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FORMULATION AND EVALUATION OF ROLL-ON FOR ANTI-INFLAMMATORY ACTIVITY FROM EPIPREMNUM AUREUM AND TINOSPORA CORDIFOLIA

Vedika Vijay Gadge*[1], Akshay Fulsundar[2], Swamini Balu Dukare[1], Kalyani Kailas Bankar[1], Vaishnavi Pramod Ganjave[1]

[1]Student of Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra.
[2]Professor of Samarth Institute of pharmacy, Belhe, Pune, Maharashtra.

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***Corresponding Author: Vedika Vijay Gadge**
Student of Samarth Institute of Pharmacy, Belhe, Pune, Maharashtra.
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ABSTRACT

The current study used natural plant extracts and essential oils to formulate and assess a Roll-on for topical pain and inflammation alleviation.[2] The analgesic, anti-inflammatory, and calming qualities of ingredients like Epipremnum aureum, Tinospora cordifolia, cinnamon oil, sesame oil, peppermint oil, and clove oil led to their selection.[3] The emulsification method was used to prepare three batches (F1, F2, and F3), and their pH, stability, homogeneity, spreadability, organoleptic qualities, and after-feel were assessed. Batch F3 outperformed the others in terms of texture, stability, and potent pain relief. For the treatment of inflammation and musculoskeletal pain, the herbal roll-on offered a cooling and soothing feeling with few adverse effects, making it a safe and efficient natural substitute for synthetic analgesic formulations.[6]

KEYWORDS: Roll-On, Epipremnum Aureum extract, Tinospora Cordifolia extract, Anti inflammatory Activity, Menthol oil.

INTRODUCTION

Using natural chemicals known for their therapeutic properties, inflammation reduces roll-on, which is a novel method to pain management.[8] The roll-on formulation limits systematic exposure and improves user experience through ease of application, making it a desirable choice for anyone looking for natural ways to relieve inflammation.[9] The goal of the current study is to create and assess a roll-on employing specific plant extracts, such as essential oils from Tinospora Cordifolia and Epipremnum Aureum, which have been shown to have analgesic and anti-inflammatory

qualities. The composition is intended to relieve inflammation quickly, safely, and effectively while enhancing patient acceptance and convenience. To guarantee the quality and effectiveness of the roll-on preparation, the study focuses on formulation development, evaluation criteria, and stability assessment.[10]

A roll-on is a kind of topical liquid preparation that comes in a compact, transportable container with a revolving ball applicator. This design makes it simple and straightforward to apply to particular body parts.[14]

Fig. No. 1: Roll –On.

Roll-ons are all-natural formulas that usually include plant-based extracts and volatile essential oils that are well-known for their medicinal qualities, especially in reducing tension in the muscles, discomfort, and stress. Acute or chronic, pain is an unpleasant emotional and sensory experience that is frequency.

A complex interplay of psychological, emotional, and physical elements is involved in its perception. Essential oils and plant extracts with analgesic, anti-inflammatory, and soothing qualities are used in roll-ons to try to alleviate this discomfort.

The current formulation combines a variety of natural ingredients, such as liquid extracts of Epipremnum aureum and Tinospora cordifolia, as well as essential oils like peppermint, cinnamon, castor, and sesame. Each of these ingredients adds in a different way to the product's calming and pain-relieving properties. For instance, Epipremnum Aureum leaf extract and Tinospora Cordifolia stem extract have anti-inflammatory and immunomodulatory properties, while peppermint oil has a cooling effect and helps increase blood flow.As a counter-irritant, cinnamon oil has a warming effect that diverts attention from discomfort. Sesame oil improves skin penetration and acts as a moisturizer, increasing the roll-on's total effectiveness.

The essential oils and herbal extracts utilized in these products are usually extracted utilizing techniques like Soxhlets Extraction from different plant components, such as leaves and stems. Climate, soil type, harvesting time, and extraction technique are only a few of the environmental and processing factors that affect the yield and quality of these volatile oils. In conclusion, roll-ons are a popular option for people looking for all-encompassing, plant-based comfort since they provide a natural, practical, and non-greasy way to manage daily pain and stress.

Because of its appealing look and versatility, Epipremnum aureum (money plant), a member of the Araceae family, is frequently planted as an indoor ornamental plant. Beyond just being decorative, it helps to improve indoor air quality by lowering toxins like xylene, formaldehyde, and benzene. Its structure, chemical makeup, and traditional applications

have all been studied by scientists, who have shown that it has antibacterial and antioxidant qualities as well as potential antimalarial, anticancer, and wound-healing effects. However, further research is required to validate these advantages. Similar to this, Tinospora cordifolia has garnered interest due to its significant anti-inflammatory properties. Its extract can reduce the expression of the hepcidin gene in liver tissue, according to research utilizing Wistar rat models with inflammation-related anemia.

Research on macrophage cells in the lab also showed lower levels of pro-inflammatory cytokines like TNF-α and IL-1β as well as lower nitric oxide generation. Chromatographic examination revealed the existence of tinosporaside, which is thought to play a major role in these actions and supports its potential use in medicinal applications in the future.

Plant profile

1. Epipremnum Aureum

Pothos is a low-maintenance herbaceous perennial broadleaf evergreen houseplant that belongs to the arum family (Araceae) and is grown for its glossy, green or variegated leaves on cascading stalks. It is native to the Society Islands. The climbing and trailing vines can grow up to 40 feet in length, but the horizontal groundcover only reaches a height of 6 to 8 feet. Its purpose makes it perfect for hanging baskets. Because it is a container plant, its young leaves typically maintain their shape. The species' Latin name translates to "golden."Pothos is very easy to grow. It prefers bright, indirect light and can tolerate low light for long periods of time. Use a humidifier or place the plant pot on a tray of wet pebbles to increase the humidity. When the leaves eventually turn yellow and fall off, most of them will be clustered near the tops of the stalks. Pruning back stems will keep them bushy. Vines grow easily in water. They climb via brown aerial roots. If the plant has enough light and a place to climb, it will begin to produce large, mature leaves.

Fig. 2: Epipremnum Aureum.

Taxonomical Classification

TableNo.1 Taxonomical Classification of Epipreemnum Aureum

Rank	Taxon
Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Monocots
Order	Alismatales
Family	Araceae (Arum Family)
Subfamily	Monsteroideae
Tribe	Monstereae
Genus	Epipremnum
Species	Epipremnum Aureum

Organoleptic Properties

Colour= Leaves colour greenish to light yellow colour

Odour= characteristics

Taste = Bitter

Texture = Leaves are generally glossy, waxy, and Heart-shaped

Historical Reclassification And Synonyms

The "Pothos" Misnomer: In the late 1800s, it was first identified as Pothos aureus. The colloquial name persisted even after botanists later removed it from the actual genus Pothos.

The Aroid Shuffle: Because of the drastic structural changes between its juvenile and mature states, it was moved across a number of closely related aroid genera over the years. It gathered synonyms like Rhaphidophora aurea and Scindapsus aureus.

Differentiation from E. pinnatum: For a considerable amount of time, it was regarded merely as a cultivated form of Epipremnum pinnatum 'Aureum'. After observing clear vegetative differences, especially the grooved petioles and lack of free stipules on new growth, botanist G.S. Bunting formally gave it independent species status in 1964.

Key Botanical Characteristics

Dimorphism of Foliage (Heterophyllous Growth)

As the plant develops from a young ground creeper to an adult climber, it displays striking morphological changes: Juvenile Phase: Heart-shaped, little, whole, smooth-edged leaves that are usually less than 20 cm (8 inches) long. In potted home plants, this is the typical form.Mature Phase: Started when the plant uses adventitious aerial roots to scale vertical structures. The leaves grow irregular pinnatifid splits (fenestrations) and abruptly enlarge up to 100 cm (39 inches) in length, like a monstera.

The "Shy-Flowering" Phenomenon

Epipremnum aureum is the only known plant in the Araceae family that is genetically incapable of spontaneous flowering, while being classified as a flowering Angiosperm.Genetic Impairment: The plant's gibberellin biosynthesis gene (EaGA3ox1) has a naturally occurring genetic mutation.It cannot go from vegetative growth to a flowering condition because it is unable to produce this essential growth hormone on its own. In a cultivated environment, a spontaneous blossom was last observed in 1964. Gibberellic acid (GA) can only be artificially applied by botanists to force flowering in lab settings.

Growth Habit & Anatomy Hemiepiphytic Nature

It is initially rooted in the forest floor, but once it finds a tree host, it becomes an epiphyte. To anchor itself and take up moisture from the air and bark, it sends down strong aerial roots.

Chemical Defense: It has high amounts of needle-like calcium oxalate crystals in its tissues, just like the majority of aroids. The plant is extremely poisonous to people and domestic pets if consumed because these crystals serve as a physical deterrent to herbivores.

Key Components of Epipremnum Aureum

Epipremnum aureum was recently referred to as E. pinnatum "Aureum" and as a cultivar of Epipremnum pinnatum, which is a key component of Epipremnum aureum.

Plants formerly identified as E. pinnatum 'Aureum' are now correctly called E. aureum.
Hunter's Robe, Devil's Ivy, Golden Pothos, and Money Plant are some common names.[25]

Look: A trailing vine with heart-shaped leaves that are often variegated (marbling) in yellow or white.
Care Requirements: It thrives in bright, indirect light, requires low-to-moderate water, and is quite hardy.
Toxicity: Because all of the plant's portions contain calcium oxalates, which are harmful to both people and pets if ingested, the plant is well recognized for being hazardous.
Use: Often used as a trailing plant in hanging baskets or on shelves, this plant is known to improve indoor air quality.

Traditional uses

Skin Care: Leaf extracts are used in traditional medicine to reduce skin swelling and irritation and to encourage wound healing.
Respiratory Support: Several Southeast Asian folkloric practices use steam inhalation of leaf decoctions to alleviate bronchitis and remove phlegm.
Gastrointestinal Health: Indigestion and bloating have long been treated with it.
Antibacterial/Antifungal: It has long been used as a crude antiseptic for wounds or to treat bacterial infections in regional medicine.

Epiprenmum aureum, commonly known as Golden Pothos or money plant, is being explored for its antibacterial, antifungal, antioxidant, and anti-diabetic properties; leaf extracts have demonstrated potential against pathogens like E. coli. It is used in traditional medicine for wound healing and gastroprotection.[28] Formaldehyde and other air pollutants are efficiently eliminated by the facility.

Chemical Constituents Of *Epipremnum Aureum*

Many bioactive phytoconstituents, including alkaloids, flavonoids, terpenoids, saponins, phenols, and steroids, are present in Epipremnum aureum, sometimes referred to as the "golden pothos" or "money plant." The primary compounds are beta-sitosterol, vitamin E, dibutyl phthalate, and 8-octadecanone, particularly in leaf extracts. These compounds have antioxidant, antibacterial, anti-cancer, and termiticidal properties. Principal Active Participants: GC-MS studies indicates that its methanolic leaf extracts include over 30 phytochemical compounds. The following are some of the most prominent active chemical components: Dibutyl phthalate (16.75%) is often the most common component in various leaf extracts.Pentadecanoic acid (26.23%) and linolenic acid (22.80%) are the two primary fatty acid components in chloroform extracts that support its antibacterial and anti-termite qualities.Vitamin E (8.00%) and gamma-sitosterol (8.07%) have a major impact on the nutritional and antioxidant composition of the plant.

2. Tinospora Cordifolia

Tinospora cordifolia Hook (Willd.).f. & Thomson is a climbing deciduous shrub. China, Bangladesh, Myanmar, Sri Lanka, and the tropical areas of India are all home to it.

Plants may grow in a wide range of soil types, from acidic to alkaline, and they need a fair quantity of moisture. Its immunomodulatory, rejuvenating, and general adaptogenic qualities are essentially why Ayurveda utilizes it. The herb has many other unique medicinal properties in addition to these.

Fig. 3: *T. Cordifolia*.

Taxonomical Classification of *Tinospora Cordifolia*

Table No. 2: Taxonomical Classification of Tinospora Cordifolia.

Rank	Taxon
Kingdom	Platae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Order	Ranunculales
Family	Menispermaceae
Subfamily	Chasmantheroideae
Tribe	Burasaieae
Genus	Tinospora
Species	Tinospora Cordifolia

Etymology And Botanical Nomenclature

The plant's physical characteristics and medicinal reputation are directly described by its scientific and colloquial names:The species epithet, cordifolia, appropriately highlights its unique cordate leaf base by combining the Latin words cor (heart) and folium (leaf).

Vernacular Origins: Its deeply ingrained ethnobotanical history is indicated by its Sanskrit names, Amrita (root of immortality) and Guduchi (that which protects the entire body).

Phylogenetic Context: Tinospora cordifolia is a member of the Menispermaceae family within the Eudicots, in contrast to the monocot Epipremnum aureum (Araceae). Because almost all of its genera yield strong, physiologically active alkaloids, this family is highly valued in pharmacognosy.

Key botanical Characteristics

Stem Morphology & Aerial Roots

Succulent, Corky Bark: This unusual stem is fleshy, dynamic, and covered in a light-brown, ropy, deeply grooved corky bark. A vivid green, photosynthetic cortex is seen beneath the outer bark when it peels off. Filiform.

Aerial Roots: Long, thin, unbranched aerial roots that emerge from the branches are a basic distinguishing characteristic. In order to receive moisture from the atmosphere, these thread-like roots descend toward the earth, frequently becoming several meters in length.

Foliage & Floral Biology:

True Cordate Leaves: These leaves are 7 to 12 cm long, simple, alternating, and clearly heart-shaped. They have seven to nine conspicuous basal nerves that connect at the petiole junction, and they are smooth and membranous.Dioecious Flowering: Tinospora cordifolia is strictly dioecious, which means that individual plants are either exclusively male or exclusively female, in contrast to self-pollinating species. When the plant is totally leafless (typically in the summer), tiny, yellow-green flowers appear in axillary racemes.Drupe Fruits: Clusters of tiny, ovoid drupes replace the female flowers. When fully ripe, these fruits turn a vivid, glossy scarlet red, attracting birds to spread the seeds.

Cellular Anatomy & Chemical Defenses

Wheel-like Stem Anatomy: The stem's highly distinctive wheel-like architecture (radiating medullary rays dividing vascular bundles) can be seen in a transverse slice. This makes it easy to identify raw or powdered stems with a simple microscope. Alkaloid Armor: The plant yields a bitter juice that is high in gilletine, berberine, and tinosporaside. These secondary metabolites serve as both the foundation for their extensive use in immunomodulatory pharmacology and defense chemical weapons against herbivores.

Important traits and attributes

Morphology: A glabrous, succulent climbing shrub that often grows above mango or neem trees. Stem and Roots: The stem is initially greenish before turning grey-white, and it has long, thin aerial roots with obvious lenticels.Simple, heart-shaped leaves that alternate (cordate).

Flowers/Fruit: Produces little, yellow-green flowers in racemes and meaty red drupes (fruits).Among the therapeutic components include steroids, glycosides, diterpenoids (amritosides), and alkaloids (berberine, palmatine).

Major Phytoconstituents

This plant is rich in terpenoids, alkaloids, lignans, and steroids, particularly columbin, tinosporaside, and berberine.Parts used: The stem is mostly used to manufacture juices, powders (churna), and extracts, even though the entire plant has therapeutic value.Safety Note: Despite being generally safe, it should be used with caution when pregnant because it may interfere with diabetes medications and immunosuppressants.

Traditional uses

T. cordifolia is referred to as Guduchi in Sanskrit and is used to treat a number of ailments. The herb has received special attention from Ayurveda, Chinese medicine, and other traditional medical systems. It is frequently referred to as "Heavenly elixir" or "Amrita" due to its healing and restorative qualities. In Ayurvedic texts such as Charaka, Sushruta Samhita, Astanga Samgraha, Bhava Prakash, and Dhanvantari Nighantu, T. cordifolia has been used to treat a variety of ailments, including asthma, jaundice, diabetes, leprosy, pyrexia, anorexia, gout, skin infections, chronic diarrhea, and dysentery. T. cordifolia is categorized as a Rasayana medicine in Ayurveda and is recommended to enhance general body resistance, promote lifespan, and reduce fatigue, tension, and anxiety.

Chemical Constituents of *Tinospora Cordifolia*

Its stem, leaves, and roots are primarily recognized to have pharmacological potential due to the presence of several chemical constituents that belong to various classes, such as alkaloids, steroids, triterpenoids, and lignans. Because of their higher alkaloid content, stems are used. Among the several phytoconstituents that are prevalent in TC are alkaloids, diterpenoids, lactones, glycosides, steroids, sesquiterpenoids, phenolic aliphatic, and polysaccharides. The

plant is used medicinally to treat a number of illnesses caused by the metabolism of carbohydrates and is a rich source of biochemicals. In Ayurvedic medicine, it is frequently referred to as a miracle herb. More trace elements, including as copper and zinc, which have antioxidant qualities and protect cells from oxygen radical damage during immunological activation, make up the plant.

The therapeutic effectiveness of TC and the quantity of secondary metabolites

T. cordifolia has a high concentration of secondary metabolites, especially in the stem and roots. Alkaloids such as berberine, palmatine, tembetarine, magnoflorine, tinosporin, and choline are important compounds.Diterpenoid lactones/terpenoids include Tinosporide, Furanolactone, Columbin, Clerodane derivatives (including Tinosporaside), and Tinocordifolin.Glycosides: Cordifolisides A, B, C, D, and E; Tinocordiside; Syringin.Giloinsterol, beta-sitosterol, and 20-beta-hydroxy ecdysone are examples of steroids.Immunity-boosting polysaccharide arabinogalactan.

Objectives of the study

The goals of the current s study was to create And Asses the roll on for topical inflammation reduces that contained Extract of Epipremnum Aureum And Tinospora Cordifolia

1. To create an ethanolic extract from the leaves of Epipremnum aureum and Tinospora Cordifolia and perform preliminary phytochemical screening to identify the primary bioactive constituents.
2. To make three Roll On batches (F1–F3) using peppermint oil as the primary cooling agent and various volumes of caster oil.
3. To evaluate the physicochemical properties of the prepared Roll- On, such as homogeneity, spreadability, viscosity, pH, and appearance.

Material And Method

Collection And Authentification

Collection of plant =

During this study of Period ,Fresh Epipremnum Aureum leveas are collected from the local area of Alephata . And Tinospora Cordifolia plant Stem was gathered from Samarth Institute of Pharmacy , Belhe ; medicinal garden. The validity of the collected plant material was confirmed by a licensed botanist from New Arts and Commerce College of Parner (Specimen No. NACSBOT:9). After authentication, the leaves were cleaned, shade-dried, and used for further experimental studies.

Fig. 4: Collection of Fresh leaves of *Epipremnum Aureum*.

Fig. 5: Collection of fresh Stem of *Tinospora Cordifolia*.

Drying and Pulverization

The collected leaves were cleaned with distilled water after being thoroughly rinsed under running water to remove any dust and other surface impurities. After washing, the leaves were spread out in a clean, well-ventilated area and dried for ten to twelve days in the shade at room temperature (25 ± 2°C) until they were crisp and had less than 10% moisture. The dried leaves were firmly crushed using a mechanical grinder, and the resulting powder was then passed through filter No. 40 (425 µm) to ensure a uniform particle size. In the end, the powdered material was stored in an airtight container at room temperature until it was required for extraction and further study.

Fig. 6: Dried Leaves of *Epipremunm Aureum*.

Fig. 7: Crush Powder of the Dried Leaves of *Epipremnum Aureum*.

Fig. 8: Dried Stem of *Tinospora Cordifolia*.

Fig. 9: Crush Powder of the D ried stem of *Tinospora Cordifolia*.

Extraction process of the *Epipremnum Aureum*

1. *Epipremnum Aureum* Plant Extraction

Soxhlet Extraction

The Soxhlet extraction procedure is a highly effective laboratory technique that uses a liquid solvent to extract a desired chemical product (such as oils, alkaloids, or bioactive compounds) from a solid substance. It depends on the hot solvent

continuously passing through the sample. For the thorough extraction of lipids or bioactive substances from solid matrices, the Soxhlet extraction process functions as a closed-loop thermodynamic cycle.

Material Required

1. Dried powdered leaves of Epipremnum aureum
2. Soxhlet apparatus
3. Round bottom flask
4. Heating mantle
5. Condenser Whatman filter paper or thimble
6. Solvent (Ethanol, Methanol, Hydroalcoholic solvent, or Distilled water depending on study)
7. Rotary evaporator or water bath

Step of Soxhlet Extraction

Step 1: Collection of Plant Material.

Fresh leaves of Epipremnum aureum were collected and washed thoroughly with distilled water to remove dust and impurities.

Step 2: Drying of Leaves.

The leaves were shade dried at room temperature for 7–10 days until complete removal of moisture was achieved. Direct sunlight was avoided to prevent degradation of phytoconstituents.

Step 3: Powder Preparation.

The dried leaves were pulverized using a mechanical grinder to obtain coarse powder. The powder was passed through sieve no. 40 and stored in an airtight container.

Step 4: Weighing of Powder.

Approximately 10 gram of the powdered leaf material was accurately weighed using an analytical balance.

Fig. 10: Weight of powdered leaves.

Step 5: Preparation of Thimble

The weighed powder was packed into a cellulose extraction thimble or wrapped in Whatman filter paper and placed inside the Soxhlet extractor chamber.

Step 6: Selection of Solvent

About 300–500 mL of suitable solvent such as ethanol or methanol was poured into a clean round bottom flask attached to the Soxhlet apparatus.

Step 7: Assembly of Soxhlet Apparatus

The Soxhlet apparatus was assembled by connecting:

- Round bottom flask
- Soxhlet extractor
- Condenser

Cooling water was circulated through the condenser continuously.

Step 8: Extraction Process

The solvent was heated using a heating mantle at controlled temperature. The solvent vaporized, condensed in the condenser, and percolated through the powdered material.

When the extractor chamber filled to the siphon level, the solvent containing extracted phytoconstituents automatically drained back into the flask.

The cycle was repeated continuously for 6–8 hours or until the solvent in the siphon tube became colorless.

Fig. 11: Soxhlet Assembly.

Step 9: Filtration

After completion of extraction, the extract solution was filtered to remove insoluble plant particles.

Step 10: Concentration of Extract

The solvent was evaporated using a rotary evaporator or water bath at controlled temperature below 50°C to obtain concentrated extract.

Fig. 12: Collection of Filterate.

2. Extraction Process of Tinospora Cordifolia

Maceration Method

Material

1. Dried stem powder of Tinospora cordifolia
2. Ethanol, methanol, hydroalcoholic solvent, or distilled water
3. Conical flask or glass container with lid
4. Measuring cylinder
5. Mechanical shaker (optional)
6. Muslin cloth or Whatman filter paper
7. Beaker
8. Rotary evaporator or water bath Analytical balance

Stepwise Process

Step 1: Collection of Plant Material

Fresh stems of Tinospora cordifolia were collected and washed thoroughly with water to remove dust and impurities.

Step 2: Drying of Plant Material

The stems were shade dried at room temperature for several days until complete removal of moisture was achieved.

Step 3: Powder Preparation

The dried stems were coarsely powdered using a grinder and passed through sieve no. 40 to obtain uniform particle size.

Step 4: Weighing of Powder

Approximately 50–100 g of powdered drug material was accurately weighed using an analytical balance.

Step 5: Addition of Solvent

The weighed powder was transferred into a clean glass container or conical flask and soaked with suitable solvent.

Step 6: Maceration Process

The container was tightly closed and kept aside for 3–7 days at room temperature.

The mixture was shaken occasionally or placed on a mechanical shaker to enhance extraction of phytoconstituents.

Fig.13: Maceration Process of T. Cordifolia.

Fig. 14: Maceration.

Step 7: Filtration

After completion of maceration, the mixture was filtered using muslin cloth followed by Whatman filter paper to obtain clear filtrate.

Fig. 15: Collection of Tinospora Cordifolia extract.

Phytochemical Analysis of Extract of Epipremnum Aureum

Table No. 3: Phytochemical Analysis test of Epipremnum Aureum Extract.

Test	Observation	Inference
Test for Alkaloid 1ml plant Extract + Few drops of Mayer's Reagent + Few drops of Iodine Solution	Formation of Cremish yellow Coloured Precipitate	Presence of Alkaloids
Test for Glycosides Killer Killari Test : 1ml plant Extract + equal amount of Equal Amount of Killar killari reagent + few drops of Sulphuric Acid	Formation of Yellow colour	Presence of Glycosides
Test of Tannins 1 ml plant Extract =3-4 drops of Lead Acetate	Formation of Yellow Precipitate	Presence of Tannins
Test of Saponins Foams test : 1ml of Extract was boiled directly + 2 ml of Distilled Water and Shake for 20- 30 Sec	Formation of Froath	Presence of Saponins
Test for Flavonoids 1ml of plant Extract + 4-5 Drops of 5% Flavonoid's Reagents throught6s the walla of test tube	Generation of Green Colour	Presence of Flavonoids

Phytochemical Anlysis test for Tinospora Cordifolia

Table No. 4: Phytochemical Analysis of Tinospora Cordifolia Extract.

Test	Observation	Inferences
Test of Flavonoids 1ml of plants Extract + drop of Sodium Hydroxide	Formation of deep yellow colour	Presences of Flavonoids
Test of Alkaloids 1 ml Plant Extract + Dil. HCL then filtered and then filterate was treated for Alkaloids like Wagner's reagents, Mayer's reagents	Formation of a cream or Pale – Yellow Precipitate	Presences of Alkaloids
Test of Glycosides 1 ml Plant Extract + Dil. HCL then the different test like modified Brontrager's test and legel' s test	Formation of Yellow Colour	Presences of Glycosides
Test of phenol 1mml plant extract + few drops of ferric chloride solution	Formation of Bluish colour	Presences of Phenols
Test of Saponin Forth test 1ml Plant Extract + Distilled water to 20 ml and were shaken for 10 -15 min.	Formation of Foam of Height of 1cm	Presences of Saponins

Formulation Table

Table No. 5: Composition of Roll- No For Anti- inflammatory Activity.

Sr.No	Drug Content	F1	F2	F3
1.	Epipremnum Aureum Liquid Extract	4 ml	5 ml	6 ml
2.	Tinospora Cordifolia Liquid Extract	1.5 ml	1.2 ml	1 ml
3.	Sesame (Til) oil	2 ml	1.5 ml	1 ml
4.	Caster oil	1 ml	0.8 ml	0.7 ml
5.	Menthol Oil	0.5 ml	0.5 ml	0.5 ml
6.	Cinnamon Oil	0.2 ml	0.2 ml	0.2 ml
7.	Propylene Glycol	0.5 ml	0.5 ml	0.4 ml
8.	Sodium Citrate	0.1 ml	0.1 ml	0.1 ml
9.	Methyl Paraben	ml	0.1 ml	0.1 ml

Fig. 16: Batch formulation.

Role of Ingredients

Table No. 6: Role of Ingredients.

Sr. No	Ingredients	Role
1.	Epipremnum Aureum Liquid Extract	Main API
2.	Tinospora Cordifolia Liquid Extract	Supportive Ingredient
3.	Sesame (Til) oil	Enhances Penetration
4.	Caster oil	Viscosity Enhancer
5.	Peppermint oil	Cooling Analgesic Agent
6.	Cinnamon Oil	Counter - Irritant

7.	Propylene Glycol	Humectant
8.	Sodium Citrate	Ph Stabilizer
9.	Methyl Paraben	Preservative

Procedure of Formulation

Step 1: Preparation of Oil base

Accurately measure quantities and mix the Sesame oil, Caster oil, Menthol oil, and Cinnamon Oil in one beaker

Step 2: In the Another beaker Mix the herbel Extract such as *Epipremnum Aureum* And *Tinospora Cordifolia* and add Propylene Glycol.

Step 3: Addition of Sodium Citrate And Methyl Paraben

The Mixture was Gently warmed with Magnetic Stirrer with heat to facilitate Dissolution of Solids.

Step 4: **Mixing of Both phase**

Combine the Both phase slowly with continuous Stirring by Magnetic Stirrer

Step 5: Homogenization

Continuous stirring to ensure uniform distribution of all ingredients.

Step 6: Filling Into Roll-On container

The prepared solution accurately measured and transferred into the clean, dry roll-on fitted with stainless steel roll-on balls.

Fig. 17: Final Product of Roll- On.

Evaluation test of Roll -On

1. Physical Appearance
2. pH Determination
3. Viscosity
4. Spreadability on skin
5. Roll –on Ball movement test
6. Skin Irritation Test
7. Homogeneity test
8. Stability Test
9. Leakage Test

1. Physical Appearances

Colour: To ensure Uniformity And Absences of Dicolouration

Odour: To check for a Pleasant, Characteristics herbel Smell and Absences of rancid or unpleasant odour

Result:

The Roll-On was uniform in Appearance and odour with pleasant menthol aroma

2. pH Determination

the ph values obtained was recorded Ideal pH Range : 5.5-6.5

Fig. 18: pH determination.

Significances

Maintaining the pH within the this range is essential for Skin safety, as it help prevent irritation, Dryness, or Allergic reaction.

Result

The pH of Roll-on was found to be within the acceptable range,indicating that the formulatiionis suitable for topical Application.

3. Viscosity

Viscosity of the Roll-on was measured by Brookfield Viscometer

Purpose

Ensure smooth rolling action

Fig. 19: Viscometer.

Results

The viscosity was found to be 420 cP.

4. Spreadability

Spreadability was evaluated by applying the Roll-on on the skin surface area

Observed parameter

Ease of spreading

Smoothness during application

Result

The formulation spread easily without producing a greasy feel.

5. Roll-on Ball Movement test

The Roll-on Ball movement was checked manually.

Evaluation parameter

- Free movement of the Stainless Steel Ball
- Uniform Dispensing of Formulation of formulation
- Absences of blockage or leakage of roll – on content.

6. Skin Irritation test

A little amount of the formulation was applied on marked area of skin and observed for 24 hrs.

Criteria for Observed:

- Red patch or Redness
- Itching or Discomfort
- Edema or Inflammation

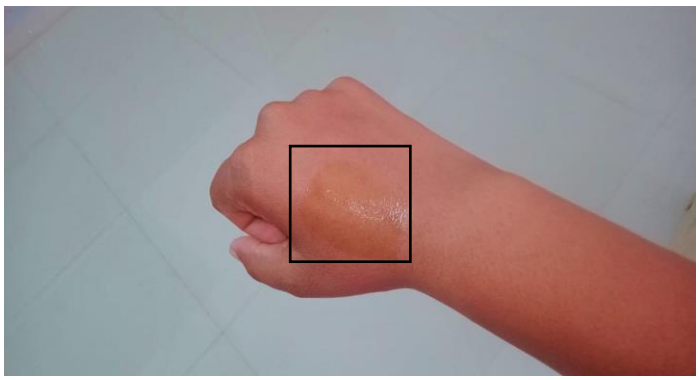

Fig. 20: Application of Roll- On on Skin.

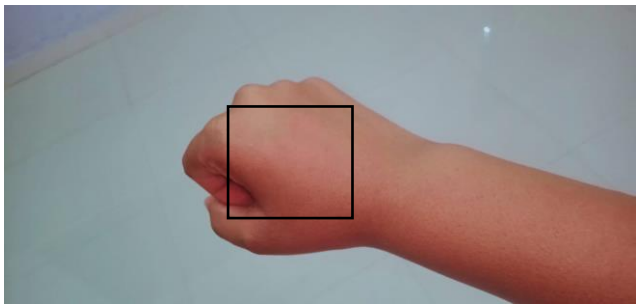

Fig. 21: After 24 hours of Application of Roll- On.

Result: No Sign of Skin Irritation was observed.

7. Homogeneity test

The formulation was checked visually for Uniformity

Result

The Roll-on Showed good Homogeneity without phase separation

8. Stability Studies

Parameter to check

- Colour : Check any discoloration of Roll-On
- Odour: Check any unpleasant or rancid smell
- pH: Check any variation of pH

Result

No change are detected in the colour, odour, and pH under any of the storage condition. The formulation remained physically and Chemically Stable, indicating the good stability of vthe Roll-On.

9. Leakage Test

The Roll-On was kept in an inverted position for 24 hours.

Results

No Leakage was Observed

The mentioned above evaluation test are performed.

Result

Phytochemical Test of Epipremnum Aureum

Table No. 7: Phytochemical test of Epipremnum Aureum.

Sr.No	Phytochemical Constituents	Test Performed	Results
1.	Alkaloid's Test	Mayer's Reagents Test	Alkaloids present
2.	Tannin test	Lead Acetate test	Tannin present
3.	Flavonoids Test	Shinoda's test	Flavonoids present
4.	Saponins Test	Foams Test	Saponins Present
5.	Phenol test	$Fecl_3$ test	Phenol present

Phytochemical Test for Tinospora Cordifolia

Table No. 8: Phytochemical Teat of Tinospora Cordifolia.

Sr.No	Phytochemical Constituents	Test Performed	Results
1.	Alkaloid's Test	Hager's Test	Alkaloids Present
2.	Flavonoid's Test	Shinoda Test	Flavonoid Present
3.	Glycoside's test	Brontrager's test	Glycosides Present
4.	Phenol Test	$Fecl_3$ Test	Phenol Present
5.	Saponin Test	Forth test	Saponin present

Evaluation of Roll- On Batch

Table no. 9: Evaluation of Roll-on Batch.

Sr.No	Evaluation Parameter	F1	F2	F3
1.	pH determination	5.8	5.85	5.78
2.	Viscosity (cP)	420	475	520
3.	Homogeneity	Smooth	No grittiness	Uniform Appearance
4.	Skin Irritation	No Redness	Little discomfort	Mild cooling Sensation
5.	Stability Testing	Stable	Stable	Stable
6.	Leakage Test	No Leakage	No Leakage	No leakage

Discussion of Batch Variation

Table No. 10: Batch Variation.

Batch	Batch Variation
F1	Balanced Herbel Formulation
F2	Moderate – high Epipremnum Aureum
F3	Maximum Epipremnum Aureum – rich Formulation

The formulated herbal anti-inflammatory roll-on containing extracts of Epipremnum aureum and Tinospora cordifolia was successfully prepared and evaluated for its physicochemical properties, stability, and skin compatibility. The phytochemical screening confirmed the presence of important bioactive constituents such as alkaloids, flavonoids, tannins, phenols, glycosides, and saponins in both plant extracts, which support their anti-inflammatory and analgesic activities.

The Roll-on had a consistent appearance, a pleasant herbal scent, and was successfully formulated. The mixture was easy to apply to the skin and was smooth and non-greasy. Good skin compatibility was indicated by the formulation's pH, which was found to be within the permitted range for topical administration. Measurements of viscosity revealed suitable flow characteristics, enabling simple roll-on application without leakage.

Three formulations (F1, F2, and F3) were prepared with varying concentrations of herbal extracts and excipients. Among all formulations, Batch F3 showed the best overall performance due to its higher concentration of Epipremnum aureum extract and balanced formulation composition.

DISCUSSION

The current study showed that a roll-on for anti-inflammatory activity with desired physicochemical and safety properties may be successfully formulated and evaluated. Good compatibility between the herbal components and excipients was demonstrated by the formulation's consistent look, agreeable odor, and smooth consistency. Regular topical usage and patient acceptability depend on these qualities. Plant-derived oils with analgesic, anti-inflammatory, and counter-irritant qualities were used to successfully manufacture the herbal pain treatment roll-on.

1. The physical characteristics (color, odor, and viscosity) demonstrated the compatibility of the excipients and herbal actives by falling within acceptable ranges.
2. Stability within a day and the absence of phase separation show that the vehicle system (caster oil/IPM with essential oils, for example) is appropriate for preserving the solubility and homogeneity of the actives.
3. Accurate viscosity adjustment is confirmed by a roller ball operating without leakage, which is essential for consumer-friendly topical products.
4. Research on skin irritation revealed that the formulation is safe to apply topically.

CONCLUSION

Using extracts from *Tinospora cordifolia* and *Epipremnum aureum*, the current study effectively created and assessed a herbal anti-inflammatory roll-on formulation. For topical application, the formulation showed acceptable physicochemical properties, stability, spreadability, and safety. The preparation's anti-inflammatory and analgesic properties are mostly attributed to the phytochemical components found in the herbal extracts. Because of its optimal concentration of herbal extracts and acceptable assessment criteria, Batch F3 was determined to be the most stable and effective of the created formulations. There were no indications of skin irritation, the formulation produced a pleasant cooling effect, and it remained stable in storage. As a result, the herbal roll-on formulation can be regarded as a topical preparation that is safe, stable, and efficient for lowering inflammation and easing muscle soreness. It may serve as a natural alternative to synthetic anti-inflammatory products with minimal side effects and improved patient acceptability.

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