The Bioscan AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES 20(3): S.I (3), 428-442, 2025 www.thebioscan.com

FORMULATION AND EVALUATION OF HERBAL GEL FOR WOUND HEALING EFFECT

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doi: 10.63001/tbs.2025.v20.i03.S.I(3).pp428-442

KEYWORDS:
Murraya Koeniggi, Carbapol 940, Spreadability, Gel.

Received on:
04-06-2025

Accepted on:
01-07-2025

Published on:
18-8-2025

ABSTRACT

Herbal medicine has important for medicinal and economical. They increase patient compliance. (1) Herbal plant such as Murraya Koenigii used for the treatment of wound healing activity. (2) The present research has aim to formulation and evaluate gel contain Murraya Koenigii leaf extract. (1) Murraya Koenigii commonly know as curry leaves and it is natural flavoring substance use in India household for prepare food. (3) The gel batch F1 to F6 prepare from methanol extract to Murraya Koeniggi. The extraction done by the maceration process. (2) The gel formation was prepared by using Carbapol 940, Propylene glycol, Methyl paraben, Propyl paraben, Glycerine and Distilled water. And maintained skin PH by add drop wise Triethanolamine. (4) The formulation of gel are evaluated parameter like physical property, PH, Spredability, Homogenecity and gel strength. The prepare formulation was safe, stable and effective to treat Wound Healing. (2) Which is contain Alkoloids, Tannins, Sapponins, and Terpenoids the major constituents are know to have Anti- inflammatory, Antioxidant Cytotoxic and Wound healing activity. (8)

INTRODUCTION

The Herbal plant plays a crucial role as source of crude drug are an integral part of Health care system. There are more medicinal plants which are used in traditional system like Unani, Ayurveda and Chinese. (3) The Murraya Koeniggi which belongs to the family Rutaceae; commonly called as a Curry Patta. It has great antioxidant activities and widely used as flavouring agent as well as gives

Antioxidant, Antimicrobial, Anti-inflammatory. Antimicrobial/Antibacterial activity of Murraya Koeniggi is due to the Tannins and Flavonoids. Many biological activities and Antibacterial reported for Murraya Koeniggi Plant. (6)

WOUND HEALING

A wound can be defined as a loss or break in the cellular, anatomical, or functional continuity of deep skin tissue. Wound healing is the process of contracting, moving, and adhering cells following a skin damage or trauma. Wound healing, a natural biological process in the human body, occurs in four exact and highly planned: Hemostatis, Inflammation, Proliferation, and Remodeling. For wound to heal successfully, all four phases must occur in the appropriate order and time period. (5)

TYPE OF WOUND HEALING

Primary Wound Healing:

Injured party healing using staples, stitches, glue, or other wound closure techniques is known as primary wound healing, or primary aim wound healing.

Secondary Wound Healing

Secondary wound healing, also known as secondary intension wound healing, happens when a non-stiched wound result in significant tissue loss.

Tertiary Wound Healing

Healing by delayed primary closure, or happens when the wound closing process need to be delayed. This could be necessary if a doctor is concerned that sealing the wound will trap infectious germs. (7)

STAGES OF WOUND HEALING:

All wounds undergo several healing phases, which range from the initial wound reaction to the stages new skin formation. Simple wounds, without severe tissue damage or infection, heal in roughly 4-6 week.

HEMOSTASIS PHASE:

The hemostasis phase occurs immediately following an injury and is the body's initial response. The wound causes blood and other fluid to exist the body. The body respond by trying to block this flow of blood.

INFLAMMATORY PHASE:

During the inflammatory phase, the cleaning and healing of the area begin. There is generally some inflammation in the area, as the immune cell rush to the damaged tissue. (10)

PROLIFERATIVE PHASE:

An increase in the number of cells as a result cell growth and cell division.

REMODELING:

Tissue tensile strength increase.

Objectives:

- Primary Objective:

a. Gel is different form like jelly and semisolid form.
b. It is used topically for variety of purposes.
c. Gel are used to produced sustained release dosage form.
d. They are used as lubricant and as carriers for different pharmaceutical agent.
e. Herbal drug are probably as old as human race.

- Secondary Objective:

a) Topically used for variety of purpose such as protectants, antiseptics and antimicrobial.
b) Gel are more stable than cream and ointments.
c) They can wash easily and are nontoxic due to their unique composition.
d) It is used to treat pain, swelling, inflammation due to muscle related problem.
e) Reduce harmful side effect. It's easy to spread.
f) Avoid of first pass metabolism.
g) Enhanced permeability.
h) Longer shelf – life.

DRUG PROFILE:

Synonym of Murraya Koenigii – Kadi Patta, Curry leaf

Geographical Source – Murayya koenigii orginates from east and south part of India, Shrilanka, China but widely cultivated in South east and some part of United States of Australia. Plant cultivated throughout India and found in Sikkim Assam Cochin. Bangladesh Shrilaka. Its grows throughout India upto height 1500 to 1600 m (16)

Part use – Leaves

Chemical Constituents – Phenol, Tannins, Saponins, Flavonoid, Terpenoid, Koenine, Koenidine, Koenimbine, Vitamin C, Nicotinic Acid, Protein, Carbohydrate, Alkaloid. (15)

Source – Murraya Koenigii commonly known as leaf or kadi patta belong to family Rutaceae.

General Introduction – Murraya koenigii in shrub or small tree but strong woody stem and branches. Leaflets 9-25 or more short after and strongly aromatic. (14) Flowers found on plant are white funnel shaped having sweet aromatic smell. (3)

General Uses:

1) Stop diarrhea

2) Fight against cancer

3) Best for hair growth

4) Beneficial for eyesight

5) Help for liver protection

6) Lower cholesterol level

7) Rich in antioxidant properties.

Medicinal Uses (9)

1) Rich in nutrient

2) May help in managing Diabetes

3) Anti-inflammatory

4) Boosts Immunity

5) Good for respiratory issues

6) Improved vision

7) Promotes better digestion.

METHODOLOGY (MATERIAL & METHODS)

- **Collection of plant material –**

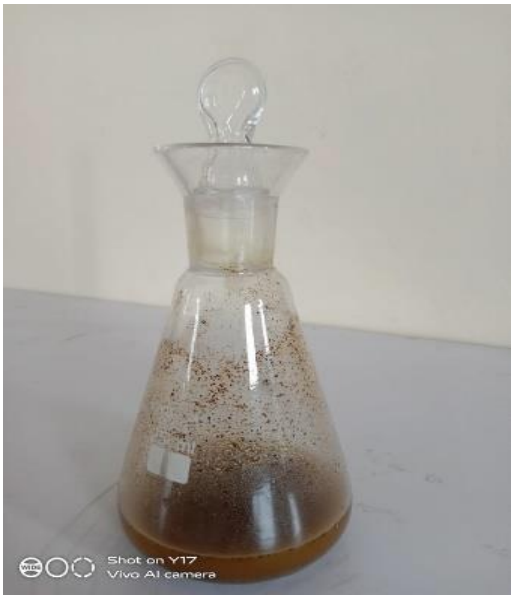
Murraya koenigii L plant were collected from the local place in Saralgoan village, In Murbad Taluka, and Thane District. The sample was collected during the month of October 2023 and the leaves were cleaned. (17)

- **Preparation of Powder Sample –**

The leaves of Murraya koeniggi L. were washed thoroughly 2-3 times with running tab water and once with sterile water, air dried under shade in 6-7 days, and mechanically make a course powder by using electrical mixer. Then the powder was collected to extraction. (18)

- **Preparation of plant extract**

The experiment was carried out in water and methanol. Take1 gram of leaves powder dissolved in 25 ml of water and methanol, The prepared solution were then maintained for 24 hours. In closed tubes at room temperature. (Methanol extract boiling in 5 min) Filtered the solution with filter paper. The filtered solution in used in further identification test and isolation. (13)



1.1) Phytochemical screening-

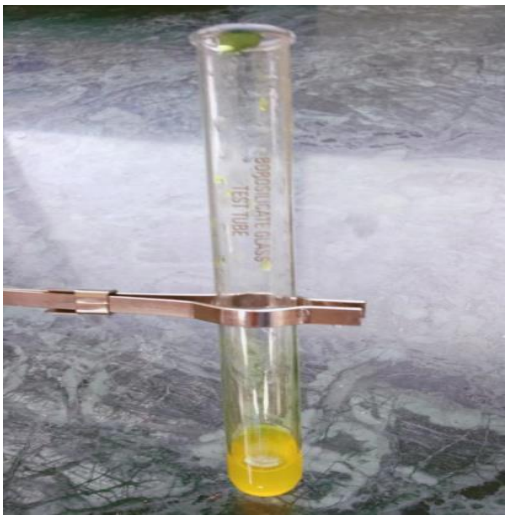
Active constituent in the plant extract of Murraya Koenigii were identified and detected the standard method Phytochemical such as Phenol, Tannins, Saponins, Terpenoid, Anthraquinones, Flavonoid, and alkaloid were detected based on standard tests.(19)

➢ Test for Phenol

2 ml of Murayya Koeniggi extract was taken in a test tube and few drop of 1% ferric chloride in a test tube. Presence of phenol was confirmed by the appearance of green/blue/brown/brownish red colour.

➢ Test for Flavonoid

2 ml of Murraya Koenigii leaf extract solution was teken in test tube and 3ml of diluted ammonium was added to the solution and 1 ml concentrated sulphuric acid in solution At time yellow colour appear detect the presence of flavonoid.

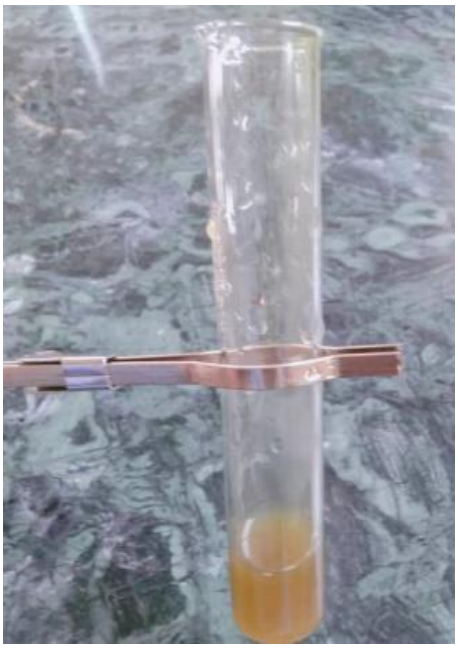


➢ Dragendroff Test

1 g of dried powder of Murraya Koenigii plant sample mixed with methanol and added diluted HCL to the residue. Mixed well and followed by filtrated collection was added with few drop of dragendroff reagent at time yellowish precipitate indicated of the presence of alkaloid.

➢ Test for Terpenoids

3 ml Murraya Koenigii leaf extract dissolved in 1 ml of chloroform in a test tube and added 1 ml of concentrated sulphuric acid into the test tube then intense red brown will occur due to the presence of terpenoids.

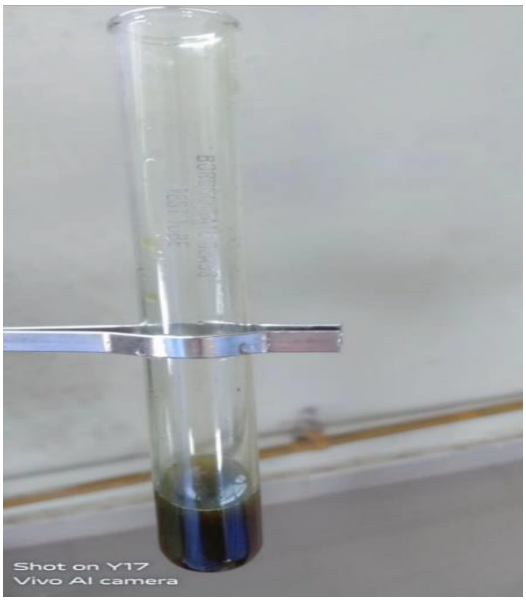


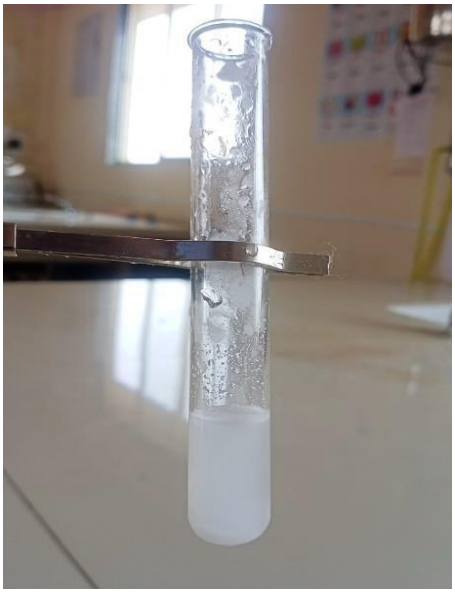
- Test for Tannins

0.5 g of dried powder of Murraya Koenigii plant sample was boiled in 4ml of water in attest tube and then filtered. Few drofs of 0.1% ferric chloride were added to observed brownish green or blue black colouration indicated of the presence tannins.(11)

- Test for Saponin

Powder Murraya Koenigii plant sample 0.5 g was boiled by 10 ml of distilled water. Then the filtrate 5 ml was mixed with 2.5 ml of distilled water and shaken it. And added 3 drop of saturated oil and shaken again. Emulsion formed indicating the presence of saponnin.





- Test for Anthraquinones

2 ml of Murraya Koenigii extract was taken in test tube and added 4 ml concentrated sulphuric acid into test tube boiled and shaken well and add 3 ml chloroform in to the test tube and the chloroform layer was separated and pipette out into another test tube containing diluted ammonia. Pink or Red colour indicated presence of anthrquinones.

- Test for Reduced Sugar

Take two test tube and add 0.2 g of powder Murraya Koenigii plant sample to each test tube and add 1 ml of ethanol was mixed with 2 ml of distilled water. 3 ml Fehling's solution A and B was taken in a test tube and boiled. Then it poured ethanolic plant extract. Colour change determine the presence of reducing sugar.(2

Phytochemical screening of the Murraya Koenigii plant to determine the presence or absence of bioactive compound. The result are given in Table No.1

Table No. 1 Phytochemical Test Determination

Phytochemical Test	Positive Test	Negative Test
Phenol	+	
Flavonoid	+	
Drangendroff	+	
Terpenoid	+	
Tannins	+	
Saponnin	+	
Anthraquinone		-
Reducing Sugar		-

Preparation of Herbal Gel:

In first beaker, a specified quantity of carbapol 940 was adeed in 15 ml of distilled water and allow it to soak for half an hour. In second beaker 5 ml of distilled water and sufficient amount of methyl paraben and propyl paraben was added and heat until they dissolved. The propylene glycol 400 was added in the beaker after the solution in it was cool, then required quantity of extract was added in beaker and this solution was mixed in first beaker with continuos stirring. At final, the volume was made upto 30 ml with distilled water. The PH was adjusted by specified quantity of Triethanolamine that gives required consistency of gel.(21)

Fig. No.: Prepared Herbal Gel

Table No: 2 Composition of Ingredient

Ingredient	Quantity in ml or gm					
	F1	F2	F3	F4	F5	F6
Carbapol 934	0.3	0.3	0.3	0.3	0.3	0.3
Methyl Paraben	0.06	0.06	0.06	0.06	0.06	0.06
Propyl paraben	0.03	0.03	0.03	0.03	0.03	0.03
Propylene glycol 400	1.5	1.5	1.5	1.5	1.5	1.5
Murraya Koenigii leaf extract	0.5	1	1.5	2	2.5	3
Triethanolamine	q.s	q.s	q.s	q.s	q.s	q.s
Glycerine	q.s	q.s	q.s	q.s	q.s	q.s
Distilled water	Up to 30 ml	Up to 30 ml	Up to 30 ml	Up to 30 ml	Up to 30 ml	Up to 30 ml
Rose oil	q.s	q.s	q.s	q.s	q.s	q.s

- **Evaluation Parameter of Herbal Gel (12)**

1) Physical Evaluation

Physical evaluation checked by visually such as color, odour, consistency

Color – The color of the formulation cheked by visual.
Consistency – The consistency of formulation was cheked by applying on skin.
Odour – Cheked by smell.

2) Percentage Yield

Weigh the empty container of gel formulation then again weigh of container with gel formulation. To obtained practical yield substract the weight of empty container with container gel formulation. Percentage yield was calculated by given formula.

Percentage yield = (Practical yield/theoretical yield) 100

3) Measurement of pH

The pH of the gel preparation were decided by using computerize pH meter. Take 1g of gel dissolved in 10 ml of distilled water. Keep aside for 2 hour. Measurement of pH formulation done by diping glass electrode into gel system. Continue process 3 time and calculate average value.(24)

4) Homogeneity

Homogeneity after the gel were placed in the container, they were visually inspected to ensure uniformity. They were examined for the existence and appearance of any aggregates.(22)

5) Spreadability

Expressed in term of time in second taken by two slide to slip of from gel that is placed between the slides in the direction of specific load. If the time required for when there is less gap between two slides, the spreadability improves. Spreadability is calculated using the following formula.(23)

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

Where M = Weight attached to the higher sides.
T = Time taken to separate slide L
= Length of glass slide

6) Clarity

Clarity of all seven batches is determine by visual inspection**.**

RESULT & DISCUSSIONS

1. Physical Evaluation

Table No: 3 Physical Evaluation of Formulation

Formulation	Color	Consistency	Odour
F1	Light green	Good	Characteristic
F2	Light green	Good	Characteristic
F3	Olive green	Good	Characteristic
F4	Olive green	Good	Characteristic
F5	Cool green	Good	Characteristic
F6	Apple green	Good	Characteristic

2. Percentage Yield

Table No. 4 Percentage Yield of Formulation

Formulation	Percentage yield
F1	82.773 %
F2	81.394 %
F3	82.219 %
F4	78.945 %
F5	83.211 %
F6	80.410%

3. pH

Table No. 5 pH of Formulation

Formulation	pH
F1	6.4
F2	6.1
F3	5.9
F4	6.8
F5	6.1
F6	6.7

4. Homogeneity

Table No. 6 Homogeneity of Formulation

Formulation	Homogeneity
F1	Good
F2	Good
F3	Good
F4	Good
F5	Good
F6	Good

5. Spreadability

Table No. 7 Spreadability

Formulation	Spreadability
F1	3.2
F2	4.7
F3	4.1
F4	4.9
F5	4.2
F6	5.3

Optimization of batches

After analysis of evaluation parameter such as color, odour, consistency, pH, spreadiability, clarity, it is notice that the formulation F6 show good result.

Table 8: Optimization batch

Parameters	Optimized batch F6
Color	Apple green
Odour	Characteristic
Consistency	Good
pH	6.7
Homogeneity	Good
Spredability	5.3
Percentage yeild	80.41%

CONCLUSION

As we all known that now days the herbal medicine demand increase day by day because they shown less side effect than synthetic ones.

The data given in presented in this study it is demonstrated that the develop herbal gel formulation **F6** possess effective, therapeutically, beneficial and suitable vehicale for drug delivery in low cost.

Based on the phytochemical screeing of Murraya Koenigii leaves extract.The presence of phyto -constituent such as saponins and flavonoid show good Antibacterial activity which inhibit growth of bacteria.

All the evaluation parameter gives satisfactory result and hence it is make a formulation safe, stable and effective for wound healing.

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