate to systemic circulation. Here, a study was planned to prepare transdermal patches with the therapeutically efficient drug yashtimadhu and carry out its physical characterization. 1.To Prepare Yashtimadhu methanolic extract 2.To formulate Transdermal patches with Yashtimadhu extract 3.To do physical characterization of prepared patches. Methods: Yashtimadhu transdermal patches were formulated by the casting evaporation method. Transdermal patches were made using Hydroxypropyl methylcellulose (HPMC) and dried in different systems and the Physical characterization (organoleptic properties, pH, folding endurance, percentage of moisture content, weight uniformity) was performed. Yashtimadhu transdermal patches can be formulated by the casting evaporation method with the Organoleptic properties characterized as smooth, dry, brown in color, having menthol odor, and transparent. The pH values ranged between 5.4 and 6, folding endurance 34, Percentage of moisture content is 3.990±0.70, Weight uniformity is 6.08 ±0.62. Conclusion: All patches satisfied the requirement of the physical characterization for the transdermal patch.
Keywords: *Transdermal patch, Yashtimadhu, Soxhlet extraction, Physical characterization*

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INTRODUCTION

The emergence of new technologies provides unique opportunities to explore novel approaches in drug delivery. A shift from conventional drug delivery system to Novel Drug Delivery System has noticed a drastic change in pharmaceutical. The first commercially available prescription patch was approved by the U.S FDA in December 1979. [1] These Patches administer Scopolamine for motion sickness. Transdermal Drug Delivery System (TDDS) is defined as self-contained, discrete dosage forms which when applied to intact skin deliver the drug through the skin at a controlled rate to systemic circulation. The rate or dose-controlled drug delivery system results in constant and continuous output, predicted and extended duration of action, lesser side effects. The wind of change in the drug scenario is blowing forcefully worldwide. [1, 2] Hence it is a need an hour the classical trend of medicinal dosage is to be changed with modern pharmaceutical trend.

The wide range therapeutic use of *Yashtimadhu* is mentioned in *classics.* Its use has been mentioned from the *Samhita* period itself. *Yashtimadhu* has been mentioned in ancient texts such as *Charakasamhita, Susrutasamhita, Ashatangahrudaya, Bhavaprakash, Raja Nighantu*, *etc.* [3] the useful part is Root. *Yashtimadhu* is mainly used for the treatment of peptic ulcer, hepatitis C, pulmonary and skin diseases.[3] A large number of components have been isolated from liquorice, including triterpene saponins,

flavonoids, isoflavonoids and chalcones, with glycyrrhizic acid normally being considered to be the main biologically active component.[4]

MATERIAL AND METHODS

PROCUREMENT OF RAW DRUGS

Yashtimadhuyavakut (No: 40 Mesh) was collected from GMP certified Parul Ayurveda Pharmacy, Other materials included HPMC (Shim Etsu, Japan), polyethylene glycol 400 (PEG 200) (Merck, Germany), methanol (Brataco, Indonesia)and distilled water (Brataco, Indonesia) were collected from central laboratory, Parul institute of pharmacy.

OBJECTIVE:

a) To Prepare *Yashtimadhu* methanolic extract
b) To formulate Transdermal patches with *Yashtimadhu* extract
c) To do physical characterization of prepared patches.

METHODS

a) EXTRACTION OF *YASHTIMADHU YAVAKUT*

Soxhlet extraction method was adopted. Coarse powder of *Yashtimadhu* soaked in Methanol for a while and placed in SOX thimble. Methanol was used as solvent, and heated under reflux. The cycles continued till the solvent became transparent and allow the system to self-cooling. After that the extract was reduced with hot water bath for 6hrs. Then collected and preserved in an air tight glass container. [5]

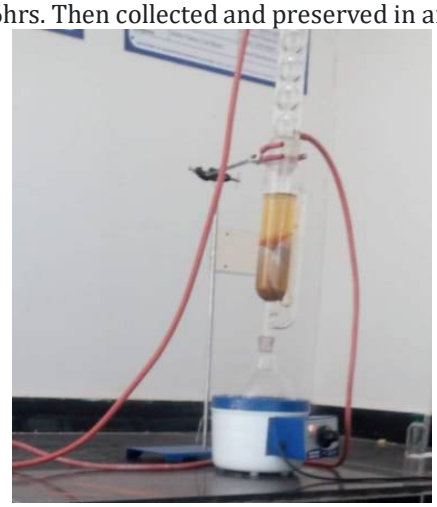

Fig: 1 Extraction of *yashtimadhu*

b) FORMULATION OF *YASHTIMADHU* TRANSDERMAL PATCH

Transdermal patches of *Yashtimadhu* extractive were made by the evaporation casting method. The chosen combination is HPMC, PEG was used as a plasticizer, and methanol was used as a permeation enhancer. 10mg HPMC was dissolved in 20 ml of Distilled water (1:1) using magnetic stirrer. PEG 200 was then added to the homogenized mixture. 20mg of *Yashtimadhu* extractive were added to the solution, and the mixture was homogenized using magnetic stirrer for 10 min until the dope solution formed. [6, 7]
Here we planned to dry the patches in two different systems**. A-**Ten milliliters resulted solution was poured into glycerine polished Petri-dish having overall area of 50.24cm^{2}and oven-dried at 30°C for 24 h. [8]

B -The remaining 10ml poured into another Petri-dish having same dimension and dried at room temperature for 48hrs. The quick evaporation of the solvent was minimized using an inverted funnel which was placed over the Petri dish. On completion of mentioned time, dried out patches was isolated from Petri-dish and kept in desiccators for further examinations.[7]

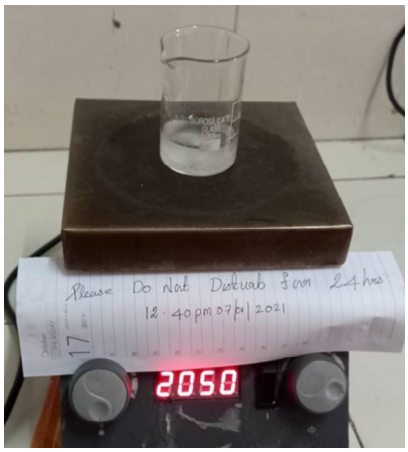

Fig: 2 Preparation of polymer in Magnetic stirrer

Fig: 3 Drying the prepared solution in Tray dryer at 30°C

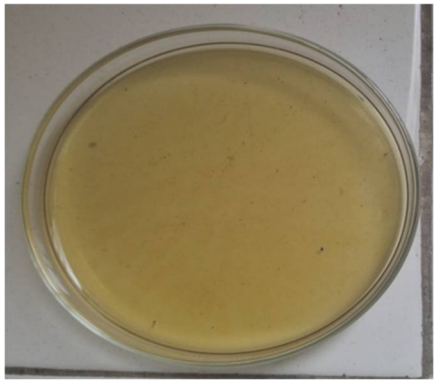

Fig: 4 Drying the prepared solution in Room temperature

PRECAUTIONS:

1. Polymer solution should be clear, transparent and homogenize mixture.
2. While adding plasticizer and drug into the polymer continuous stirring is needed.
3. Only bubbles free and clumps free solution will form a good patch and meets all the standard needs.
4. While drying the patches should be protected from contamination.
5. After drying the patches should preserve in air tight system.

c) PHYSICAL CHARACTERIZATION OF TRANSDERMAL PATCHES

Organoleptic evaluation

The organoleptic evaluation was conducted by observing the color, odour, and texture of the patches.[9,10]

pH evaluation

The patches were cut (1 x 1 cm^2) and immersed into 1 ml of distilled water for 2 hrs at room temperature. pH evaluation was performed by placing a universal indicator on the patches' surfaces for 1 minute. pH was then measured [9,10].

Weight uniformity

For each formula, each of the patches was weighed, and the average weight was then calculated [9, 10].

Percent of moisture content

The percent of moisture content of the patches was evaluated by weighing the patches and then placed them into desiccators for 24 hrs.After 24 hrs the patches were re-weighed. The percent moisture content was calculated by the following formula [9, 10]

Moisture content (%) = Initial weight−Final weight Initial weight x 100%

Folding Endurance

Developed patch was taken and subjected to repetitive folding at same point until it gets break. Instances of time when patch folded without breaking was noted down. [9, 10]

RESULT AND DISCUSSION

Yashtimadhu methanolic extraction was done with Soxhlet extraction method. 5mgof *Yashtimadhuyavakut* soaked in 500ml. Methanol for a while and placed in SOX thimble. Methanol was used as solvent, and heated under reflux. 9cycles were completed and collected the extract. The extract preserved in semisolid form. [5]

Selection of proper polymer is the main step for formulating a TD patch. Here we used HPMC as polymer, PEG as plasticizer and Methanol as solvent. Chosen casting evaporation technique and opted two methods to understand the difference. The chosen proportion is HPMC E 50 5%, 2ml of PEG was used as a plasticizer, and two to four drops of methanol was used as a permeation enhancer. 50ml HPMC was dissolved in 20ml of Distilled water (1:1) using magnetic stirrer for three hours.2ml of PEG 200 was then added to the homogenized mixture.20ml of *Yashtimadhu* extractive were added to the solution, and the mixture was homogenized using magnetic stirrer for 10min until the dope solution formed. [6, 7]. Prepared 20ml solution poured in two different Petri- dishes having same diameter and dried under different systems. The Petri dishes marked as A and B, then A dried under Hot air oven at 30^0Cfor 24 hrs and B dried in atmospheric condition, and dried in 48hrs. Both of them kept in Desiccators and done the physical examinations. We have done the possible physical characterization and observations recorded in the Table no: 1.

Patches	A	B
Colour	Brown	Brown
Odor	Feeble Methanol smell	Methanol smell
Texture	Hard, sparingly transparent	Smooth, Transparent
pH	5.5 to 6	5 to 6
Weight uniformity	0.68 ±0.03	6.08 ±0.62
Percentage of Moisture content	0.75±0.01	3.990±0.70
Folding endurance	26	34

Table no: 1 Observations of physical characterization

A, is oven dried and which is Hard, Thin, and non- elastic one and the folding endurance is poor than second one. B is dried under room temperature, having the features like smooth, thin, transparent, and elastic and the folding endurance is appreciable. While doing the physical evaluation, the one which dried in normal atmospheric condition satisfies all the standard parameters of Transdermal patch (Fig 5).

A B

Fig: 5 Prepared patches

CONCLUSION

In this novel approach, herbal extract (methanolic extract of *Yashtimadhu)* loaded transdermal patches were Productively Synthesized Using Hydroxy Propyl Methyl Cellulose (HPMC) polymer and poly Ethelene glycol 200, plasticizer and Methanol, an organic solvent. Patches were characterized for some physical parameters. It can be concluded from this work that formulation of Transdermal patches with bioactive component is possible and which satisfies all the features of an ideal product. Although transdermal systems offer a promising route of delivery of new-age drugs, Traditional and new dosage forms are equally needed to enhance another drug's therapeutic efficacy. TDDS perform site specific delivery of the drug.

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