e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

FORMULATION AND EVALUTION GINGER GEL FOR ANTIMIGRAINE ACTIVITY

Chirag Hiray*1, Chetan Kothawade*2, Sairaj Jadhav*3, Pratik Patil*4

*1,2,3,4Department Of Pharmaceutics, K.B.H.S.S Trusts Institute Of Pharmacy, Malegaon Dist. Nashik, Maharashtra, India.

ABSTRACT

Migraine, a prevalent neurological condition associated with vascular deviations, is a prominent cause of disability worldwide. Patients are increasingly interested in herbal and alternative therapies as a way of reducing the unpleasant adverse reactions of medication. Zingiber officinale, at times known as ginger, is known for its analgesic properties in a variety of illnesses such headaches, migraines, muscle tension, stomach spasms, and dysmenorrhea. Ginger's broad pharmacological activities make it an excellent option for treating and preventing migraines. The intention of this review is to evaluate ginger's effectiveness and safety in this context. Ginger's bioactive elements has the potential to be an efficient and secure method to treat acute migraine symptoms. As a result, in order to ensure improved absorption rates and pharmacological actions, it is advised to investigate the production of multiple medicinal dosage forms of ginger extract for application globally.

Keywords: Ginger Gel, Carbopol, Antimigrain Activity, Gel Formulation.

I. INTRODUCTION

Migraine

What is migraine?

Migraine is a neurological illness marked by constant episodes of intense, vibrating pain, generally confined to one side of the head. This pain activates the blood vessel walls in the brain that pass through the meninges, the layers of tissue that surround the brain and spinal cord.

TYPES OF MIGRAINE:

- Aura-associated migraine
- Aura-free migraine.
- Chronic migraine.
- Migraine with paralysis.
- Migraine caused by menstrual.

SYMPTOMS OF MIGRAINE:

- Headache that vibrates and beats.
- Sensitivity to both light and sound.
- Difficulty focusing or concentrating.
- Discomfort in the abdominal.
- Nausea.
- Vomiting.
- Stiffness or pain in the neck and shoulders are a few of the symptoms of migraine exhaustion. [1,7]

PHASES OF MIGRAINE:

There are four stages to a migraine attack, and they can all appear at the same time:

1. Prodrome: Symptoms that precede the actual onset of a migraine can appear up to a day in advance. These could involve changes in mood (such as happiness or depression), excessive blinking, retention of water, increased urination, or food cravings.
2. Aura: An aura may appear just before or during an attack of migraines. Some persons might experience sensory disturbances like muscular weakness or a feeling of being took or taken away or visual problems like heat waves or flashing lights.

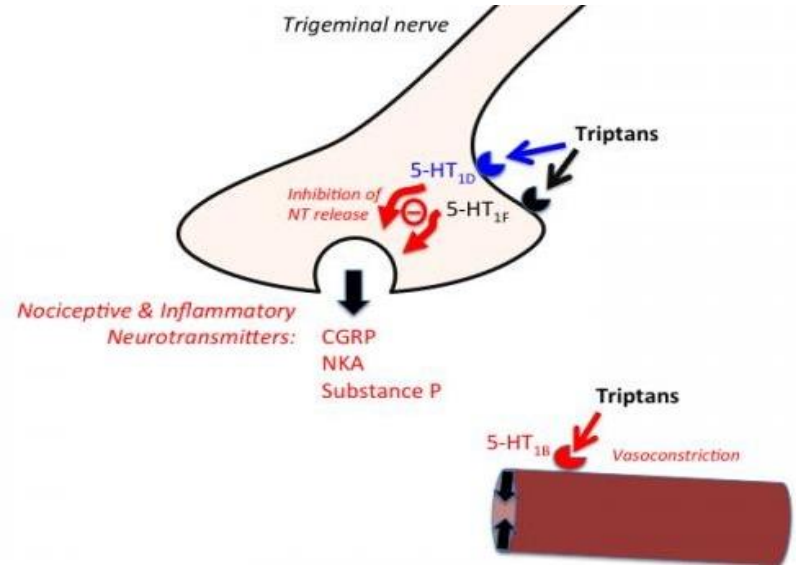
e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

3. Headache: A migraine's headache phase may or may not be seen. It typically starts out of carefully and become deeper over time.
4. Postdrome: The "migraine hangover," or afterwards, is a condition following the headache phase. This phase may be defined as weakness, drowsiness difficulty concentrating, fluctuations in mood, and a general feeling of malaise.

MEDICATIONS USED TO TREAT MIGRAINE HEADACHES:

1. The method that triptan drugs operate is by increasing the brain's concentration of the neurotransmitter serotonin. Serotonin decreases blood vessel flexibility and feelings of pain in the brain.
2. Ibuprofen, aspirin, or acetaminophen were a few instances of over-the-counter analgesics that help relieve mild to moderate migraine headaches.
3. Acetaminophen, caffeine, and/or a narcotic are only some of the medications used in combination analgesics. For migraines that are insensitive to traditional analgesics, medications work excellently.
4. NSAIDs, or nonsteroidal anti-inflammatory drugs, reduce migraine-related pain and inflammation [1,6]

MECHANISM OF ACTION OF ANTI- MIGRAINE DRUGS- TRIPTANS:



OBJECTIVE:

1. Formulation Development: Developing a powerful, stable gel formulation containing active ingredients, like ginger extract, that are popular for their pain-relieving effects.
2. Ingredient Optimization: Finding the most effective quantities of gelling agents, ginger extract, and other ingredients that improve the gel's stability, solubility, and efficacy.
3. Advanced management System: Creating a gel with improved skin penetration and absorption abilities that allows for targeted management of active ingredients to appropriate tissues, improving pain relief.
6. Safety and Tolerability Analysis: Conducting comprehensive tests to ensure the safety profile of the ginger gel, assessing its potential for skin irritation, allergic reactions, or systemic side effects with repeated or prolonged use.

II. MATERIALS AND METHODS

Formulation:

Sr. No.	Ingredients	Quantity taken
1.	Ginger Extract	6 ml
2.	Carbopol	3 grams
3.	Polyethylene glycol	15 ml
4.	Triethanolamine	q. s

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

5.	Sodium benzoate	q. s
6.	Distilled water	Up to 50 ml

INGREDIENTS:

Ginger: Synonyms: Zingiber, Sunthi.

Biological Source: Ginger consists of whole or cut, dried scrapped and unscraped rhizomes of *Zingiber Officinale Roscoe*

Family: *Zingiberaceae*

Geographical source: Though it has been widely grown in the Caribbean, Africa, Australia, and the nation of India, it is mostly believed to have started in Southeast Asia.

Chemical Constituent: The elements of ginger are the following: 1-4 percent volatile oil, 40–60% starch, 10% fat, 5% fibre, 6% inorganic materials, 10% residual moisture, and 5-8 % arid resinous matter. The constituents of ginger oil include phenolic propanidids, oxygenated mono-and sesquiterpene, monoterpene hydrocarbons, which and sesquiterpene hydrocarbons.

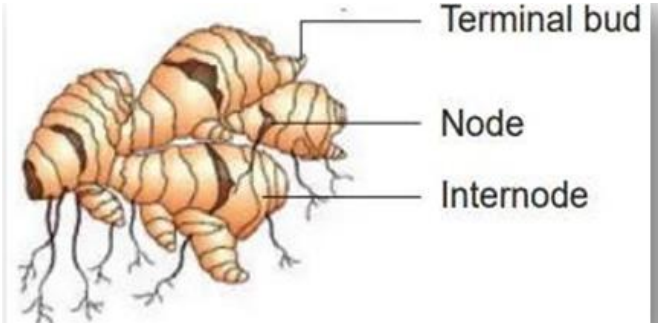


Fig. Ginger Rhizome

MICROSCOPIC CHARACTERS:

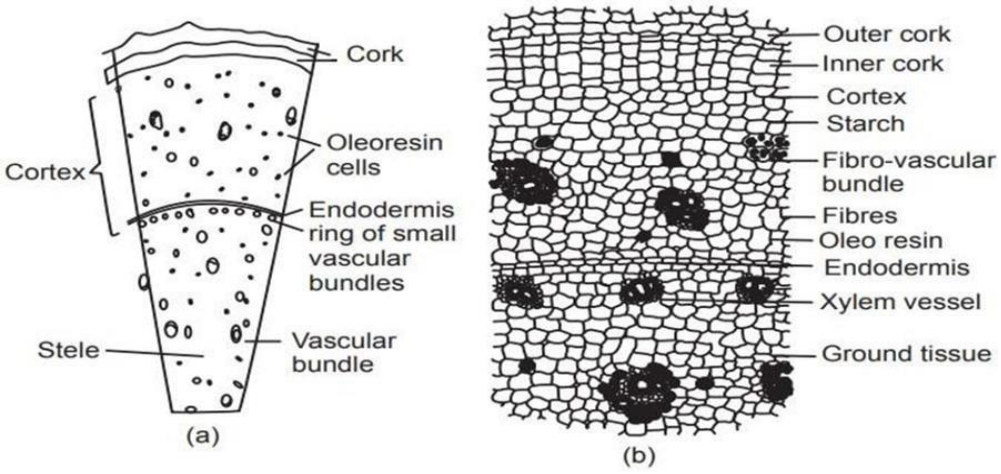
Colour: The exterior is a buff colour.

Aroma: pleasant and spicy

Taste: aromatic and delightful

size: Ginger rhizomes range within 5–15 × 1.5–6.5 cm

Shape: compressed, with a bud at the apex and short, flat, oval in shape, and oblique branches on the highest point size.



USES:

- Better Absorption
- Enhanced Immunity

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

- Reduces Nausea and Upset Stomach
- Possible Cancer Benefits
- Pain Prevention
- Healthier Skin [8 ,10, 11]

PREPARATION OF EXTRACT:

10 grams of ginger powder

⬇

were placed into a conical flask and soaked in 100 ml of ethanol. The flask was then covered with aluminum foil to prevent light exposure.

⬇

This mixture was allowed to macerate for 4-5 days with interval shaking

⬇

After maceration, the mixture was subjected to filtration

⬇

The resulting filtrate was collected in a beaker.

Fig. Preparation of extract

METHOD OF PREPARATION:

The required quantity of Carbopol was dispersed into a beaker and sprinkled with 3 mL of water.

⬇

The beaker was kept aside for 15 minutes for the Carbopol to swell

Later, a weighed amount of polyethylene glycol and ginger powder was added to the

⬇

beaker and stirred utilizing a mechanical stirrer for 1 hour.

⬇

the slurry of ginger powder in polyethylene glycol can also be prepared and

⬇

incorporated into the Carbopol mixture's beaker.

Triethanolamine was added to the mixture to adjust the pH to 7, followed by the addition of sodium benzoate.

⬇

sufficient distilled water was added to achieve the desired consistency for the ginger gel.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

Fig. Prepared Ginger Gel

PHYSIOCHEMICAL SCREENING:

Physiochemical screening of the ethanol extract of ginger was performed using std procedures

Test for amino acid (protein):

0.2 g of plant extract and 5 mL of distilled water were mixed and left for three h. The mixture was later filtered. To 2 mL of the filtrate, 0.1 mL million reagent was added.

A yellow precipitate indicates the presence of protein (amino acid)

III. RESULT AND DISCUSSION

Standard: blue-black solution.Observed: yellow Color Inference: present

Test for volatile oil:

To test for volatile oil, mix 2 mL of ethanol with 0.2 g of plant extract. Following that, add a few drop of the ferric chloride solution. Volatile oil can be detected by a green coloring.

Standard: green coloration indicates volatile oilObserve: Green Color

Inference: Present

Acidic test:

The mixture of 0.2 grams of plant extract and distilled water was warmed in a hot water bath and subsequently cooled. A wet litmus paper was then submerged into the solution.

Test for phenol:

One millilitre of a 10% FeCl3 solution was combined with about 0.5 g of plant extract. The presence of phenol was shown by an intense bluish-green colouring.

Observed: bluish green color

Inference: present

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

Test for steroids :(Salkowski test):

0.2 g of plant extract and 2 mL of chloroform were added, and 2 mL of concentrated sulphuric acid was added to form a layer. The formation of a violet/blue/green/reddish-brown ring at the interface indicates the presence of a steroidal ring.

Result and Discussion:

Standard: violet/blue/green/reddish-brown ring

Observed: reddish- brick brown color

Inference: Present

OBSERVATION TABLE FOR TEST:

Evaluation parameters:

PHYSICAL APPEARANCE:

The visual appearance of the formulation was examined visually which included.

Colour: The formulations' colours were examined when compared to a white the background.

Consistency: The skin was utilized to determine the consistency.

Feel on the skin - No Irritation

pH:

A pH scale was utilized to determine the prepared gel's pH. This technique involved dispersing gel in distilled water. Before being used, the electrode was calibrated utilizing a standard buffered solution at4.0,7.0, and 9.0 after having been washed with double-distilled water and dry with tissue paper. Three duplicates of the pH results were taken and the average values were determined.

Sr.no.	Chemical Test	Standard	Observed	Inference
1.	Test for amino acid	Yellowish /black solution.	Yellow Colour	Present
2.	Test for Steroids	Violet/blue/green/reddish-brown ring	Reddish-brick brown colour	Present
3.	Test for phenol	Green /blue /black solution	Bluish Green	Present
4.	Test for VolatileOil	Green coloration indicates volatile oil	Green colour	Present

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:04/April-2024 Impact Factor- 7.868 www.irjmets.com

Spreadability:

One gram of the gel was put on butter paper for the spread ability tests. Later that, this was placed between two parallel tiles with a one kg weight on the top plate. The gel's spreading diameter was determined to estimate its spread ability. After the gel had been spread, the circle's average diameter was calculated.

Viscosity:

Viscosity of gel was determined by using Brookfield rotational viscometer at 5,10,20,30 and 50 rpm. Each reading was taken after equilibrium of the sample at the end of two minutes. The samples were repeated three times 12.

Stability studies:

The gel formulation was stored cold at 5°C and warm at 30°C in a tightly closed glass container. Data of studies on treatment penetration, physical appearance, and content consistency were determined on a regular basis. Result: After two months, the enhanced formulation's appearance and content uniformity proved to be unaltered, and a superficial application was used to examine the drug's absorption.

IV. CONCLUSION

In summary, the formulation and evaluation of ginger gel for its antimigraine properties offer a potentially effective avenue for pain relief. Ginger's analgesic and anti-inflammatory qualities make it a valuable natural ingredient for topical treatments. However, meticulous formulation and optimization are crucial to develop a stable gel, considering variables like concentration, excipients, and rheological characteristics.

Rigorous research, encompassing both in vitro and in vivo assessments, is essential to determine the gel's efficacy in reducing inflammation, alleviating pain, and establishing safety profiles. Future advancements may focus on enhancing bioavailability, exploring innovative delivery methods, and conducting thorough clinical trials to confirm its effectiveness across various pain disorders.

Overall, the development and testing of ginger gel demonstrate promise as a potential substitute or complement to conventional analgesics.

V. REFERENCES

[1] Trease and Evans, Pharmacognosy, Sixteenth Edition, Saunders Elsevier, Pageno.289-292.

[2] Indian Pharmacopoeia 2022, Volume III, Ninth Edition, Commission Ghaziabad, Page no. 4304-4305. Published by Indian Pharmacopoeia

[3] Kokate c. k. A book of Pharmacognosy. Nirali Prakshan, 58th Edition, Page no. 14.142-14.143.

[4] Joshi Saroja, Practical Pharmacognosy, published by Frank Bros and co. 1" Edition 2009, Page no. 146-147.

[5] Rajpal, D.P.S. Kohli, Herbal drugs industry, Published by Business Horizons, 2nd edition 2009, Page no.238-239,

[6] Safitri FI, Nawangsari D. Febrina D. Overview: Application of Carbopol 940 in gel. In International Conference on Health and Medical Sciences (AHMS 2020) 2021 Jan 27 (pp.80-84). Atlantis Press.

[7] Lachman/Lieberman's, The Theory and Practice of Industrial Pharmacy, CBS publishers & Distributors, 4th Edition, Page no.501.

[8] Theroleof Triethanolamine Echemi.com https://www.echemi.com/cms/85497.html

[9] Rang & Dale's Pharmacology, Elsevier Churchill Livingstone, Eighth Edition, Page no. 203-205.

[10] Tripathi KD., Essentials of Medical Pharmacology, 8" Edition, page no. 192-193.

[11] N.K.JAIN "INTRODUCTION TO NOVEL DRUG DELIVERY SYSTEMS" Chapter 6 transdermal drug delivery Structure of skin.

[12] Mohsin J. Jamadar, Rajmahammad Husen Shaikh/ "PREPARATION AND EVALUATION OF HERBAL GEL FORMULATION"/ Journal of Pharmaceutical Research & Education/ISSN:2456-4508.

[13] Patil RJ, Nikam SM, Milmile PS. Awandekar NB, Umekar MJ. Herbal treatment for migraine.

[14] Ernst E, Pittler MH. Efficacy of ginger for nausea and vomiting: a systematic review of randomized clinical trials. British journal of anaesthesia. 2000 Mar 1:84(3):367-71.

[15] Wasiullah M. Yadav P, Yadav S, Yadav M. A REVIEW ON THE ROLE OF PHYTOMEDICINES IN THE TREATMENT OF MIGRAINE.

[16] Beristain-Bauza SD, Hernández-Carranza P. Cid-Pérez TS, Ávila-Sosa R.Ruiz-López II, Ochoa-Velasco CE. Antimicrobial activity of ginger (Zingiber officinale) and its application in food products. Food Reviews International. 2019 Jul 4:35(5):407-26.

[17] Gautam GK, Vidhyasagar G, Das S. Dwivedi B. Comparative analgesic activity of selected medicinal plants from Indian origin. International Journal of Pharmaceutical Sciences and Research. 2013 Jul 1:4(7):2726.

[18] Singh A, Singh A. Chouhan O, Tandi GP. Dua M. Gehlot A. Anti- inflammatory and analgesic activity of aqueous extracts of dried leaves of Murraya koenigii Linn. National Journal of Physiology, Pharmacy and Pharmacology. 2016:6(4):286.

[19] Hussain S, Kumar M, Deeba F, Kumar A, Gangwar AK. Ginger: A Herbal Medicine for Numerous Ailments. Saudi J Med Pharm Sci. 2022:8(11):674- 93.

[20] Grzanna R, Lindmark L, Frondoza CG. Ginger--an herbal medicinal product with broad anti-inflammatory actions. J Med Food. 2005;8(2):125-32. [PubMed ID: 16117603].
https://doi.org/10.1089/jmf.2005.8.125.