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Formulation and Evaluation of Herbal Night Gel

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Abstract: In the present study three medicinal plants were used i.e. *Tridax procumbnes* Linn., *Butea monosperma* Lam. and *Psidium guajava* Linn. which are having significant anti-inflammatory potential to formulate the topical herbal night gel. These gels were prepared using the ethanolic extracts of the herbal plants. The physicochemical investigation of dried plants were done i.e. total ash, moisture content, extractive value etc. Thin layer chromatography was performed and the antimicrobial activity of the herbal extracts has been checked by using *Pseudomonas aeruginosa* bacteria. Also the preliminary phyto-chemical screening of the ethanolic extracts were performed. The evaluation the herbal night gels were determined by measuring pH, spreadibility, viscosity and the organoleptic properties etc.

Keywords: *Butea monosperma*, *Tridax procumbens*, *Psidium guajava*, Antimicrobial activity, Gel, *Pseudomonas aeruginosa*

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Introduction

The herbal medication in India is most likely the world's oldest medical care system. Herbs have such a long history in ancient India that the oldest type of herbal medicine is even described in the Vedas, an ancient holy text of the Indians. It is no wonder that the world's one-fourth population i.e. 1.42 billion people, are dependent on traditional medicines for the treatment of various ailments Ayurvedic and Unani herbal medicine methods deal with the use of herbs and natural items to treat health problems (Shaikh *et al.*, 2018). Although herbal remedies appear to be novel to

western healers and medical practitioners, the truth is that most prescribed medications contain plant extracts even today. At the moment, countries all over the world value this ancient kind of therapy and Indian herbal pharmaceuticals are in high demand, resulting in rapid growth and a nearly thirty per cent yearly growth rate (Lavhale and Mishra, 2007). In recent years, there has been a significant surge in global demand for herbal remedies, herbal skin care products, and even herbal cosmetics. Our surroundings is distinguished by a diverse plant life. Plant diversity consists of around 500,000 botanical species. Plants are an important component of biodiversity because they help to preserve the earth's environmental equilibrium and ecological stability(Ikewuchi *et al.*, 2015).

Butea monosperma is comonly used Ayurvedic Plant which belongs to the family *Fabaceae.* Its height is about 12-15 m and found in different parts of India, Burma and Sri Lanka. The plant's vernacular names include: in Hindi-- Chichratesu, polak, dhak, palas, and desukajhad; in English-- Flame of the Forest, Parrot Tree; in Sanskrit-- Brahmopadapa, Lakshataru, and Palasha; in Bengali-- terms palas, kinaki, peras, and polashi; in Assam- Polash; in Gujarati --khakra, phullas, and kakria; in Kannada-- uthuga; in Odia Palash; in Marathi Palash, Porasum, Parasu; in Telugu-- Mooduga, Palasamu; in Urdu-- Palash, papra; in Punjabi--Dhak, palas, Brahmavriksham. The Flower of these plants are well known for their colouring properties (Somayaji and Hegde, 2016). The present investigation evaluated the antioxidant activity of hydroalcoholic extract (75:25) of *Butea monosperma* flowers*.* It is a well-known Ayurvedic herb with significant therapeutic properties that is frequently used by rural and tribal people in many parts of India to treat a wide range of diseases (Kumar *et al.*, 2015). *Butea monosperma* produces a red or orange dye from its blooms that is both a pesticide and a colouring agent (Somayaji and Hegde, 2016). *B. monosperma* is widely utilized in Ayurveda, Unani, Homoeopathy and other traditional medical systems. Anticonvulsant, antioxidant, antistress, antigout, diuretic, antileprotic, anti-inflammatory, antiulcer, astringent, antiestrogenic activity, antihepatotoxic, eye disorder, diarrhoea, depurative, tonic, leprosy, skin diseases, and thirst are all benefits of *Butea monospermalinn*. flowers. Triterpenes, flavonoids, and glycosides such as butein, butin, isobutrin, coreopsin, isocoreopsin, sulphurein, monospermoside, isomonospermo-side, chalcones, aurones, and steroids have been detected in floral extract of *B. monosperma* (Tiwari *et al.*, 2019).

As the most vulnerable area of our body to pathogens, our skin need protection from illnesses, particularly acne-causing bacteria. Acne has been identified as the most frequent skin problem that 85% of today's youngsters face. They can last throughout adulthood and primarily affect the areas with the most oil glands, such as the face and neck (Kumar *et al.*, 2015).

Tridax procumbens Linn. (family Compositae) is a weed that grows throughout India. It is also called as the Coat buttons. The plant originated in tropical America and has since spread to tropical Africa, Asia, and Australia. Local name is "Ghamara," which translates to "coat buttons" in English. Traditionally it is used to treat bronchial catarrh, dysentery, malaria, diarrhoea, high blood pressure and to stop bleeding from cuts, bruises, and wounds as well as to prevent hair loss (Sawant and Godghate, 2013). This plant's ethanol and methanol extracts have been shown to exhibit antioxidant action.This weed extracts in aqueous, ethanol, and methanol had antibacterial action against *Escherecia coli* (Andriana *et al.*, 2019).When we concentrate on the uses and acceptability of this plant in rural areas of the country, we must also accept that its compliance and mode of application remain difficult. When it comes to dosage form, gel becomes an excellent choice. There are various types of gel which benefits over other dosing methods (Lohitha *et al.*, 2011).

The formulation was created using the *Tridax procumbens* Linn. ethanolic extract's rutin-rich fraction. Because of their numerous

pharmacological characteristics, the leaves are also extensively utilised for therapeutic purposes.Analgesic, anti-anemic, anti-arthritic, anti-diabetic, antihypertensive, anti-inflammatory, antioxidant, antimicrobial, antipyretic, hepatoprotective, hypocholesterolemic, and weight-loss characteristics are among them.

Psidium guajava, frequently known as 'guava plant', is a tiny evergreen shrub in the *Myrtaceae* family. It is a major natural source of many bioactive chemicals. *P. guajava* mature leaf extracts have been demonstrated to exhibit antibacterial activities. The leaves, fruits, barks, and roots of the *P. guajava* plant have long been used to cure many ailments in Africa, Asia, and South America, either as a topical application or orally as a decoction, infusion, and cooked preparation. It also has the antioxidant property. The use of antioxidants on the skin is another key technique for preventing damage caused by oxidative stress. A high concentration of antioxidants in skin care products enables for epidermal and dermal penetration. The primary advantage of topical treatment over oral administration for treating and preventing skin disorders is direct delivery of bioactive molecules to the target area, which eliminates worries about systemic circulation. In many nations, various components of the guava tree, such as the roots, leaves, bark, stem, and fruits, have been used to treat stomachaches, diabetes, diarrhoea, and other health problems (Díaz-de-Cerio, 2017).

Plant preparations and pure phytochemicals are currently gaining popularity in the cosmetic, pharmaceutical, and nutraceutical industries (Yogesh *et al*., 2012). By 2022, the plant preparation market was expected to increase to roughly USD 86.74 billion.The India biostimulants market is expected to increase at a CAGR of 15.57% during the forecast period, from $266.58 million in 2022 to $734.13million in 2029.The benefits of gel dosage form over other dosage forms include less removable irritancy, softening the skin and ease of administration (Ghosh *et al*., 2019).

Materials and Methods

Collection of plant:

The plants used are widely occurs in the all parts of the India. *Butea monosperma* flowers, leaves of the *Tridax procumbens* and the *Psidium guanjava* was collected in the month of Decmber and January from the medicinal garden of the Datta Meghe Ayurvedic Medical College, Wanadongri, Nagpur, India. 1 kg of *Butea monosperma* flowers were collected, fresh flowers were used for anatomical research and the remaining flowers were dried under shade and pulverised using a mechanical grinder, with the resultant powder stored in an airtight container for powder microscopy evaluation. About 1 kg of *Tridax procumbens* and *Psidium guavajava* leaves were collected from the garden and then dried under shade and coarse powder was prepared. The coarse powder was passed through the seieve no. 40. The powder passed through seive was collected and stored in the air tight container to check the powder characteristics.

Preparation of Extract:

10 g of of *Butea monosperma* flowers powder was subjected to the soxhlet apparatus in the solvent ethanol then it was kept for about 36 h to complete the extraction process. After completion the extract was stored in the incubator at normal temperature.The shade dried powder of the *Psidium guajava* linn.was taken and plant material was extracted by using the soxhlet apparatus. About 12–15g of powder is taken. The extraction process was for minimum 24 h.

The soxhlet extractor was set up to obtain the ethanolic extract of *Tridax procumbens* leaves. 15 g of coarsely powdered *Tridax procumbens* leaves were loaded into the thimble and then the thimble was placed into the main chamber of soxhlet extractor. 150 ml of ethanol was added to round bottom flask and placed on a heating mantle. The soxhlet extractor was attached to the round bottom flask. A reflux condenser was attached above the extractor with a cold water inlet attached at the lower end and the outlet above the

Table 1: Characteristics of leaf powder of *Tridax procumbens*, *Psidium guajava* and powder of flower of *Butea monosperma*

S. No.	Reagents	Observation	Characteristics
1.	Phoroglucinol + Conc. HCl	Red, Pink	Lignified xylem, lignified pericyclifibrous vessels(VB) and xylem of VB
2.	HCL or Dil. HCl	Crystals get dissolved	Calcium Oxalate
3.	Sulphuric Acid (60% w/w)	Formation Of Needle shaped Crystals of calcium Sulphate.	Calcium Oxalate
4.	Dil. Acetic Acid	Insoluble crystals	Calcium Oxalate crystals
5.	Dil. Iodine solution	Blue	Starch in endodermis
6.	BaljetTest: A thick section of sodium picrate solution	Yellow or Orange color.	Cells cotaining glycosides
7.	Ruthenium Red	Red/Pink	Mucilage cells of epidermis
8.	Alcoholic Picric acid	Yellow	Akeurone grain present in the cells of endosper and embryo
9.	Dil. Iodine + Conc. Sulphuric acid	Blue	Hemicellulose endospermic walls
10.	Strong KOH solution	Needle shaped potassium Eugenate Crystals	Eugenol of volatile oil
11.	Conc. H_2SO_4	Green	Stone cells
12.	Acetic Acid or HCl	Dissolve with effervescent	Stone cells

solvent was heated to reflux and extract, till the extract became colorless (Khandelwal and Sethi, 2013).

Macroscopic Examination:

(i) *Butea monosperma Flowers*: They start appearing in the month of February and hold on up to the last Week of April. The colour is Reddish Orange, taste very Bitter, Shape Aligned in a cluster or raceme form and size 4 cm long (Burli and Khade, 2007).

(ii) *Tridax procumbens*: Colour is Dark green, Taste Bitter, Size (Leaves) 1 to 2 cm long and Shapes of leaves are opposite, simple, carried by a petiole, they are thick and soft (Talekar *et al.*, 2012).

(iii) *Psidium guajava leaves*: Colour is Dark green, Taste Sweet and Aromatic, Size (Leaves) 7 to 8 cm long and Shape Oval to oblong leaves (Metwally *et al.*, 2010).

Microscopy:

The microscopical properties of the leaf powder of *Tridax procumbens*, *Psidium guajava* and characteristics of powder of flower of *Butea monosperma* were studied and results are shown in Table 1.

Physicochemical Investigation:

Total ash, acid insoluble ash, water soluble ash, loss on drying, extractive values were determined.

(a) *Determination of Total Ash*:

Inorganic radicals including phosphates, carbonates, sodium, potassium, magnesium and calcium silicates, among others were present in ash. Since they are present in a specific crude medication in a known quantity, their standardisation can be aided by quantitative determination in terms of different ash values.

i. Weighed and ignited flat, thin, porcelain dish or a tared silica crucible.
ii. Weighed about 4 g of the powdered drug into the dish/crucible.
iii. Supported the dish on a pipe-clay triangle placed on a ring of retort stand.
iv. Heated with a burner, using a flame about 2 cm high and supporting the dish about 7 cm above the flame, heated till vapours almost ceased to be evolved; then lowered the dish and heated more strongly until all the carbon was burnt off.

v. Cooled in a desiccator.

vi. Weighed the ash and calculated the percentage of total ash with reference to the air dried sample of the crude drug (Khandelwal and Sethi, 2013).

(b) *Acid Insoluble ash Value*:

Ash was boiled with 25 ml dil. HCl, filtered and collected the insoluble matter on Ashless filter paper. Washed residue with hot water, ignited, cooled and weighed and kept on filter paper, heated until the carbon has been removed. Carbon free from ash and cooled in desiccator and weighed residues (Khandelwal and Sethi, 2013).

(c) *Water Soluble Value*:

Ash was boiled with 25 ml of water for 5 min. Filtered through ash less filter paper, washed the residue twice with hot water, ignited china dish flame, cooled, weighed and kept on filter paper, heated until carbon has been removed from ash and cooled in desiccator and weighed the residue (Khandelwal and Sethi, 2013).

(d) *Extractive Values*:

When no other approach can be utilized to evaluate the value of crude pharmaceuticals, extractive values are used. Different solvent extractive values are used to analyse quality, purity, and to detect adulteration caused by depleted and improperly processed pharmaceuticals.

(i) *Alcohol Soluble Extractive value*:

The alcoholic extract was prepared by mixing 5 g of *Tridax procumbens* with 250 ml of 70% ethanol for 24 h. This mixture was filtered by funnel using filter paper (Whatman No. 185). 25 ml filtrate was added to porcelain by heating on water bath and evaporated it in the oven at 105 ℃ for 6 h. Cooled in dessiccator for 30 min. Weighed the ash and calculated %W/W of extractive with reference to the air dried drug.

(ii) *Water soluble Extractive Value*:

The extract was prepared by mixing 5 g of *Tridax* powder with 250 ml of chloroform for 12 h. This solvent was filtered by Bruchner funnel using filter paper (Whatman No. 185). 25 ml filtrate was added to porcelain by heating on water bath, evaporated to dryness and dried in oven 105 ℃ for 6 h, cooled in dessiccator for 30 min and weighed (Khandelwal and Sethi, 2013).

(e) *Determination of Swelling Index*:

The term swelling factor gives an idea about the mucilage content of the drug hence, it is useful in the evaluation of crude drugs containing mucilage. Take 1 g of the powder in a 25 ml stoppered cylinder. Added water up to 25 ml marking. Shaked occasionally during 23 h. Keep aside for one hour. Measure the volume occupied by the swollen seed.

Swelling factor = Final volume – Initial volume

(f) *Loss on Drying*:

Gravimetric Method was used. Weighed about 2 g of the powdered drug into a weighed flat porcelain dish. Dried in the oven at 100 ℃ or 105 ℃ until two consecutive weighings do not differ by more than 0.5 mg. Cooled in a desiccators and weighed. The loss in weight is usually recorded as moisture.

Per cent LOD = Moisture content /Initial weight of crude drug *100

Preliminary Phytochemical Screening:

(i) *Tests for carbohydrates*:

Molisch's test: To 2-3 ml aqueous extract, added few drops of alpha-naphthol solution in alcohol, shaked and added conc. H_2SO_4 from sides of the test tube. Violet ring is formed at the junction of two liquids (Khandelwal and Sethi, 2013).

(ii) *Tests for reducing sugars*:

(a) Fehling's test: Mix 1 ml Fehling's A and 1 ml Fehling's B solutions, boil for one minute. Added equal volume of test solution. Heated in boiling water bath for 5-10 min. First yellow, then brick red precipitate is observed.

(b) Benedict's test: Mixed equal volume of Benedict's reagent and test solution in test tube. Heated in boiling water bath for 5 min. Solution

appeared green, yellow or red depending on amount of reducing sugar present in test solution.

(iii) *Tests for proteins*:

(a) Biuret test: To 3 ml test solution added 4% NaOH and few drops of 1% $CuSO_4$ solution. Violet or pink colour appeared.

(b) Precipitation test: The test solution gives white colloidal precipitate with Absolute alcohol, 5% HgCl solution, 5%, $CuSO_4$ solution, 5% lead acetate and 5% ammonium sulphate.

(iv) *Tests for amino acids*:

(a) Ninhydrin test: Heated 3 ml test solution and 3 drops of 5% Ninhydrin solution, boiled in the water bath for 10 min. Purple or bluish colour appeared.

(b) Test for tyrosine: Heated 3 ml test solution and 3 drops Millions reagent. Solution showed dark red colour.

(c) Test for cysteine: To 5 ml test solution added few drops of 40% NaOH and 10% lead acetate solution. Boiled the solution, Black precipitate of lead sulphate was formed (Khandelwal and Sethi, 2013).

(v) *Tests for steroid*:

(a) Salkowski reaction: To 2 ml of extract added 2 ml chloroform and 2 ml conc. H_2SO_4, shaked well. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence.

(vi) *Tests for cardiac glycosides*:

(a) Keller – Killani test: To the extract added glacial acetic acid, one drop of 5% $FeCl_3$ and Conc. $H2SO_4$, reddish brown colour appeared at junction of the two liquid layers and upper layer appeared bluish green.

(vii) *Tests for saponin glycosides*:

(a) Foam test: Shaked the drug extract or dry powder vigorously with water. Persistent stable foam observed.

(viii) *Tests for alkaloids*:

(a) Dragendorff's test: To 2-3 ml filtrate, added few drops Dragendorff's reagent. Orange brown precipitate was formed.

(b) Mayer's test: Mixed 2-3 ml filtrate with few drops of Mayer's reagent. White precipitate was formed.

(c) Hager's test: 2-3 ml filtrate with Hager's reagent formed yellow precipitate .

(d) Wagner's test: 2-3 ml filtrate with few drops Wagner's reagent formed reddish brown precipitate.

(ix) *Test for polysaccharides*:

(a) Barfoed's test: Mixed equal volume of Barfoed's reagent and test solution. Heated for 1-2 min in boiling water bath and cooled. Red precipitate was formed.

(x) *Test for flavonoids*:

(a) Shinoda test: To the extract added 5 ml 95% ethanol/t-butyl alcohol, few drops conc. HCl and 0.5 g magnesium turnings. Orange, pink, red to purple colour appeared (flavonols, dihydro derivatives and xanthenes). Added t-butyl alcohol before adding the acid to avoid accidents from a violent reaction and to dissolve the coloured compounds into the upper phase. By using zinc instead magnesium, only flavanols give a deep red to magenta colour while flavanones and flavonols gave light pink to magnetic colour or no color.

(b) Sulphuric acid test: On addition of sulphuric acid (66% or 80 %), flavones and flavono dissolved into it and give a deep yellow solution. Chalcones and aurones gave red or red bluish solutions. Flavones gave orange to red colour.

(xi) *Tests for tannins and phenolic compounds*:

(a) 5% FeCl solution: Deep blue-black colour

(b) Lead acetate solution:White precipitate

(c) Gelatin solution: White precipitate

(d) Bromine water: Decolouration of bromine water

(e) Acetic acid solution: Red coloured solution.

Thin Layer Chromatography:

Obtained pre-coated silica gel plates. Spots were created using the standard and samples on the plate after marking it 1 cm from the bottom. The plate was then loosely suspended in the solvent and ran until it reached the 3/4 position. The spraying agent was Ninhydrin, which was applied liberally to the plate (3% ninhydrin in 100 ml butanol with 3 ml acetic acid) and then allowed to dry. The Rf value was determined by measuring the distance that the solute and solvent travelled after the colored spots appeared (Shanmugapriya and Maneemegalai, 2017).

(i) *TLC for the Butea monosperma extract*:

The mobile phase used for the TLC of the *Butea monosperm* is ethyl acetate:methanol: Water in the ratio of 100:15:5, respectively (Lohitha *et al*., 2011).

(ii) *TLC for the Tridax procumbens extract*:

The mobile phase used for the TLC of the *Tridax procumbens* is ethyl acetate and hexane in the ratio of 1:3, respectively (Ghosh *et al.*, 2019).

(iii) *TLC for the Psidium guajava Extract*:

The mobile phase used for the TLC of the *Psidium guajava* is benzene, chloroform and ethyl acetate in the ratio of 4:3:3, respectively (Sarkar *et al*., 2011).

Antimicrobial Activity of Ethanolic Extracts:

Antibacterial and antifungal activities were determined using the agar diffusion technique. *Pseudomonas aeruginosa* was used provided by the Department of Microbiology, Nagpur College of Pharmacy, Wanadongri, Hingna Road, Nagpur.

To check the antimicrobial activity of the extract following procedure was used:

5 g of agar was weighed and added to the distilled water with continuous stirring. Then keep aside for some time and then sterilized in the autoclave at 121° at 15 micro pressure for 15 min. After the sterilization poured the agar media in the sterilized petri plates and keep aside tosolidify. Then performed the inoculation with sterile inoculating loop. Then placed it in an incubator for 24 h at 45°. After 24 h added the extract of *Butea monosperma*, *Tridax procumbens* and *Psidium guajava* in well made by Bore instrument. Allowed to incubate for 24 h, checked the antimicrobial activity (Metwally *et al.*, 2010).

Formulation and Evaluation:

(i) *Formulation for placebo gel*:

To prepare placebo gel the carbapol 934 is mixed with 50 ml of water and continuous stirring on the heating mantle and then added the methyl paraben and propyl paraben and mixed it. Placed the placebo gel for 2 h (Table 2).

Table 2: Formulation of Gel

S. No.	Ingredients	Quantity
1	Carbapol 934	1g
2	Propylene Glycol	10 ml
3	Methyl Paraben	0.2 g
4	Propyl Paraben	0.1 g
5	Glycerin	1 ml
6	Triethanolamine	Q.S
7	Rose water	Q.S
8	Water	Q.S

(ii) *Procedure for formulation*:

(a) To prepare the herbal gel carbapol 934 weighed and dispersed in required amount of distilled water with continuous stirring on heating mantle.

(b) 5 ml of distilled water was taken and 0.1g propyl paraben and 0.2 methyl paraben were dissolved by heating on water bath and mixed it into carbapol 934 gel with continuous stirring. Added 1 ml of glycerin.

(c) Take extract of *Tridax procumbens*, *Butea monosperma* and *Psidium guajava* in 10 ml of propylene glycol which was then added in polymer dispersion and remaining quantity of water was then added.

(d) Finally full mixed ingredients were mixed properly to the carbapol 934 gel with continuous stirring and added triethanolamine

drop wise to the formulation to have stable pH i.e. 6.8 – 7 (Shaikh *et al.*, 2018).

(iii) *Evaluation*:

According to the guidelines, the standards were prescribed for each evaluation test as following:

(a) *Organoleptic Test*:

The preparation's flavour, colour, and texture were evaluated by organoleptic tests (Sindhia and Bairwa, 2010).

(b) *pH Test*:

The test was conducted using a universal pH that was fully submerged in a diluted gel sample before being used to determine whether the result matched the universal pH standard. The preparation's pH must be between 4.5 and 6.5 to match the skin's pH (Sindhia and Bairwa, 2010).

(c) *Spreadability*:

In order to perform the spreadability test, a specific amount of the substance was placed on a glass scale. The load is then raised, the top is given the same glass, and a further 1-2 min was added. When the preparation stops spreading, the dispersion diameter is then measured at each additional load. Spreading out more widely demonstrates its capacity to distribute equally. 5-7 cm^2 is an excellent spreadability area. The gel is placed in the centre of a glass scale instrument and weighed at a maximum of 0.5 g. Then, for a period of 1-2 min, the load was increased at the top while still giving it the same glass. Additionally, the dispersion diameter was regularly assessed after every incremental load when the preparation stopped spreading after a predetermined length of time.

The spreadability (Lavhale and Mishra, 2007) is expressed by the formula:

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

Where S = Spreadability; T = Time taken; M= Weight applied; L = Length moved on glass slide.

(d) *Viscosity*:

The viscosity of gel was determined by Brookfield rotational viscometer. Rpm set to check the viscosity of gel was 6, 12, 30. Each reading was taken after equilibrium of the sample at the end of 2 min. The samples were repeated three time (Shahnawaz *et al.*, 2017).

Results and Discussion

(i) *Characteristics of crude drug*: Table 3 illustrates characteristics of the powder of the *Butea monosperma, Psidium guajava* and *Tridax procumbens.*

(ii) *Physico- chemical Investigation*: Table 4 depicts the physico-chemical characteristics of *Butea monosperma, Psidium guajava* and *Tridax procumbens.*

(iii) *Preliminary Phytochemical Screening*: The preliminary phytochemical screening of *Butea monosperma, Psidium guajava* and *Tridax procumbens* are given in Table 5.

(iv) *Thin Layer Chromatography*:

TLC for the extracts (Table 6, Fig. 1) of the *Butea monosperma*, *Tridax procumbens* and *Psidium guajava* was performed and the Rf value was measured.

Rf = Distance travelled by the compound/distance travelled by the solvent.

(v) *Antimicrobial Activity of plant extract*:

The antimicrobial activity of the *Butea Monosperma*, *Tridax procumbens* and the *Psidium guajava* was performed (Fig. 2) in the laboratory of Pharmacognosy, Department of the Nagpur College of Pharmacy, Wanadongri, Nagpur.

The antimicrobial activity in the *Tridax procumbens* is observed by forming the band around the inoculated area of the extract however, the results of the *Psidium guajava* and the *Butea monosperma* failed to show antimicrobial activity.

(vi) *Formulation of Herbal Night Gel*:

Table 7 depicts the quantity of contents taken for the formulation of gels (Fig. 3). The quantity of extract taken for preparation of gels has been

Table 3: Powder Characteristics of crude drugs

S. No.	Reagents	Observation	*Butea monosperma*	*Psidium guajava*	*Tridax procumbens*
1.	Phoroglucinol + Conc. HCl	Red, Pink	+	+	_
2.	HCL or Dil.HCl	Crystals get dissolved	+	+	+
3.	Sulphuric Acid (60% w/w)	Formation Of Needle shaped Crystals of calcium Sulphate.	+	+	+
4.	Dil. Acetic Acid	Insoluble crystals	_+	_+	_+
5.	Dil. Iodine solution	Blue	_	_	_
6.	Baljet Test: A thick section of sodium picrate solution	Yellow or Orange color.	_	+	_
7.	Ruthenium Red	Red/Pink	+	-	+
8.	Alcoholic Picric acid	Yellow	+	+	_
9.	Dil. Iodine + Conc. Sulphuric acid	Blue	+	+	+
10.	Strong KOH solution	Needle shaped potassium Eugenate Crystals	+	+	_
11.	Conc. H_2SO_4	Green	-	+	-
12.	Acetic Acid or HCl	Dissolve with effervescent	+	+	+

Table 4: Physico chemical Investigation of herbal drugs

S. No	**Physico chemical Investigation**	***Tridax procumbens***	***Butea monosperma***	***Psidium guajava***
1.	Total Ash (% W/W)	35%	10	12.5%
2.	Acid Insoluble Ash Value(% W/W)	16.65%	3.275%	4%
3.	Water Soluble Ash Value(% W/W)	10.85%	3.67%	4.62%
4.	Loss on drying(% W/W)	4.1%%	7.94%	9.8%
6.	Alcohol Soluble extractive value(% W/W)	5.88%	33.24%	14.6%
7.	Water soluble extractive(% W/W)	16.5 %	30.6%	15.3 %
8.	Swelling Index	4ml	5ml	2ml

Table 5: Preliminary phytochemical screening

S. No.	Tests for	Tests	*Butea monosperma*	*Tridax procumbens*	*Psidium guajava*
1.	Carbohydrates	Molish	-	-	-
		Fehling	+	-	+
		Benedicts	+	+	+
		Iodine (Polysaccharide)	-	-	-
		Barfoeds Test	-	+	-
2.	Proteins	Biuret	-	-	-
		Millon's Test	+	-	+
3.	Mucilage	Water- Swell			
4.	Amino Acids	Ninhydrin	+	+	+
		Test for tyrosine	-	+	+
		Cysteine	+	+	+
5.	Steroid	Salkowaski Reaction	+	+	+
6.	Tannins & Phenolic Compounds	$FeCl_3$	+	-	+
		Bromine Water	-	-	-
		Acetic Acid	-	+	+
		Lead Acetate	+	+	+
7.	Alkaloids	Dragendroff's Reagent	+	-	-
		Mayer's Reagent	-	+	-
		Hager's Reagent	-	-	+
		Wagner's Reagent	+	-	-
8.	Glycosides	Killer- Killani	+	+	+
		Foam test	+	+	+

Table 6: Observations of TLC

S. No.	TCL Performed	Rf value
1.	*Tridax procumbens*	0.40
2.	*Psidum guajava*	0.54
3.	*Butea monosperma*	0.65
4.	*Formulation*	0.53

shown in Table 8.

Evaluation of the Formulation:

(i) *Organoleptic Tests*: Colour, odour and texture of various formulations are shown in Table 9.

(ii) *pH*:

The pH of the preparation was measured by the digital pH meter and shown in Table 10.

(iii) *Viscosity*:

The viscosity of the preparations were determined by setting the different RPM of the Brokfield viscometer and shown in Table 11.

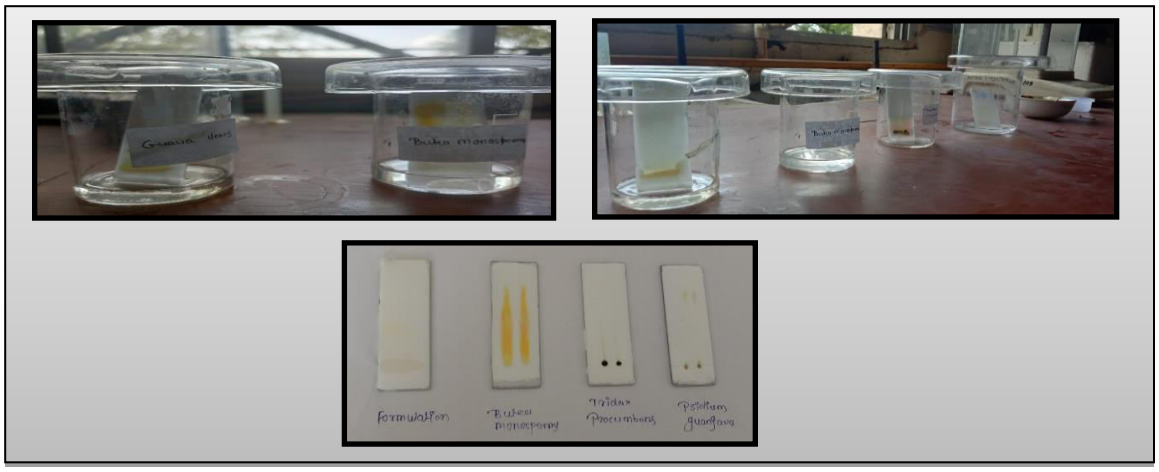

Fig. 1: Thin Layer Chromatography of plant extracts.

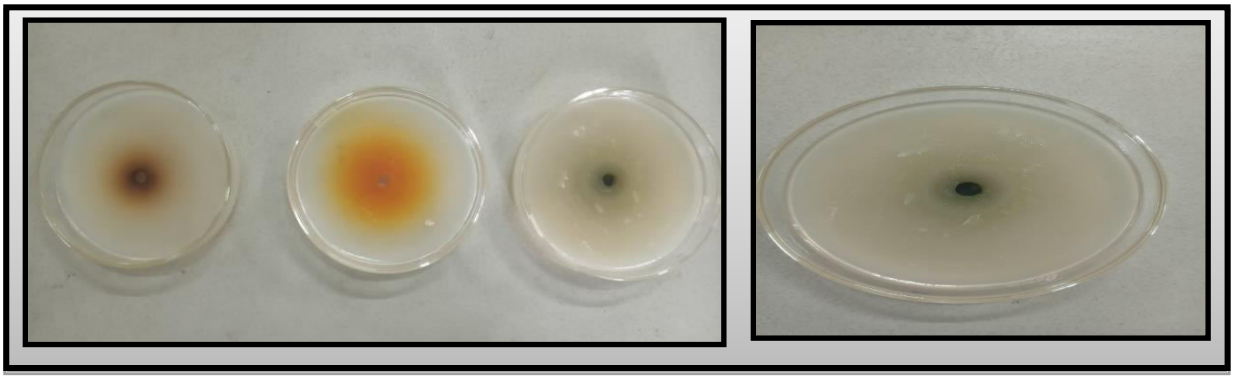

Fig. 2: Antimicrobial activity of drugs.

Table 7: Formulation of herbal gels

S. No.	Ingredients	F1	F2	F3	F4
1	Extract	0.3 g	0.6 g	1.5 g	-
2	Carbapol 934	1 g	1 g	1 g	1 g
3	Propylene Glycol	10 ml	10 ml	10 ml	10 ml
4	Propyl Paraben	0.1 g	0.1 g	0.1 g	0.1 g
5	Methyl Paraben	0.2 g	0.2 g	0.2 g	0.2 g
6	Glycerin	1 ml	1ml	1ml	1 ml
7	Triethanolamine	Q.S	Q.S	Q.S	Q.S
8	Water	Q.S	Q.S	Q.S	Q.S
9	Rose water	Q.S	Q.S	Q.S	Q.S

Fig. 3: Formulations of different concentration.

Table 8: Quantity of extract taken for preparation of formulation

S. No.	Extract	F1	F2	F3
1.	*Tridax procumbens*	0.1 g	0.2 g	0.5 g
2.	*Psidium guajava*	0.1 g	0.2 g	0.5 g
3.	*Butea monosperma*	0.1 g	0.2 g	0.5 g

Table 9: Organoleptic test of formulation

S. No.	Formulation	Colour	Odour	Texture
1.	F1	Green	Fresh smell	Thick Smooth
2.	F2	Light Green	Fresh smell	Thick Smooth
3.	F3	Dark Green	Fresh smell	Thick Smooth
4.	F4	White	Fresh smell	Thick Smooth

Table 10: pH of different formulations

S. No.	Batch	Normal Range	pH
1.	F1	6.8 -7	7.5
2.	F2	6.8 -7	7.1
3.	F3	6.8 -7	6.5
4.	F4	6.8 -7	6.0

Table 11: Viscosity of different formulations

S. No.	Batch	RPM		
		6	12	30
1.	F1	26400mpa's	17450mpa's	11640mpa's
2.	F2	69900mpa's	48850mpa's	19660mpa's
3.	F3	18500mpa's	13149mpa's	75000mpa's
4.	F4	98400mpa's	49150mpa's	19640mpa's

(iv) *Spreadibility*:

Mass of the object placed on the glass slide is about 112 g and time to place the weight on the glass slides is 5 min. Spreadibility of the formulation is given in Table 12 and Figure 4.

The current study brief's about the benefits of herbal cosmetics over synthetic ones as well as it highlights about the pharmacognostical characterization of *Butea monosperma*, *Tridax procumbens* and *Psidum guajava* along with its collection, extraction, physico-chemical investigation, microscopy, macroscopy, Thin Layer Chromatography, antimicrobial activity of ethanolic extracts and its preliminary phytochemical screening. Carbapol-934 gel with addition of methyl paraben, propyl paraben in 50 ml of water acts as the base for the formulation

Table 12: Spreadibility of formulations

S. No.	Batch	Spreadibility
1.	F1	76.16
2.	F2	78.4
3.	F3	64.96
4.	F4	67.2

Fig. 4: Spreadability of Formulations.

which helps in providing positive effects on the skin such as moisturization as well as soothening effects, and the extract of the crude drugs incorporated into the base gives various therapeutic effects on the skin. The crude drug extracts of all the three drugs were studied thoroughly for the presence of various chemical constituents and physicochemical characteristics in it and also its antioxidant and antimicrobial properties. From the above observation it has been concluded that the use of natural ingredients over synthetic gives minimal side effects and rapid healing of the skin without causing any irritation. The formulation was developed at room tempreature and was studied for various evaluation parameters. At room temperature the formulation was observed for changes in its colour, odour, texture and appearance and there was no noticeable change observed hence, it was found to be stable. It can be easily stored and used by any person not only for the prevention of the diseases but also as the daily skin care product.

Conclusion

In conclusion, the formulation and evaluation of the herbal night gel have been successfully carried

out, incorporating a blend of natural and botanical ingredients known for their therapeutic properties. The objective of this study was to develop a safe and effective night gel that could provide various benefits to the skin such as moisturization, rejuvenation and improved overall skin health. Through a systematic approach, a suitable formulation was developed using a combination of herbal extracts, essential oils and other plant-derived ingredients. These components were carefully selected based on their individual properties and compatibility with each other. The gel formulation was prepared using appropriate techniques and standardized to ensure consistency and quality. The evaluation of the herbal night gel involved several tests and assessments to determine its efficacy and safety. The physical characteristics, such as appearance, color and texture, were evaluated to ensure a pleasant user experience. The pH level was also measured to confirm its compatibility with the skin's natural pH. Overall, the formulation and evaluation of the herbal night gel proved successful, demonstrating its potential as a safe and effective skincare product. The combination of herbal extracts and natural ingredients in the gel formulation showed promising results in terms of moisturization, rejuvenation and overall skin health improvement. Further studies, including long-term stability testing and clinical trials, are recommended to validate and substantiate these findings before commercialization.

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