Research Article **ISSN: 2349 – 7106**

Asian Journal of Research in Chemistry and Pharmaceutical Sciences

Journal home page: www.ajrcps.com

https://doi.org/10.36673/AJRCPS.2020.v08.i02.A16

FORMULATION AND EVALUATION OF HERBAL ADHESIVE BANDAGE

Virendra V. Patil*[1], Yogesh S. Thorat[1], Nagesh S. Kote[1], Avinash H. Hosmani[2]

[1*]Department of Pharmaceutics, D.S.T.S. Mandal's College of Pharmacy, Solapur, Maharashtra, India.
[2]Department of Pharmaceutics, Government College of Pharmacy, Ratnagiri, Maharashtra, India.

ABSTRACT

The main aim of our research was to develop a wound healing adhesive bandage formulation consisting of *Curcuma longa* (Turmeric) for the treatment of wound healing. Herbal Adhesive Bandages present in market were having Antiseptic property only and the present study aimed to design, develop. Herbal wound pad containing powdered herbal drug's i.e. *Curcuma longa* (Turmeric) the plants have been reported in the literature as having good antimicrobial, anti-inflammatory activity. A wound healing herbal adhesive bandage formulation consisting of *Curcuma longa* (Turmeric) extracts was prepared. Microbiological studies were performed safety of materials used in the formulation. The developed bandage consisting of *Curcuma longa* (Turmeric) was found to be safe and effective for the treatment of wound healing activity.

KEYWORDS

Curcuma longa (Turmeric).

Author for Correspondence:

Virendra V. Patil,

Department of Pharmaceutics,

D.S.T.S. Mandal's College of Pharmacy,

Solapur, Maharashtra, India.

Email: virendra4151@gmail.com

INTRODUCTON

Adhesive wound pad consist of sterilized woven fabric this antiseptic pad impregnated with *Curcuma longa* (Turmeric) herbal ointment. It is used to protect and heal cuts, scratches, blisters, insect bites minor wounds and to stop bleeding. It is antiseptic woven fabric adhesive bandage as the elementary material is more suitable to all person. Curcuma longa (Turmeric) show pharmacological actions as antibacterial, antifungal, and anti-inflammatory. The woven fabric was used as Adhesive sheet[1-5]. The Acrylate adhesives were used on woven fabric sheet. The cotton absorbent pad was used and the pad was medicated with prepared herbal ointment[6-9].

Some European and North-American countries such as the USA, United Kingdom, France, Germany, Denmark, Netherlands, etc are exploring the use of herbs in the pharmaceutical field and also practicing them for many centuries. In the 21st century, various human diseases had come out with different names. These herbs are free of side effects or adverse reactions and are also effective[10].

Wounds are common conditions in human beings. Healing of wounds is a complex biological event and the internal and external factors can lead to various complications[11,12]. A wound may often lead to serious adverse events if not treated properly[13]. The steps in the wound healing process include first inflammation, angiogenesis, development of granulation tissues, repair of connective and epithelial tissues and at last remodeling[14].

Treatment of wounds is important to achieve the best functional and aesthetic results in a short time[15]. Turmeric is obtained from the dried roots and rhizomes of the plant 'Curcuma longa' belonging to family Zingiberaceae. Curcumin is the main component of turmeric and is responsible for wound healing properties[16]. Curcumin has a history of administration in traditional systems of India, China, and Iran[17]. The plant 'Curcuma longa' is found in abundance in countries like India, Malaysia, Sri Lanka, Myanmar, Indonesia, China and some African countries[18].

Different curcuminoids are isolated from Curcumin. They are Curcumin I, desmethoxycurcumin (Curcumin II), and bisdemethoxycurcumin (Curcumin III). They have biological properties similar to those of curcuminoids[19].

Curcumin inhibits pain and inflammation by selectively inhibiting the arachidonic acid cascade[20]. Curcumin down-regulates the expression of enzyme and inhibits the expression of pro-inflammatory enzyme 5-LOX. It also induces down-regulation of various inflammatory cytokines such as TNF, IL-1, IL-6, IL-8, interferon and some other chemokine[21,22].

MATERIALS AND METHODS

Collection of dry curcuma Longa (Turmeric) powder

The dry 'Curcuma longa' (turmeric) extract was took from the laboratory.

PROCEDURE FOR OINTMENT PREPARATION

1. First, the ointment base has been prepared by weighing the appropriate quantity of hard paraffin wax. Placed in the porcelain dish on a water bath. After the melting of hard paraffin wax, the remaining ingredients such as lanolin, Cetyl alcohol and white soft paraffin were added.
2. Further dry Curcuma longa extract has been added to the ointment base by levigation method. First, the powder is rubbed with a little quantity of the bottom to forming a concentrated ointment base containing a finely divided powder uniformly distributed in it. The concentrated ointment is then diluted with the remaining quantity of the base by rubbing with a spatula.
3. At last the two preservatives that are Methyl paraben and Propyl paraben has been added[23].

Preparation of herbal adhesive bandage

- The woven fabric was cut into suitable dimension 7 × 2.5cm (length ×width)
- Wound pad of 2.5×1.2 cm size was prepared and fixed on adhesive woven fabric.
- Then prepared herbal ointment was spread over wound pad.

The backing plastic material having same size was fixed over the adhesive woven fabric[24].

EVALUATION PARAMETERS

Colour and odour

These are determined by the visual examination.

Consistency

Smooth and no grittiness are observed.

pH

The pH of the curcumin ointment has been measured with the help of digital pH meter. The

ointment solution has been prepared by using 100 ml distilled water and set aside for 2 hrs[25].

Viscosity

The viscosity was measured by CAP- 2000 Brookfield viscometer. The ointment was taken in 250ml beaker and therefore the viscosity of the ointment was decided by the quality procedure of Viscometer by using spindle No.1 to 4. Their rheological characteristics were also tested at 250 C using Brookfield viscometer[26].

Spreadability

The spreadability is determined by placing the excess sample in between two slides which were compressed to uniform thickness by placing a definite weight for a specific time. The time required separate the two slides was measured as spreadability. As less time required for separation of two slides results in better spreadability. Spreadability was calculated by the following formula:

$S=M \times L/T$

Where,

S= Spreadability

M= Weight tide to the upper slide

L= Length of glass slide

T= Time taken to separate the slides

Solubility

Soluble in boiling water and miscible with ethanol, ether and chloroform.

Washability

The ointment was applied to the skin and then ease the extent of washing with water was checked.

Non-Irritancy test

The curcumin ointment has been applied to the skin of human being and observed for the effect.

Stability Studies

The international conference on harmonization (ICH) harmonized tripartite guidelines on stability testing of new drug substances and the product was issued on 27th October 1993[27]. The stability test of the curcumin ointment was carried out for four weeks at various temperature conditions like 4ºC, 25ºC, and 37ºC. The ointment was found to be physically stable at different temperature i.e. 4ºC, 25ºC, 37ºC[28,29].

RESULTS AND DISCUSSION

Formulation and evaluation of herbal antiseptic bandage was performed. Adhesive bandage was evaluated in terms of appearance, characteristic, odour were checked visually. The present study shows that newly developed polyherbal antiseptic wound pad was successfully designed, developed. Hence herbal wound pad could be used as better and safe substitution of synthetic wound pad Hansaplast. In previous studies it is described that when powder of *Curcuma longa* applied on open wound it serves as an excellent antiseptic property. The extract of Turmeric has shown antibacterial activity against S. aureus, *Escherichia coli, Klebsiella pneumonia* and *B. subtilis*. Traditionally it's said that turmeric when applied to face it improves the sweetness and safe guard against number of skin diseases hence traditionally it's utilized in herbal cosmetics.

The number of batches having different concentrations of herbal drugs was prepared and evaluate.

Formulation of Ointment

Table No.1: Formulation of Turmeric Extract Ointment

S.No	CONTENTS	Quantity taken in F1	Quantity taken in F2	Quantity taken in F3
		Gm	Gm	Gm
1	Curcuma longa Extract	0.06gm	0.06gm	0.06gm
2	Lanolin	0.55gm	0.60gm	0.70gm
3	Cetyl Alochol	0.55gm	0.60gm	0.70gm
4	Hard Paraffin	0.55gm	0.60gm	0.70gm
5	White Soft Paraffin	8.4gm	8.3gm	8.2gm
6	Methyl paraben	0.1gm	0.1gm	0.1gm
7	Propyl paraben	0.01gm	0.01gm	0.01gm

Physicochemical Evaluation of Ointment

Table No.2: Physicochemical Evaluation of Ointment

S.No	EVALUATION PARAMETERS	F1	F2	F3
1	Colour	Yellow wish orange	Yellow wish orange	Yellow wish orange
2	Odour	pleasant	pleasant	Pleasant
3	Consistency	Smooth	Smooth	Smooth
4	PH	6.1	6.7	6.3
5	Viscosity	216c.p	243c.p	229c.p
6	Spreadability (Sec)	4 sec	7 sec	4 sec
7	Solubility	Soluble in Boiling water, miscible with alcohol, ether, chloroform	Soluble in Boiling water, miscible with alcohol, ether, chloroform	Soluble in Boiling water, miscible with alcohol, ether, chloroform
8	Washability	Good	Good	Good
9	Non-Irritancy Test	Non-irritant	Non-irritant	Non-irritant
10	Stability Studies (40c, 250c, 370c)	Stable	Stable	Stable

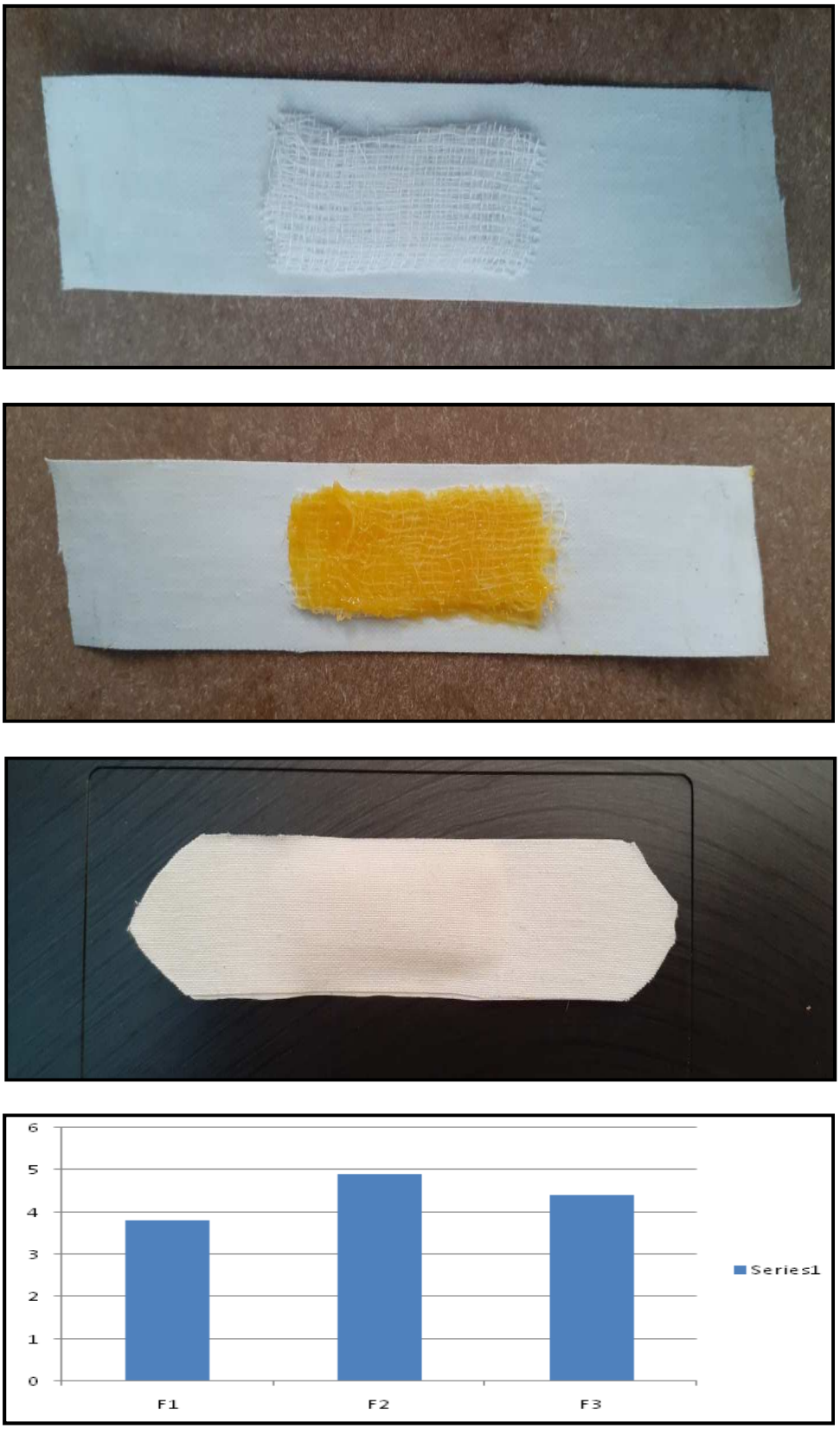

Figure No.1: Stability Studies of Curcuma longa ointment

CONCLUSION

Since ancient times, turmeric has been used for its various medicinal properties such as anti-bacterial, anti-cancer, anti-inflammatory, anti-fungal, etc. In this study, the ointment has been formulated with different bases such as hard paraffin, Cetyl alcohol, lanolin (wool fat) and white soft paraffin and with preservatives such as Methyl paraben and Propyl paraben. From the study, it is concluded that the# F2, that is, formulation 2 is more stable than other ones. By combining the turmeric extract with appropriate ointment bases and preservatives a better therapy and patient compliance can be attained. Herbal dosage forms of *Adhesive bandage* showed good elegance and appearance. This developed herbal wound pad was suitable dosage form for antiseptic bandages.

ACKNOWLEDGEMENT

The authors are sincerely thanks to the Department of Pharmaceutics, D.S.T.S. Mandal's College of Pharmacy, Solapur, Maharashtra, India for providing the facilities to complete this research work.

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBILIOGRAPHY

1. Dubey R C, *et al*. Practical microbiology, *Published by S. Chand and Comp Ltd, Ram Nagar, New Delhi,* 3rd Revised Edition, 2012, 21-47.
2. Dubey R C, Maheshwari D. Textbook of microbiology, *Reprint 2012 Published by S. Chand and Company Ltd, New Delhi,* 1st Edition, 1999, 522, 544.
3. Gupta A K. Pharmaceutics -2nd practical notebook, Reprint 2016, *CBS Publishers and Distributors Pvt. Ltd New Delhi,* 2nd Edition, 1994, 122-163.
4. https://en.wikipedia.org/wiki/Calendula.
5. https://www.leverayush.com/products/anti-marks-turmeric-face-cream-50gm.
6. https://en.wikipedia.org/wiki/Tagetes-erecta.
7. https://www.feedipedia.org/node/90.
8. https://plants.ces.ncsu.edu/plants/all/tagetes-erecta.
9. http://www.alwaysayurveda.com/acacia-catechu.
10. Rajasree P H, Vishwanad V, Cherian M, Eldhose J, Singh R. Formulation and evaluation of antiseptic polyherbal ointment, *International Journal of Pharmacy and Life Sciences,* 3(10), 2012, 2021-2031.
11. Gillitzer R, Goebeler M. Chemokine in cutaneous wound healing, *Journal of Leukocyte Biology,* 69(4), 2001, 513-521.
12. Hess C T, Kirsner R S. Orchestrating wound healing: Assessing and preparing the wound bed, *Advanced Skin and Wound Care,* 16(5), 2003, 246-257.
13. Harpal S, Kuldip S. Wound healing and tissue repair, *In: Ruminant Surgery, J Singh, CDS Publishers and Distributors, Delhi, India,* 1st Edition, 1993, 58-71.
14. Midwood K S, Williams L V and Schwarzbauer J E. Tissue repair and the dynamics of the extracellular matrix, *International Journal of Biochemistry and Cell Biology,* 36(6), 2004, 1031-1037.
15. Mohammad Abdullah Al Mamun. Comparative effect of turmeric (Curcuma longa) and durba (Cynodondactylon) on the healing of surgical wounds in cattle (Bos indicus), *Asian Journal of Medical and Biological Research,* 4(2), 2018, 164-171.
16. Li W, Wang S, Feng J, Xiao Y, Xue X, Zhang H, Wang Y, and Liang X. Structure elucidation and NMR assignments for curcuminoids from the rhizomes of Curcuma longa, *Magn Reson Chem,* 47(10), 2009, 902-908.
17. Nishiyama T, Mae T, Kishida H, Tsukagawa M, Mimaki Y, Kuroda M, Sashida Y, Takahashi K, Kawada T, Nakagawa K, Kitahara M. Curcuminoids and sesquiterpenoids in turmeric (Curcuma longa) suppress an inc. in blood glucose level in type 2 diabetic KK-Ay mice, *J Agric Food Chem,* 53(4), 2005, 959-963.

18. Ammon H and Wahl M A. Pharmacology of Curcuma longa, *Planta Med,* 57, 1991, 1-7.
19. Aggarwal B B, Sundaram, C, Malani, N, Ichikawa H. Curcumin: The Indian solid gold, *Adv. Exp. Med. Biol,* 595, 2007, 1-75.
20. Sidhu G S, Mani H, Gaddipati J P, Singh A K, Seth P, Banaudha K K, Patnaik G K and Maheshwari R K. Curcumin enhances wound healing in streptozotocin-induced diabetic rats and genetically diabetic mice, *Wound Repair and Regeneration,* 7(5), 1999, 362-374.
21. Gong C, Wu Q, Wang Y, Zhang D, Luo F, Zhao X, Wei Y, Qian Z. A biodegradable hydrogel system containing curcumin encapsulated in micelles for cutaneous wound healing, *Biomateri,* 34(27), 2013, 6377-6387.
22. Prescott S. Is cyclo-oxygenase-2 the alpha and the omega in cancer, *Jour of Clin Invest,* 105(11), 2000, 1511-1513.
23. Gao X, Kuo J, Jiang H. Immunomodulatory Activity of Curcumin: Suppression of Lymphocyte Proliferation, development of cell-mediated cytotoxicity and cytokine production *in vitro*, *Biochem Pharmacol,* 68(1), 2004, 51-61.
24. https://en.wikipedia.org/wiki/Senegalia_catechu.
25. Mehta R M. Pharmaceutics, *Vallabh Prakashan,* 3rd Edition, Reprint 2008, 21-25.
26. Indian Pharmacopoeias, Appendix 11.2, A-135, 2, 1996.
27. Chakole C M, Shende M A, Khadatkar S N. Formulation and evaluation of novel combined halobetasol propionate and fusidic acid ointment, *International Journal of Chem Tech Research,* 1(1), 2009, 103-116.
28. ICH Guidelines, Stability testing of New Drug Substances and Products, *European Medicines Agency,* 2003, 1-20.
29. Mohanta G P, Jamal M and Umadevi S. Formulation and Evaluation of Polyherbal Wound Healing Cream, *Indian Drugs,* 44(4), 2007, 280-283.

Please cite this article in press as: Virendra V. Patil. *et al*. Formulation and evaluation of Herbal Adhesive Bandage, *Asian Journal of Research in Chemistry and Pharmaceutical Sciences,* 8(2), 2020, 96-102.