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FORMULATION AND EVALUATION OF PAIN RELIEF OINTMENT

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ABSTARCT

Topical drug delivery is an attractive to conventional methods because such as non –invasive delivery, by pass of first pass metabolism, and improved patient compliance. How ever, several factor such as skin, physicochemical properties of the drug, and vehicle characteristics influence the permission. Within a formulation, critical factor such as concentration of drug, physical state of drug in the formulation, and organoleptic properties affect the flux across the skin. The aim of the study was to develop and investigate topical, semisolid preparations (Ointment, cream and gels). **Objective:** The objective of the present work was to formulate and evaluate ointment. **Methods:** In the present work, ointment formulations where prepared using Neem, Turmeric, Ginger Black Piper by fusion technique. PEG base was compared with standard base for it is Ph, appearance, strength, spread ability, water no, and wash ability. Further, the optimized formulation was prepared and evaluate for it is physicochemical parameter. **Result:** The prepared formulation of ointment where evaluated for it is physiochemical parameters and all the findings obtained where within the prescribed limit. Based on viscosity, strength, and spread ability formulation F1 was chosen as an optimize formulation. **Conclusion:** By using Neem, Ginger, Black piper, and Turmeric prepared the ointment showed multipurpose effect and all these herbal ingredients show significant different activities. Based on result and discussion the formulation F1 where stable at room temperature and can safely used on the skin.

KEYWORDS: Neem, Turmeric, Ginger, Black piper.

INTRODUCTION

Osteoarthritis (OA) is the most common chronic (long lasting) joint condition. Joint is where two bones come together the ends of these bones are covered with protective tissue called cartilage. With OA this cartilage breakdown, causing the bones within the joint to rub together. These can cause pain stuffiness', and other symptoms. OA occur most offend in older people, although it can occur adults of any age. OA is also called degenerative joint disease, degenerative arthritis. OA is caused by joint damaged this damage can accumulate over time, which is why age is one of the main caused of the joint damaged leading to Osteoarthritis. The most common symptoms of OA included pain, tenderness(discomfort when preferring on the area with your fingers) stiffness, inflammation as OA become more advanced the pain associated with it may become more intense. Over time swelling in the joint and surrounding area may also occur.

MATERIALS AND METHODS

In the present work, ointment formulation where prepared using neem, turmeric ginger, black piper by fusion technique. PEG base was compared with standard base for it is Ph, apprenence, strength, spread ability, water number and wash ability. Further, the optimize formulation was prepared and evaluated for it is physicochemical parameter, drug content, skin irritancy.

Collection of plant material

Neem (Meliaceae, Azadirechta indica)

Turmeric (Zingiberaceae, curcuma Longa L.)

Ginger (zingiberaceae, Zingiber officinale)

Black Piper (Piperaceae, Pipper nigrum Linn).

Excipients and Herbal Ingridents with their roles

Table 1: Role of Ingridents.

Sr.no	Ingridents	Roles
1	Turmeric	Reduce knee pain, Anti-inflammatory
2	Black Piper	Anti-arthritic
3	Ginger	Reducing pain and disability
4	Neem	Anti-microbial agent
5	PEG	Base
6	Menthol	Cooling agent
7	Methyl saclicylate	Muscle relaxant
8	Methyl paraben	Preservative
9	Eucalyptus oil	Fragrance, pain suppressants

EXTRACTION PROCESS

Extraction of Neem Leaves

Leaves of the plant were collected and washed thoroughly with distilled water and shade dried for ten days. Dried leaves were grind into powder form. 100gm powder was imbibed with 350ml of 90% ethanol for three hours and transfer to percolator with addition of 150ml 90% ethanol for maceration for seven days with occasional stirring. Finally ethanolic extract was collected and concentrated to get blackish green residue. The extract was stored in the air tight container at a cool and dark place.

Fig. 1: Extract of Neem Natural Plant.

Extraction of Turmeric

Rhizomes of the plant were collected and wash thoroughly with distilled water and shade dried for ten days. Dried rhizomes were grind in to powder form. 100gm of powder was imbibed with 350ml of 90% ethanol for three hour and transfer to percolator with addition of 150ml of 90% ethanol for maceration for seven days with occasional stirring. Finally ethanolic extract was collected and concentrated to get crimson red colour was obtained and stored at cool and dark place in air tight container.

Fig. 2: Extraction of Termeric.

Extraction of Black Piper

10 gm of black piper powder extracted with 150ml 95% ethanol in soxhlet extractor for two hours. The solution was filtered in concentrated on the water bath at 60^0c. 10ml 10% of alcoholic potassium hydroxide was added to the filtrate with a continuous stirring. The insoluble recidue was filtered and alcoholic solution was left over night and filtered through a membrane filter.

Fig. 3: Extraction of Black Piper.

Extraction of ginger

20gm of fresh ginger root was grinded. then, 100ml of absolute ethanaol solvent (Merck, Germany) was added into the flask together with the ginger root. The process was conducted at 78.4^oc for 12 hrs, with 5-6 heat cycles in a heating mental (MTOP, Republic of Korea) for 1 hr.

Fig. 4: Extracts of Ginger Natural Plant.

Formulation of ointment

In this method, the constituents of the base were placed together in a melting pan and allowed to melt together at 70^oc. after melting the ingredients were stirred gently maintaining

temperature of 70°c for about 5 mint and then cooled with continuous stirring to 40°c. Ointments were then stirred until a smooth consistency was obtained and stored at room temperature (25°c) and used for further analysis.

Fig. 5: Slab and Spatula.

Fig. 6: Ointment Formulation.

Table 2: Ointment Formulation.

Sr. No	Ingredients	Formulation F1
1	Turmeric	0.06 ml
2	Black pipper	0.06ml
3	Ginger	0.06ml
4	Neem	0.06ml
5	PEG	10gm
6	Menthol	0.5ml
7	Methyl salicylate	0.3ml
8	Methyl paraben	0.3ml
9	Eucalyptus oil	q.s

EVALUATION OF OINTMENT

Physical Evaluation

In this test, the ointment was observed for color, odor, texture, state.

Irritancy

Mark the area (1cm) on the left hand dorsal surface. Then the ointment was applied to that area and time was noted. Then it is checked for irritancy, erythema and edema if any for an interval up to 24 hr and reported.

Wash ability

A small amount of ointment was applied on the hand and it is then washed with up tap water.

PH

1 gm ointment was taken and dispersed in 100ml distilled water and stored for 2 hr and the measurement was done in triplicate and average value was calculate by using digital ph meter.

Viscosity

Viscosity of ointment was done using brook field viscometer at a temperature of 25^{o}c using spindle no.63 to 2.5 RPM.

Spared ability

The spread ability was express in terms of time in second taken by two slides to sleep from the ointment, place in between the slide, under certain load. Lesser the time taken for separation of two slides better the spared ability. Two sets of glass slides of standard dimension were taken. Then one slide of suitable dimension was taken and the ointment formulation was placed on that slides. Then other slide was placed on the top of the formulation. Then a weight of certain load was placed on the upper slide so that the ointment between the two slides was pressed uniformly to form a thin layer. Then the weight was removed and excess of formulation adhering to the slide was scrapped off. The upper slide was allowded to sleep off freely by the force of weight tied to it. The time taken by the upper slide to sleep off was noted.

$$\text{Spread ability} = m*l/t$$

Where, m= standarded weight which is tied to or placed over the upper slide

l = length of glass slide(5cm)

t = time in seconds

Tube extrudability

The formulation was filled in collapsible tube containing. The extrudability was determine in terms of weight of ointment required to extrude 0.5cm of ribben of ointment in 10 seconds.

Non Irritancy test

Herbal ointment prepared was applied to the skin of human being and observed for the effect.

Stability study

physical stability test of the herbal ointment was carried out for four weeks at various temperature conditions like 2^{o}c, 25^{o}c and 37^{o}c. the herbal ointment was found to be physically stable at different temperature that is 2^{o}c, 25^{o}c and 37^{o}c within four weeks.

LOD

LOD was determine by placing the formulation in Petridish on water bath and dried for the temperature 105^{o}c.

Table 3: Physicochemical Parameters.

Physic chemical parameters	Observation
Color	Yellow
Odor	Characteristics
Consistency	Smooth
Ph	6.6
Spead ability(seconds)	7
Extrudability	0.4gm
Diffusion study (after 60 min)	0.7cm
Loss on drying	30%
Solubility	Soluble in boiling water, miscible with alcohol, ether, chloroform
Wash ability	Good
Non Irritancy	Non irritant
Stability study(2^{o}c,25^{o}c,37^{o}c)	stable
Viscosity(cps)	21020

RESULT AND DISCUSSION

Evaluation results of the formulations are gives below.

Physical evaluation

In this test color, odour, texture and state of the formulation were checked.

Tbale 4: Physical Evaluation.

Sr.No	Parameters	Formulation
1	Colour	Faint green
2	Odour	Pleasant
3	Texture	Smooth
4	State	Semi solid
5	PH	6.6

Irritancy

Mark the area (1cm) on left hand dorsal surface. Then the ointment was applied to that area the time was noted. Then it is checked for irritancy, erythma and edema if any for an interval up to 24 hr and reported.

Table 5: Irritancy Study Observation.

Sr.No	Formulation	Irritant effect	Erythema	Edema
1	F1	Nil	Nil	Nil

Wash ability

Wash ability treat was carried out by Appling a small amount of ointment on the hand and washing it with tap water. The Formulation were easily wash.

Table 6: Wash Ability Observation.

Sr. No	Formulation	Wash ability
1	F1	Easily wash

PH

According to results, the PH of formulation were found to be nearer to the skin PH so it can be a safely use on the skin.

Table 7: Ph Observation.

Sr.No	Formulation	PH
1	F1	6.6

Viscosity

Viscosity of the ointment was done by using brook field viscometer at a temperature 25^{o}c using spindle no.63 at the 2.5 RPM according to the result formulation show adequate viscosity.

Table 8: Viscocity Observation.

SR.NO	Formulation	Viscosity
1	F1	21020

Phase separation

Prepared ointment was kept in closed container at a temperature of 25-100^{o}c away from light. The phase separation was checked for 24 hr for 30 days. Any change in the phase separation was observed. According to the result no phase separation observed in the formulation.

Table 9: Phase Separation Observation.

Sr.No	Formulation	Phase separation
1	F1	No phase separation

Speared ability

The speared ability of the formulation was carried out by the two slides to spread is less so as said evaluation test lesser time taken for separation of two slides, better the spread ability.

Table 10: Speared Ability.

Sr. No	Formulation	Time (sec)	Spread ability
1	F1	12	22.8

Greasiness

Here the ointment was applied on the skin surface in the form of smear and checked if the smear was oily or grease like according to result, we can say the formulation were non greasy.

Table 11: Greasiness Observation.

Sr.No	Formulation	Greasiness
1	F1	Non - Greasiness

CONCLUSION

The purpose of the study was to prepare herbal ointment using locally available plants. On the basis anti arthritis efficacy four different local plants were taken and there ethanolic extracts were in corporate in the most effective ratio in appropriate base. The final product readily speared on skin surface, showed no irritant effect, diffuse well and was stabile at different temperature.

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AUTHORS CONTRIBUTIONS

All authors have contributed equally.

CONFLECTS OF INTRESTS

Declare none.

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