Formulation And Evaluation Of Herbal Gel For The Treatment Of Anti Microbial Potency

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Abstract:

Herbal medicines is still the main stay of about 75-80% of the world population mainly the developing countries for primary health care because of better cultural acceptability, better compatibility with human body and lesser side effects. Herbal medicines consist of plant or its part to treat injuries, disease or illnesses and are used to prevent and treat diseases and ailmentsor to promote health and healing. it is a drug or preparation made from a plant or plants and used for any to such purpose. The aim of present study was to prepare herbal gel formulationcontaining methanol extract of antimicrobial herbal gel containing methanol extract of senna auricular and murraya koenigii.Topical gel formulation was designed by using methanolic extract antimicrobial herbalgel containing methanolic extract of senna auriculata, murraya koenigii in varied concentrations. The gel was prepared by using carbopol 934(1%w/v),methanol,propy glycol, methyl paraben, polyethylamine glycol, methyl paraben, tri-ethanolamine and required amount of distilled water. the prepared gels were evaluated for physical appearance, pH, spread ability, drug content, swelling index, diffusion study, viscosity, homogeneity and grittiness. it was inferred from results that gel formulations were good in appearance and homogeneity.Antimicrobial herbal gel containing methanolic extract of senna auriculata and murraya koenigii based gel proved to the formula of choice, since it showed the highest percentage of extrudability, good spreadability and rheological properties.

Keywords: Methanolic extract, Optimization, Rheological properties, Antimicrobial activity.

1. Introduction:

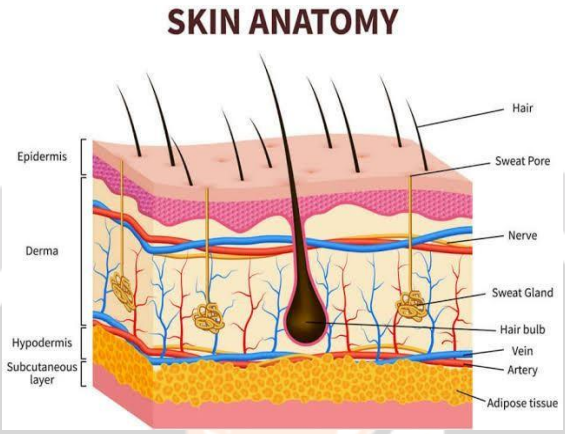
Most of the time, the human species live in peaceful coexistence with the microorganismsthat surrounded them and only when the defense system is damaged or the concentration of pathogens reach an exceptionally high density, an infection may emerge. Most infections pass byunrecognized but sometimes the infecting agents do elicit a response of the body, which leads to clinically manifest signs and symptoms, a condition known as infectious disease. (1)

As strategies to control bacterial infections in patients improved, fungi be the most hazardous pathogens. Yeasts and moulds now rank amongst the 10 most frequently isolated pathogens among patients in Intensive Care Units. On the contrary, modern treatment modalities may even facilitate the growth of fungi through negative interference with the remaining components of the immune system. Let's have a closer look at these peculiar infective agents, called fungi or mycoses. In India, drugs of herbal origin have been used in traditional systems of medicines such as Ayurveda, Unani, Siddha and Folk (tribal) medicines since ancient times. Among these systems, Ayurveda is most practiced and widely accepted alternative system of medicine in India. (1)

The most noticeable change towards herbal medicine in the developed countries of this century has been because of the interest shown by the ordinary people. From being regarded as **"old fashioned"** and **distrusted,** herbs such as ginseng and guarana which are now hailed as wonder drugs. The change in attitude began in the 1960s, when the 'hippie' movement advocated a nature living, initiating "alternative"' medicine and therapies. The growth of the conservation movement and the founding of companies using only natural products in an environmentally friendly way were also major factors. (1)

Plants have been used to treat various chronic and infectious diseases in traditional medicine and are known to contain a wide range of substances (Nimri et al., 1999). There are numerous reports on the inhibitory effects of various plant extracts on the growth of many bacteria and fungi in culture.For example, ethanol extracts of Cassia alata L. leave sex hibited high antimicrobial activities against various species of dermatophytic fungi (Ibrahim & Osman, 1995) and methanol extracts of Ceanothus americanus L. were active against selected oral

pathogens (Li et al., 1997). The emer-gence of new and resistant strains of microbes has under- mined the effectiveness of existing antimicrobial agents and hence renewed interests in the discovery of new and novel plant-derived antimicrobial compounds. In the discovery of new bioactive compounds .(2)



The skin is the body's largest organ. It covers the entire body. It serves as a protective shieldagainst heat, light, injury, and infection. The skin also:
Regulates body temperature

Stores water and fat Is a sensory organ
Prevents water loss
Prevents entry of bacteria

Acts as a barrier between the organism and its environmentHelps to
make vitamin D when exposed to the sun
Your skin takes on different thickness, color, and texture all over your body. For example, your head contains more hair follicles than anywhere else. But the soles of your feet have none. In addition, the soles of your feet and the palms of your hands are much thicker than skin on other areas of your body.
The skin is made up of 3 layers. Each layer has certain functions:

- Epidermis
- Dermis
- Subcutaneous fat layer (hypodermis)(3)

2. Need of Investigation:

1. Natural substances are more acceptable in the belief that they are safer with fewer sideeffects than synthetic medicines.
2. The herbal ingredients or materials required for the gel preparation are cheaper or moreeffective than synthetic ones.
3. The herbal formulations are less toxic; hence, people mostly prefer them.

3. Plan of work:

1. Literature Review
2. Collection of plant
3. Authentication of herb
4. Formulation of gel
5. Evaluation parameter
    - Physical parameter
    - Viscosity
    - Spredability
    - pH
    - Extrudability study
    - Antimicrobial study

4. AIM AND OBJECTIVE:

- **Aim:** Formulation and evaluation of herbal gel for the treatment of antimicrobial potency.
- **Objective:**

1. To study herbs and collect data about them.
2. To develop herbal gel.
3. To evaluate herbal gel for its Consistency.
4. To determine antibacterial activity.

5. Literature Review:

1. **Subramanian L.Ramanathan M. *et al* [2019]:**

He study effort was effort to make a multipurpose herbal cream by using Cassia auriculata linn. The task of this work is, to protect the herbal active biomolecules and certify the activity. The herbal cream was prepared by using Cassia auriculata flower extract, it was prepared by using two different solvent of ethanol and distilled water. The resultant extract was analyzed by various chemical tests. The results confirms that both the extract have active biomolecules. Cassia auriculata linn flower extract incorporated into inert cream base then the biological activity and cream evaluation were piloted. The result shows water extract of Cassia auriculata herbal cream was better results than ethanol extract using herbal cream in all standard parameters.

2. Thiru Murugun *et al* [2017] :

Plants produce a wide variety of phytochemical constituents, which are secondary metabolites and are used either directly or indirectly in the pharmaceutical industry. For centuries, man has effectively used various components of plants or their extracts for the treatment of many diseases,including bacterial infections. In the present study methanol, chloroform and aqueous extracts of Cassia auriculata leaf were subjected for antimicrobial activity by well-diffusion method against six bacterial strains namely Bacillus cereus, Staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa and Proteus mirabilis.

3. D.D. Bandawane *et al* [2014] :

Cassia auriculata L. (Caesalpiniaceae) is a herb, used as a traditional Indian medicine forinflammation and rheumatism and it is reported to have anti-inflammatory and analgesic activity.In view of its potent anti-inflammatory activity, the present study was designed to evaluate its anti-arthritic activity and to identify the phytoconstituents responsible for the proposed activity.

4. Samuel Aney J. Mulla Nida [2020] :

The present study has been undertaken with the aim to formulate and evaluate the gel contaning leaf extract of Andrographis Paniculata. Methodology and results: The formulation was designedby using alcoholic extract of leaves of Andrographis paniculata. The gel was prepared by using carbopol 934, triethanolamine,propylene glycol, methyl paraben, propyl paraben and required amount of distilled water. The prepared gel was evaluated for physical appearance, pH, spread ability,viscosity, extrudability, albumin denaturation assay and stability. Conclusion: Carbopol gels with dried leaves extract of Andrographis paniculata could be prepared successfully.

5. Fenny Indah Safitri *et al* [Jan 2021] :

Carbopol is an acrylic polymer. Carbopol is non-toxic and non-irritating so that it is suitable for gel preparations. Carbapol 940 is often used as a gelling agent in gel preparations. Concentration of carbopol 940 as a gelling agent needs to be concerned to obtain a good gel preparation. This study aimed to determine the effect of carbopol 940 concentration on physical properties, drug release and the use in eye drops. The research method used was descriptive method with data collection technique using PICO (Population, Intervention, Compare, Outcome) approach. Based on the Descriptive research results, it was obtained that carbopol 940 had influences onthe physical properties of the gel in the form of pH, viscosity, spreadability, adhesion, organoleptic and stability. Carbopol 940 is commonly used in controlled-release drug formulations. In addition, carbopol 940 is also safe to use in eye drops preparations which do notcause irritation in in vivo testing

6. M. Abishek Chakkaravarthi and P L. Balasubramanian [2020] :

The main intention of these studies was to formulate and evaluate a novel herbal cream which includes Senna alata,Wrightia tinctoria and Datura metel for the treatment of secondary skin infections. The most suitable route for skin infection is topical. The development of topical drug transport systems designed to have systemic results appears to be useful for a number of drugs asa result of the numerous advantages over traditional routes of drug administration.

In this study anovel herbal cream formulation consisting of Senna alata,Wrightia tinctoria and Datura metel was prepared. This study was subjected to in-vitro diffusion method.

6. EXPERIMENTAL WORK:

6.1 Materials:

SR.NO	INGREDIENTS	ROLE
1	Carbopol 934	Thickening agent
2	Methyl paraben	Preservative
3	Propyl paraben	Preservative
4	Triethanolamine	pH adjuster
5	Propylene Glycol	Diluent

- **Pharmaceutical grade:**

INGREDIENTS	ROLE	PHARMACEUTICAL GRADE STATUS	IMAGES
CARBOPOL 934	A high molecular weight polymer used as thickening and stabilizing agent	Generally recognized as safe by the FDA and considered pharmaceutical grade with GMP guidelines	
METHYL PARABEN	Preservative used to prevent the growth of bacteria and fungi in pharmaceutical formulations	Considered pharmaceutical grade with manufactured to meet GMP guidelines	

PROPYL PARABEN	A preservative used to prevent the growth of bacteria and fungi	Pharmaceutical grade with manufactured tomeet GMP guidelines	
PROPYLENE GLYCOL	A penetration enhancer to improvethe texture of gel	Generally recognized as safe by the FDA and considered pharmaceutical grade with GMP guidelines	
TRIETHANOLAMINE	TEA is used as a pH adjuster in gel formulations	Pharmaceutical gradewith manufactured to meet GMP guidelines	
METHANOLIC EXTRACT	Methanolic extract are obtained by soxhlet extraction , which extract active compound from plant	Generally recognizedas safe by the FDA and considered pharmaceutical guidelines	

- **List of Equipment:**

Fig[1]: Soxhlet apparatus

Fig[2]: Magnetic stirrer

Fig[3]:Brookfield viscometer

Fig[4]:Homogenizer

Fig[5]: pH meter

Fig[6]: Hot air oven

Plant Profile

a) SENNA AURICULATA

- **LOCAL NAME:** English (tarwar, Matara tea, senna,tanner's cassia); French (avaram); Portuguese (avúl)

- **BOTANICAL DESCRIPTION:** Senna auriculata is an

  evergreen, fast-growing, much branched shrub or small tree up to 7 m tall, with trunk up to 20 cm in diameter with a thin, brown, lenticellate bark. Leave alternate, paripinnatelycompound; stipules large and leafy, broadly reniform, 7–22 mm wide, persistent. Inflorescence an axillary raceme, yellow coloured, 2–8 flowered; flowers bisexual. Fruit a flattened cylindrical pod 5–18 cm × 1–2 cm, transversely undulate between the 10–20 seeds, indehiscent Seeds compressed ovoid-cylindrical, 7–9 mm × 4–5 mm, with a distinct areole on each face.

- **BIOLOGY:** Within its natural range, flowering and fruiting is almost throughout the year, but in India there are usually two main flowering periods, one in the early monsoon and another in the late monsoon

- **ECOLOGY:** auriculata grows wild in woodland and wooded grassland, on stony hills and scrub forests in arid and semi-arid zones.

- **BIOPHYSICAL LIMITS:** Altitude: 0-720 m. Temperature: 16-27°C (mean max. temps of hottest month 38-45 ºC; mean min. temps of coldest month 0 - 5ºC) Rainfall: 250-400 mm, but can also tolerate wet climates with an annual precipitation of up to 4300 mm. with dry season duration of 7-9 months Soil type: It tolerates many soil types, including saline soils, but prefers fairly rich, well-drained soils that are light to medium in texture.

- **DOCUMENTED SPECIES DISTRIBUTION:** The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countriesthan those depicted. Since some tree species are invasive, you need to follow biosafety

  procedures that apply to your planting site. Exotic rangeNative rangeIndia, Myanmar,

  Pakistan, Sri LankaNigeria, Tanzania

b) MURRAYA KOENIGII

- **LOCAL NAMES:** Curry Leaf (English), Karepaku (Andhra Pradesh), Narasingha (Assam); Barsanga, Kartaphulli (Bengal)Gorenimb (Gujrat)

- **BOTANICAL DISCRIPTION:** Murraya koenigii, called curry leaf, is a small, tropical to sub-tropical tree or shrub that typically grows to 6-15' tall and is noted for its pungent, aromatic, curry leaves which are an important flavoring used in Indian/Asian cuisine. This tree is native to moist forests in India and Sri Lanka**.**

- **BIOLOGY:** Murraya koenigii is small spreading plant and attains height of about 2.5 m.The leaves of this shrub are exstipulate, bipinnately compound, reticulate venation, lanceolate 25–30 cm long, each bearing many leaflets.

- **ECOLOGY:** Murraya koenigii is small spreading plant and attains height of about 2.5 m. The leaves of this shrub are exstipulate, bipinnately compound, reticulate venation, lanceolate 25–30 cm long, each bearing many leaflets.

- **Taxonomic status**

  Kingdom - Plantae

  Sub-kingdom - Tracheobionta

Superdivision - Spermatophyta
Division - Magnoliophyta Class -
Magnoliospida Subclass - Rosidae
Order - Sapindales
Family - Rutaceae
Genus - Murraya J. Koenig ex L

- **BIOPHYSICAL LIMITS:** the biophysical limits of Murraya koenigii. However, they highlight the plant's antioxidant, antimicrobial, and medicinal properties, indicating its potential for various applications in traditional medicine, culinary practices, and pharmacology.While the information provided is insightful about the plant's bioactive compounds and therapeutic benefits, it does not specifically discuss the biophysical limits of M. koenigii. Further research would be necessary to explore the specific biophysical boundaries or constraints associated with this plant.

- **DISTRIBUTION:** Murraya koenigii originates from east and south part of India, Pakistan, Sri Lanka, China and Hainan but widely cultivated in South-East Asia and some parts of the United States and Australia.

6.2 Methodology:

METHOD OF PREPARTION: FOR EXTRACTION

Senna auriculata & Murraya Koenigii extract gel formulation and antibacterial activityassessment
Method Of Preparation:-(for extraction)

1 Materials: Dried Senna auriculata & Murraya Koenigii2.Solvent such as methanol
3.Soxhlet extraction apparatus
4.Weighing balance

- **Procedure:**

1. Weigh 10 g of dried Senna auriculata & Murraya Koenigii Samples and place them in a Soxhlet extraction thimble.
2. Set up the Soxhlet extraction apparatus by attaching the thimble containing the sample to the extractor and connecting the extractor to a condenser and a flask containing the solvent
3. Turn on the heat and let the extraction proceed for 6-8 hours or until the solvent in the flask becomes clear.
4. Once the extraction is complete, remove the thimble containing the sample and the extracted solution from the apparatus and separate them.
5. Filter the extracted solution using filter paper to remove any insoluble impurities Concentrate the extracted solution using a water bath to obtain the desired extract.
6. Weigh the extract and record the yield.The choice of solvent and the duration of the extractionmay vary depending on the properties of the sample and the desired extract. It is important to perform a literature search and consult with a qualified expert to determine the optimal conditions for your specific experiment.

Method of Preparation:-(For Gel Formulation)

SR. NO.	FORMULATION	F1	F2	F3	F4	F5
1	Extract of Senna Auriculata	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
2	Extract of Murraya Koenigii	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
3	Carbapol 934	0.2 gm	0.4 gm	0.6 gm	0.8 gm	1 gm
4	Methyl paraben	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
5	Propylene glycol	5 ml	5 ml	5 ml	5 ml	5 ml
6	triethanolamine	0.2 ml	0.2 ml	0.2 ml	0.2 ml	0.2 ml
7	water	100 ml	100 ml	100 ml	100 ml	100 ml

METHOD OF PREPARATION: FOR GEL FORMULATION

Firstly carbopol 934 was dispersed in distilled water and purified water kept the beaker aside to swell the carbopol 934 for half an hour. and then stirring should be done to mix the Carbopol 934to form gel. In another beaker weight and transfer the required quantity of extracted drug powderand dissolved in polyethylene glycol the solution was added and mixed to the first solution. 5ml of distilled water was taken and required quantity of methyl paraben dissolved by heating on water bath and solution was cooled. Finally full mixed ingredients were mixed properly to the carbopol 934 gel with continuous stirring and lastly triethanolamine was added drop wise to the formulation for adjustment of required skin pH (6.8 -7) and to obtain the gel at requiredconsistency.

By using this method we prepared 5 formulations with 5 different concentration of carbopol i.e 0.4% 0.6% 0.8% 1% respectively.

PREPARED GEL

6.3 Evaluation Parameter:

1) Evaluation tests

1.1 Physical appearance:

The physical appearance of the formulation was checked visually.

1.2 Color: The color of the formulations was checked out against white & black backgroundsconsistency the consistency was checked by applying the gel on to the skin.

1.3 Greasiness: The greasiness was assessed by the application on to the skin. Odor: The odor ofthe pels was checked by mixing a little amount of gel in water and by taking smell.

BATCH CODE	COLOUR	HOMOGENEITY	CONSISTENCY	PHASE SEPARATION
F1	Brown	Excellent	Excellent	None
F2	Brown	Excellent	Excellent	None
F3	Brown	Excellent	Excellent	None
F4	Brown	Excellent	Excellent	None
F5	Brown	Excellent	Excellent	None

2) Determination of pH:

The pH values of 19% aqueous solutions of the optimized gel was measured at 25°C using a pHmeter

SR .NO.	FORMULATION CODE	pH VALUE
1	F1	6.9
2	F2	6.7
3	F3	6.8
4	F4	6.8
5	F5	7

3) Brookfield Viscometer

The viscosity of formulated batches was determined. using Brookfield Viscometer with spindle 3(Brookfield Engineering Laboratories).

1) Turn on the viscometer and allow standing, must be auto zero, after the few seconds thescreen appears which indicates 2 digits.

2) Now press the key, the screen displays to remove spindle, after removing the spindle andpressing the key the instrument begins, it is auto zeroed.

3) After approximately 15 see, the screen displays the instruction to replace spindle

4) Attach the spindle to viscometer by screwing then on the lower shaft using left hand thread.

5) Press the spindle key and up and down arrow keys. When the desired code is displayed releasethe arrow key.

6) To select spindle, first press either up and down key which cause the area to show currentspeed, press the set speed key for adjusting the speed.

7) Insert center of this spindle in the test material until the fluid level is at the immersion grooveon the spindle shaft. Tilt the spindle slightly while immersing to avoid air entrapment.

8) To measure high viscosity choose a small spindle and to slow speed if the chosenspindle/speed result in torque above 1 00% and then reduce the value.

9) Allow time for the individual reading to stabilize, record the value.

10) Press the motor on/off/escape key to turn off motor.

11) The time mode allows the user to record the reading for fixed period of time or until a settorque value is attained.

12) Then enter/auto turnkey allows determining maximum calculated viscosity possible withcurrent spindle/speed.

13) Pressing the up and down arrow keys will allow the viscometer data to be examine, pressingand other key (except enter/press key) will bring back normal display.

14) Turn off the mains after use.

Observation table

SR.NO	BATCH CODE	VISCOCITY
1	F1	2520 cps
2	F2	2820 cps
3	F3	3145 cps
4	F4	3405 cps
5	F5	4604 cps

4) Spreadability

The spreadability was expressed in mes of time in second taken by two alides un slip-off fromthe gel, placed in between the slides, under certain lose. Liser the time taken for separation of thetwo stades better the sproudalslity Two sets of glass slides of standard dansernion were taken Then one abide of suinible dinimion was taken and the gel formulation was placed on that slide Then other life was placed on the top of the formulation. Then a weight or certain load was placed in the upper slide ses that the gel between the two sides was pressed uniformly to form a thun layer. Then the weight was removed and excers of formulamon adhering the slides was scrapped off. The upper slide was allow to slip off freely by the force of weight tred in it. The time taken by the supper

Slide to slip off was noted.
Spread ability = m* 1\t Where,
m= Standant weight which is tied to or placed over the upperslide
(30gm)
l= length of a glass side (5 cm)t=
time taken in seconds.

5) ntimicrobial Study Test of Gel

Herbal gel were tested for antimicrobial activity against Staphylococcus using the disk diffusion method with slight modification. agar plates were prepared by Microbiological studies.The gel showed good effects on microbial growth, according to the microbiological investigation, and the zone of inhibition was measured using a zone reader. Staphylococcus had a zone of inhibition of 2.1 cm

Fig: Antimicrobial activity Result

6. Extrudability Study:

It is a useful empirical test to measure the force required to extrude the material from a tube. Fordetermination of extrudability the gel formulation was filled in standard plastic caped collapsibletube. The initial weight of tube was recorded. The tube was placed between two glass slides and clamped. 1 g weight was placed over the glass slide and then cap was opened. The amount of gelextruded was collected and weighed.

Fig: **Extrudability Study**

7. Result and Discussion:

The development of formulation preformulation studies are performed on repoted methods. Solubility of Senna auriculata, Murraya koenigii and was determination is various polar and non-polar solvent and result are reported as describe in pharmacopoeia of India. The solubility of Sennaalata, Murraya koenigii and Aleo vera was found to be methanol 1mg/1000 ml.Gel have the potential to be efficient, viable, safe and cost effective system for administration of herbal on account of their biodegradability, biocompatibility, and suitability for topical applications and low immunogenicity. Herbal gel was Prepared by emulsification technique and optimized for various formulation variables. It was observed that on increasing the gelling agent concentration from 0.2gm to 1 gm the viscosity increase from 2000 to cp. The increase in viscosity with an increase in concentration of gelling agent can be attributed due to greater quantity of gelling agent available which enhanced the viscosity of the formulation.
However on further increasing the concentration of gelling agent the drug content was found to be decreased as highly viscous solution was prepared, which was difficult to process. The highestdrug content was found in the formulation F5 and the viscosity was also sufficient, therefore this concentration of gelling agent was selected. Finally the gel was prepared 1% herbal gel using extract 1gm of herbal product, 1 gm of Carbopol, methy paraben 0.5 gm 0.2 ml trichtenolamine and water characterized for its physical appearance, pH, spreadability, extrudability. The prepared herbal Gel formulation was brown coloured viscous creamy preparation with a smooth and homogenous appearance. The pH value of the optimized formulation was found to be 6.8 which was near the pH value of the skin, so it does not give any adverse effect. The pH value of formulation was found to be suitable for topical delivery. The values of spreadability indicate that the gel is easily spreadable by small amount of shear. The % extrudability of prepared gel and marketed cream was found to be 89% and 85% respectively, which indicate that herbal gel possess better extrudability as compared to marketed gel Herbal gel are formulated for use a bacterial infection. The optimized formulation was evaluated for antibacterial activity against staphylococcus bacterial strain as compared to drug suspension. In this study, during 5 hrs gel of drug actively inhibit bacterial zone but after 24 hrs its effectiveness was constant while during 5 hrs medicated gel slowely inhibit bacterial zone but after 5 hrs its effectiveness was controlled because it give antibacterial activity for longer period of time. gel showed larger or controlled zone of inhibition (1.53 20.04) as compared to drug suspension (0.89 ±0.21) after 24 hrs.

8. Conclusion:

As many traditional healers are using this senna alata, and murrye kaunigit for treating number of fungal and bacterial infections, we made a formulation by using the senna alata and murry kainigii extractions. No change was observed in its pH and other physical parameters and skin irritation studies were observed with all the four formulations. Where F5 batch shows best viscosity to apply in skin or topical use. alongwith the above the gel formulation is also have good antimicrobial activity. The antimicrobial activity of the sennaalata, aloe vera and murrya kaunigili herbal gel formulations shows dose dependent zone of inhibitions in exponential manner Le HG3 formulations shows 1.53±0.4 cm zone of inhibition it is very much greater than the remaining three formulations and the standard Neomycin. When compared with the standard drug our formulation gels are showing better antimicrobial activity. By this study results we are concluding that all these five formulations are best in their stability and anti-microbial activity sowe can use this formulation for treating microbial infections. Antifungal activity of the herbal gel formulation was also planned to perform by using the isolated fungal stained as early as possible.

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