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FORMULATION AND EVALUATION OF POLYHERBAL WET WIPES FOR TOPICAL APPLICATION.

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❖Abstract

The present study focuses on the formulation and evaluation of polyherbal wet wipes for topical application using natural medicinal plant extracts. Wet wipes are widely used for personal hygiene and skin care due to their convenience and ease of use. However, conventional wipes often contain synthetic chemicals that may cause skin irritation and adverse effects. Therefore, this research aims to develop a safe, effective, and eco-friendly alternative using herbal ingredients.

In this study, polyherbal wet wipes were prepared using extracts of Neem (Azadirachta indica), Tulsi (Ocimum sanctum), Turmeric (Curcuma longa), and Amarkand (Eulophia herbacea), which are well known for their antimicrobial, anti-inflammatory, antioxidant, and wound healing properties. The plant materials were collected, dried, powdered, and extracted using the decoction method. The formulated extracts were incorporated into a wet wipe solution containing suitable excipients such as glycerin, ethanol, and distilled water, followed by impregnation into non-woven fabric sheets.

Preformulation studies, including bulk density, tapped density, Carr's index, Hausner's ratio, angle of repose, ash value, and solubility, were carried out to evaluate the properties of the herbal powders. The prepared wet wipes were further evaluated for various parameters such as organoleptic properties, pH, moisture content, spreadability, thickness, antimicrobial activity, and skin irritation.

The results indicated that the formulated polyherbal wet wipes showed satisfactory physicochemical properties, were skin-friendly with a pH range of 5.5–6.5, and exhibited good antimicrobial activity against selected microorganisms. The formulation was found to be safe, effective, and suitable for topical use without causing irritation.

In conclusion, polyherbal wet wipes offer a promising natural alternative to synthetic wipes, providing enhanced safety, therapeutic benefits, and eco-friendly characteristics for daily personal hygiene and skin care applications.

❖Key Words :-

Wet wipes, Anti-inflammetort, Anti-Oxidant, *Curcuma lounga*, *Eulophia herbaceae*, *Ocimum sanctum*, *Azadirachta indica* .

1.Introduction

Wet wipes are convenient hygienic products used for cleaning the skin and maintaining personal hygiene. In recent years, there has been increasing demand for herbal wet wipes due to their safety, natural origin, and minimal side effects.

Wet wipes are non-woven fabrics impregnated with liquid formulations containing active ingredients, preservatives, surfactants, and moisturizing agents. They are widely used for personal hygiene, infant care, medical cleansing, and dermatological applications. Natural wet wipe formulations that are safer, skin-compatible, and environmentally friendly.

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Herbal wet wipes prepared using medicinal plants such as Tulsi (*Ocimum sanctum*), Neem (*Azadirachta indica*), Turmeric (*Curcuma longa*), and Amarkand (*Eulophia herbecea*) are especially beneficial because of their antimicrobial, anti-inflammatory, and skin-protective properties. Tulsi and Neem help in preventing microbial infections, Turmeric acts as a natural antiseptic and healing agent, while Amarkand provides soothing and moisturizing effects. Thus, herbal wet wipes containing these ingredients offer an effective, natural, and eco-friendly alternative to synthetic wipes for daily personal hygiene and skin care.

Neem (*Azadirachta indica*) has strong antimicrobial, anti-inflammatory, and wound healing properties due to bioactive compounds like nimbidin and *azadirachtin*, making it useful for treating skin infections, acne, eczema, and wounds.

Tulsi (*Ocimum sanctum*) possesses antimicrobial, antioxidant, and anti-inflammatory effects, with proven activity against bacteria, fungi, and viruses, and is gentle and soothing for sensitive skin.

Turmeric (*Curcuma longa*) shows strong anti-inflammatory, antimicrobial, and wound healing activity through *curcumin*, though its poor solubility limits use; topical systems like wet wipes can improve its local effectiveness.

Eulophia herbacea is a traditionally used but underexplored plant with wound-healing and anti-inflammatory potential, adding novelty to the formulation.

A polyherbal combination of Neem, Tulsi, Turmeric, and Amarkand offers synergistic antimicrobial, anti-inflammatory, and wound-healing effects with reduced irritation risk. Polyherbal wet wipes provide an innovative, convenient, and eco-friendly topical drug delivery system for skin cleansing, wound care, and infection prevention.

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(A) **(B)**

Fig no.1 Wet Wipes

Anatomy and Physiology of Skin:

The skin is the largest organ of the body, accounting for about 15% of the total adult body weight. It has a surface area of about 1.5 to 2 m^3 in adults and it includes glands, hair and nails. It performs many vital functions, including protection against external physical, chemical, and biologic assailants, as well as prevention of excess water loss from the body and a role in thermoregulation. The skin is continuous, with the mucous membranes lining the body's surface. The integumentary system is

formed by the skin and its derivative structures. The skin is composed of three layers: the epidermis, the dermis, and subcutaneous tissue. The outermost level, the epidermis, consists of a specific constellation of cells known as keratinocytes, which function to synthesize keratin, a long, threadlike protein with a protective role. The middle layer. the dermis, is fundamentally made up of the fibrillar structural protein known as collagen. The dermis lies on the subcutaneous tissue, or panniculus, which contains small lobes of fat cells known as lipocytes. The thickness of these layers varies considerably, depending on the geographic location on the anatomy of the body. The eyelid, for example, has the thinnest layer of the epidermis measuring less than 0.1 mm, whereas the palms and soles of the feet have the thickest epidermal layer, measuring approximately 1.5 mm. The dermis is thickest on the back, where it is 30-40 times as thick as the overlying epidermis.

Structure of Skin:

The human skin structured of following layers-

- Epidermis
- The Dermal-Epidermal Junction
- Epidermal Appendages
- Dermis
- Subcutaneous
- Fat

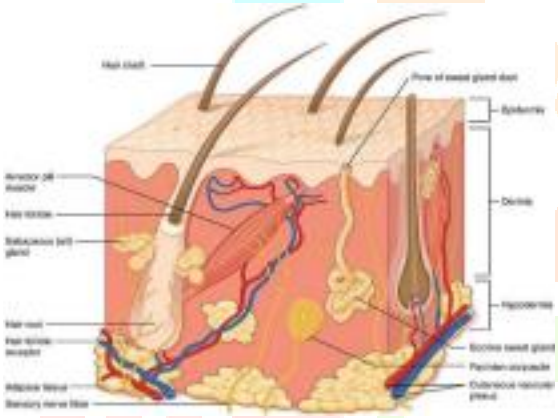

Fig no. 2. Anatomy of skin

Wet Wipes:

Wet wipes, also known as moist towelettes or wet tissues, are small pieces of nonwoven fabric pre-moistened with a cleansing or disinfecting solution. They are widely used for personal hygiene, baby care, cosmetic purposes, surface cleaning, and medical disinfection.

Their convenience, portability, and ready-to-use nature make them a popular alternative to traditional washing methods.

1.Component of wet wipes

Nonwoven Fabric Base	Acts as the wipe material made from viscose, polyester, polypropylene, or blends. Provides softness, strength, and absorbency.
Cleansing/Disinfecting Solution	Contains water (as solvent) plus ingredients like surfactants, humectants, preservatives, and fragrances.
Humectant:	Prevent the wipe from drying out (e.g., glycerin, propylene glycol).

Preservatives	Prevent microbial growth in the moist environment (e.g., noxyethanol).
Fragrances & Soothing Agents	Enhance user experience (e.g., aloe vera,chamomile extract).

2.Types of Wet Wipes

Baby Wipes	Mild and gentle, formulated for sensitive skin.
Cosmetic Wipes	Used for makeup removal, cleansing or Exfoliating
Antibacterial/Disinfectant Wipes	**Contain alcohol or antimicrobial agents for sanitizing hands or surfaces.**
Personal Hygiene Wipes	For refreshing and cleaning the body when water isn't available
Medical/Clinical Wipes	Used in hospitals for disinfection or pre Surgical cleaning.
Household Wipes	For surface cleaning (kitchen, bathroom, electronics).

3.Ideal properties

1. Effective cleansing and antibacterial action
2. Soft, non-irritating, skin-friendly
3. pH balanced and moisture retaining
4. Strong, durable, uniformly wet
5. Safe, stable, and eco-friendly

4.Advantages

1. Convenient and easy to use.
2. Portable and disposable.
3. Provide instant cleansing/disinfection.
4. Useful in travel and emergency situations.
5. Variety of formulations available for different needs.

5.Disadvantages

1. Non-biodegradable wipes cause environmental pollution. 2. Can clog sewage systems if flushed. 3. Skin irritation or allergy possible due to chemicals or preservatives. **4.** High cost compared to reusable alternatives.

2.Literature Review

1)SSA Salih (2025)

Has given a review paper on Detection of Anti-fungal activity of turmeric (*Curcuma Longa* L.), 2025. This study aimed to evaluate the antifungal activity of turmeric against candida species isolated from clinical specimens of patients suffering from fungal infection. Turmeric extract can inhibit Candida species, with a more pronounced impact on Candida of other species than Candida albicans. This study shows how *curcumin* works against types of Candida infections. It was discovered that using a mixture of drug formulations or *curcumin* can be helpful asits derivatives get past the medication's resistance to fungal diseases, particularly candidiasis.

2Carolina Angulo-Pineda (2025)

The article "Compositional factors driving antibacterial efficacy in healthcare wet wipe products" discusses how the design and composition of antibacterial wet wipes affect their ability to combat healthcare-associated infections. The study evaluated the mechanical properties, chemical composition, surface tension, and disinfectant release of four different commercial wet wipe products used in UK and European healthcare settings.

3.Tarkeshwar Prasad. Shukla et al (2025)

The article "Review -Phytomedicine (Neem)", published in November 2025, is a comprehensive review highlighting the extensive medicinal and economic significance of the Neem tree (*Azadirachta indica*). It discusses how traditional uses in systems like Ayurveda are supported by modern research, which identifies potent bioactive compounds such as azadirachtin and nimbolide responsible for its diverse pharmacological properties.

4.Sultan Singh et al (2024)

This article provides a comprehensive overview of Tulsi (*Ocimum sanctum*), exploring its significant medicinal properties, nutritional value, and spiritual benefits. Published as a chapter in a 2024 book on sustainable agriculture, the research highlights how Tulsi acts as an adaptogen with potent antioxidant, anti-inflammatory, and antimicrobial effects, supporting various aspects of physical and mental health.

5.Nirmal Sakshi Kailas (2024)

This Paper Present on *Eulophia Herbaceae* Used for Health Benefits" from the International Journal of Progressive Research in Engineering Management and Science (IJPREMS) can be summarized as, Antimicrobial and Anthelmintic Activities:- It has demonstrated effective antibacterial, antifungal, and antiparasitic properties, suggesting it may serve as a safe alternative remedy for various infections.

6.Prasun Sengupta (2024)

This review article discusses Tulsi (*Ocimum sanctum*), also known as the "Queen of Herbs," highlighting its dual identity in both mythological significance and medicinal

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applications. In Hindu mythology, Tulsi is revered as an incarnation of the goddess Vrinda and considered sacred for use in religious rituals.

7.Chandrakanta Mourya and Usha Kahol (2023)

Comprehensive Review on the Nutraceutical Potential Effect of Amarkand Tuber (*Eulophia Orchidaceae*)," The review concludes that Amarkand tubers, especially from *Eulophia* nuda and related species, have strong nutraceutical potential due to their rich nutritional and phytochemical composition. These tubers contain antioxidants, sugars, starch, proteins, and oils, and demonstrate medicinal properties including cardioprotective, hepatoprotective, analgesic, and anticancer effects. the traditional use of Amarkand as both food and medicine among tribal communities in India underscores its importance

8.Nita Chainani WU(2023)

Numerous studies were identified, including in vitro, animal, and human trials. *Curcumin* was found to be safe in six human trials, with no toxicity reported in a phase trial that used up to 8000 mg per day for three months. Some evidence of anti-inflammatory activity was found in human studies. Laboratory studies identified that curcumin inhibits a number of molecules involved in inflammation, such as phospholipase, cyclooxygenase 2, and tumor necrosis factor (TNF).

9.Manoj Jena et al (2022)

The article on Neem (*Azadirachta indica*) summarizes its importance as an excellent source of natural botanicals with diverse applications in traditional medicine and organic farming. Various parts of the tree (leaves, bark, seeds, and oil) contain bioactive compounds, such as azadirachtin, nimbidin, and nimbin, which possess potent anti

inflammatory, anti-bacterial, anti-fungal, and anti-viral properties.

10.Ramya K (2021)

Presented a review paper on ecofriendly wet wipes. Most wet wipes currently available on the market are made of synthetic fibers moistened with chemical solutions. Only a few brands use biodegradable fibers, and flushable wet wipes that break down in water are limited. Wet wipes finished with pure herbal extracts are still primarily in the research phase and have not yet been commercialized.

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3.PLANT PROFILE

A) Turmeric (*Curcuma longa)*

Fig 3.

Table No.1 Characteristic of *Curcuma Longa :-*

Characteristic	**Description**
Scientific Name	*Curcuma longa*
Common Name	Turmeric
Family	*Zingiberaceae*
Biological source	Rhizomes
Geographical source	India and southeast asia

Major phytoconstituents	*Curcumin*, demethoxycurcumin, volatile oil
Pharmacological activites	Wound healing ,anti inflammatory ,antioxidant ,antimicrobial.
Traditional uses	Wounds , burns ,skin infections
Role in wet wipes	Accelerates ,wound healing ,reduces inflammation ,enhances skin repair

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B) Amarkand *(Eulophia herbaceae)*

Fig.2

Table No. 2

Characteristic of *Eulophia Herbacea* :-

Characteristic	Description
Scientific Name	*Eulophia herbaceae*
Common Name	Wild *Eulophia*, Ground Orchid
Family	*Orchidacae*
Biological source	Tubers
Geographical source	Dry deciduous forests of india
Major phytoconstituents	Alkaloids ,glycosides ,flavonoids ,phenolic compounds
Pharmacological activites	Antiinflammatory, antioxidant.

Traditional uses	skin disorders
Role in wet wipes	anti inflammatory action

c) Neem (*Azadirachta indica)*

Fig .3 Neem

Table no.3

Characteristics of *Azadirachta indica*:-

Characteristic	**Description**
Scientific Name	*Azadirachta indica*
Common Name	Neem
Family	*Meliaceae* (the Mahogany family)
Biological source	Leaves
Geographical source	Widely distributed throughout india
Major phytoconstituents	Nimbidin, nimbin, ,azadirachtin, flavonoids ,tannins
Pharmacological activites	Antibacterial, antifungal ,anti inflammetry ,wound healing
Traditional uses	Skin infections , wounds , acne ,eczema

Role in wet wipes	Prevents microbial growth ,reduces inflammation ,protects skin

D) Tulsi (*Ocimum sanctum*)

Fig. 4

Table no.4

Characteristics of *Ocimum sanctum*:-

Characteristics	**Description**
Scientific name	*Ocimum sanctum*
Common name	Tulsi
Family	*Lamiaceae*
Biological source	Leaves
Geographical source	Cultivated throughout india
Major phytoconstituents	Eugenol ,ursolic acid ,rosmarinic acid ,flavonoids
Pharmacological activites	Antimicrobial ,anti inflammetry , antioxident
Traditional uses	Skin disorders ,inflamations ,wound healing
Role in wet wipes	Soothes skin ,inhances antimicrobial actions , improves skin compatibility

4.Plan of work

Literature survey
Finalization of Topic
Collection of sample
Authentification and identification of sample Pre formulation study Formulation of Wet wipes
Evaluation of Wet wipes
T
Compilation of data
submission

5. Materials And Methods

❖**Materials and instruments**

Table no.1 ingredients

Ingredients	**Uses**
Neem	Preventing microbial contamination and skin infection
Tulsi	Act as skin-soothing
Turmeric	Helping in faster skin repair and protection
Amarkand	Contributes anti inflammatory and wound healing effect
Distilled water	Used as the solvent and base
Glycerin	Acts as a humectant
Polysorbate 20/80	Function as solubilizer
Tee tree oil	Used as preservative
Citric acid /sodium hydroxide	Used as pH adjustment
Non -woven fabric sheets	Serve as the substrate for wet wipes

❖**Instruments and apparatus used**

1.Seive no.80,100,120 7.Burner
2.Weiging balance 8.Wire gauze
3.pH meter 9.Test tubes
4.Crucible 10.Beaker
5.Funnel 11.Filter paper
6.Tripod stand 12.Measuring cylinder

Method of Preparation

1.Collection & Drying:
Azadirachta indica, *Ocimum sanctum* , *Curcuma longa*, and *Eulophia herbacea* were collected, washed, and shade dried.
2.Powdering:
The dried plant materials were coarsely powdered.
3.Extraction:
The powdered drugs were extracted using a distilled water by using decoction method. 4.Concentration:
The extracts were filtered, concentrated, and dried.
5.Preparation of Solution:
A wet wipe solution was prepared using distilled water, glycerin, extractions (Amarkand ,Tulsi ,Turmeric and Neem), Tee tree oil ,Levendor oil etc.
6.Incorporation of Extracts:
The herbal extracts were added to the solution and pH was adjusted to 5.5–6.5. 7.Impregnation:
Non-woven fabric sheets were immersed in the prepared solution and excess liquid was removed.
8.Packaging:
The impregnated wet wipes were packed in airtight containers.

Pre formulation study:

Pre formulation study is an important phase in the development of pharmaceutical products. It involves evaluating the characteristics of the drug substance and its compatibility with excipients before creating the final formulation.

- Bulk density
- Tapped density
- Carr's index
- Hausner's ratio
- Angle of repose
- %Ash value
- Solubility

Bulk density

The bulk density of a powder is the ratio of the mass of an untapped powder sample and its volume including the contribution of the inter-particulate void volume.

FORMULA:

BULK DENSITY = MASS

BULK VOLUME

Tapped density

The tapped density is an increased bulk density attained after mechanically tapping a container containing the powder sample.

FORMULA:

TAPPED DENSITY = MASS

TAPPED VOLUME

Carrs index

Carr's Index of any solid is calculated for compressibility of a powder which is based on true density and bulk density.

FORMULA:

CARR'S INDEX = TAPPED DENSITY − BULK DENSITY

TAPPED DENSITY ××100

Hausner's ratio:-

Hausner ratio is defined as the ratio of a powder's tapped bulk density to its poured (loose) bulk density

FORMULA:

HAUSNER'S RATIO = TAPPED DENSITY

BULK DENSITY

Angle of repose:-

Angle of repose powder poured from a vessel forms a cone-like pile. The angle of repose- the angle between the slope of the pile and the horizontal correlates with the strength of particle particle interactions and, therefore, is measured to infer flowability.

FORMULA:

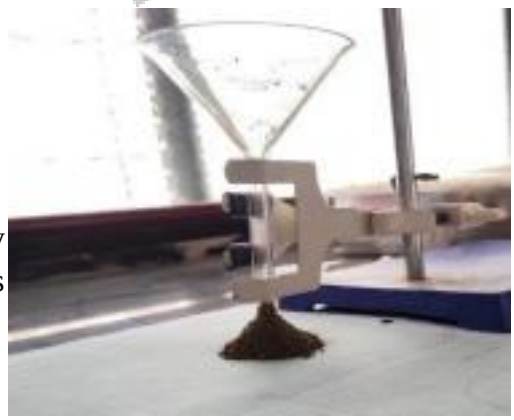
$\Theta = \tan^{-1}(h/r)$

Where,

h : the height in cm

r : the radius in cm

ɵ : the angle of repose



Ash value :- Fig.5 Angle of Repose The ash values usually represent the inorganic residues such as phosphates, carbonates and silicates present in herbal drugs

FORMULA:

% ASH VALUE =weight of crucible ×× W1: weight of sample

Where, W2: weight of ××100 crucible ash WO:

Fig .6 Ash value

Solubility:-

Solubility is the ability of a solid, liquid, or gaseous chemical substance (referred to as the solute) to dissolve in solvent (usually a liquid) and form a solution. We are going to check solubility of our sample in water, acidic and alkaline solution.

Extraction

Preparation of Polyherbal Extract by Decoction Method

Materials Required:

- Dried powder of Neem leaves (*Azadirachta indica*)
- Dried powder of Tulsi leaves (*Ocimum sanctum*)
- Turmeric powder (*Curcuma longa*)
- Amarkand powder (*Eulophia campestris*)
- Distilled water
- Beaker / round bottom flask
- Measuring cylinder
- filter paper
- Funnel

Fig.7 Extraction

Method

Collection of Plant Materials ↓

Drying & Powdering (Neem, Tulsi, Turmeric, Amarkand) ↓

Mixing of Powders

↓

Addition of Distilled Water (1:10 w/v)

↓

Boiling for 20–30 minutes

↓

Reduction of Volume (½)

↓

Cooling at Room Temperature

↓

Filtration (Muslin cloth / Filter paper)

↓

Collection of Clear Extract

↓

Storage (4°C)

↓

Used in Wet Wipes Formulation

Phytochemical test

1.Test of alkaloids

a) Dragondorff's test:

To 1 ml of the extract, add 1 ml of dragendorff's reagent (Potassium Bismuth iodide solution). An orange-red precipitate indicates the presence of alkaloids.

b)Mayer's test:

To 1 ml of the extract, add 1 ml of Mayer's reagent (Potassium mercuric iodide solution). Whitish yellow or cream colored precipitate indicates the presence of alkaloids.

2.Test for Flavonoids :

a)Shinode test:

To 1 ml of the extract Flavonoids react with magnesium turnings and concentrated HCl to produce pink, red, or orange color, indicating their presence.

3.Phenolic compound :

a)Ferric chloride test:

To 1ml of the extract is dissolved in water,followed by the addition of 3 drops of ferric chloride (FeCL3) To produce green, blue, purple.

b)Lead Acetate test :

To 1ml of the extract and add 3ml of 10% Lead acetate solution to the plant extract to form white precipitate indicates the presence of phenolic.

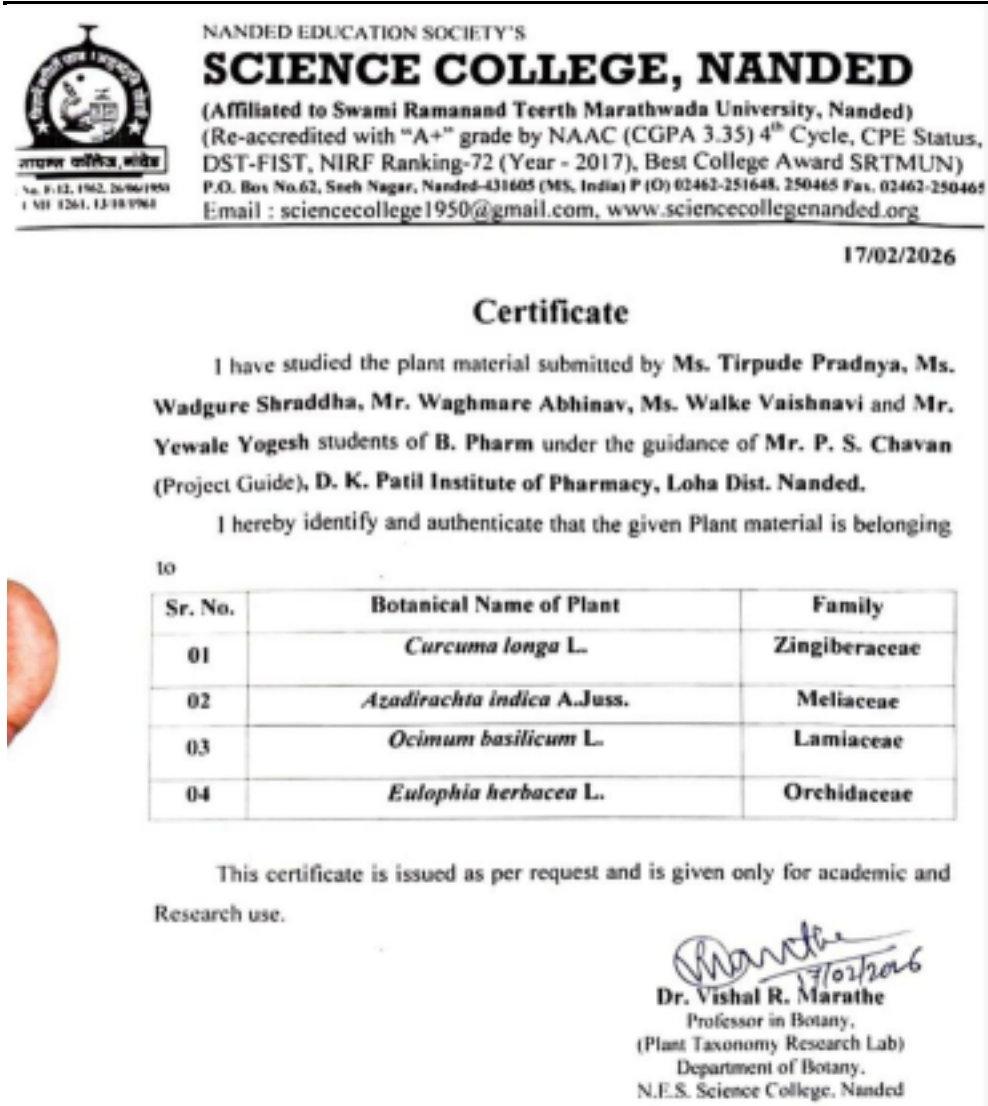
6.Result and Discussion

A)Collection Of Sample

Sample is collected from local area of Loha Dist. Nanded 431708

B)Authentication Letter:

The sample was authentified by Dr.Marahthe, HOD (botany dept.) of NES Science College , Nanded.



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17/02/2026

Certificate

I have studied the plant material submitted by **Ms. Tirpude Pradnya, Ms. Wadgure Shraddha, Mr. Waghmare Abhinav, Ms. Walke Vaishnavi** and **Mr. Yewale Yogesh** students of **B. Pharm** under the guidance of **Mr. P. S. Chavan** (Project Guide), **D. K. Patil Institute of Pharmacy, Loha Dist. Nanded.**

I hereby identify and authenticate that the given Plant material is belonging to

Sr. No.	Botanical Name of Plant	Family
01	*Curcuma longa* L.	Zingiberaceae
02	*Azadirachta indica* A.Juss.	Meliaceae
03	*Ocimum basilicum* L.	Lamiaceae
04	*Eulophia herbacea* L.	Orchidaceae

This certificate is issued as per request and is given only for academic and Research use.

17/02/2026

Dr. Vishal R. Marathe
Professor in Botany,
(Plant Taxonomy Research Lab)
Department of Botany,
N.E.S. Science College, Nanded

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Preformulation study

1.Preformulation Table of *curcuma lounga*

parameter	A(Sieve No.80)	**B(Sieve No.100) #**	C(Sieve No.120)
Bulk Density g/ml	0.5	**0.5**	0.5
Tapped Density g/ml	3	**2.8**	2.6
Carrs index%	83.3	**82.1**	80.7
Hausners ratio	6	**5.6**	5.2
Angle of repose	34	**38**	32

% Ash value	22%	**22%**	22%

Table no. 1

2.Preformulation table of *eulophia herbaeshia*

parameter	A(Sieve No.80)	**B(Sieve No.100) #**	C(Sieve No.120)
Bulk Density g/ml	0.44	**0.38**	0.37
Tapped Density g/ml	0.64	**0.60**	0.62
Carrs index %	31	**36**	40
Hausners ratio	1.45	**1.57**	1.67
Angle of repose	46.12	**48.74**	47.46
% Ash value	23%	**23%**	23%

Table no.2

~~[Type here]~~

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3. Table of *Azadirachta indica*

parameter	A(Sieve No.80)	**B(Sieve No.100)#**	C(Sieve No.120)
Bulk Density g/ml	0.39	**0.38**	0.37
Tapped Density g/ml	0.48	**0.47**	0.5
Carrs index %	18	**19**	40%
Hausners ratio	1.23	**1.23**	1.35
Angle of repose	48.74	**48.74**	46.12
% Ash value	23%	**23%**	23%

Table No. 3

4.Preformulation Table of *Ocimum sanctum*

parameter	A(Sieve No.80)	**B(Sieve No.100) #**	C(Sieve No.120)
Bulk Density g/ml	0.33	**0.31**	0.31
Tapped Density g/ml	0.4	**0.38**	0.4
Carrs index %	17%	**18%**	22%
Hausners ratio	1.21	**1.22**	1.29
Angle of repose	46.12	**46.12**	56.30
% Ash value	31%	**31%**	31%

Table No. 4

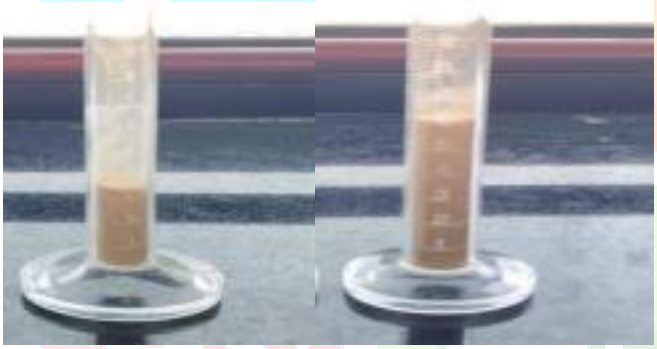

Fig no.11 Bulk Density Fig no.12 Tapped Density

Fig no.13 Angle of Repose

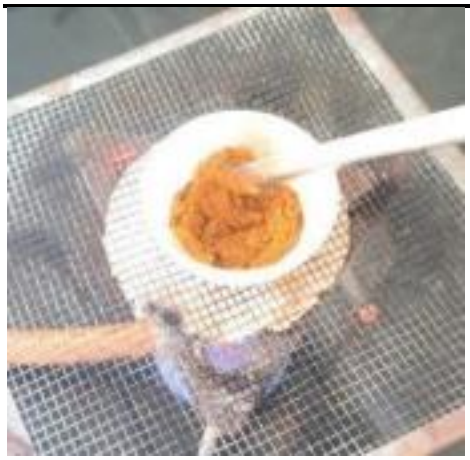

Fig no. 14 Ash value

5.Solubility

Ingredients	Solubility in water	Solubility in ethanol
Turmeric	Insoluble	Soluble
Amarkand	Partially soluble	Moderately soluble
Neem	Partially soluble	More soluble
Tulsi	Moderately soluble	Highly soluble

Table no.5

Formulation table

Ingredients	**B1#**	B2	B3	B4
Turmeric	**1.5ml**	2ml	2.5ml	3ml
Amarkand	**1.5ml**	2ml	2.5ml	3ml
Neem	**1.5ml**	2ml	2.5ml	3ml
Tulsi	**1.5ml**	2ml	2.5ml	3ml
Distilled water	**50ml**	50ml	50ml	50ml
Glycerine	**3ml**	3.5ml	4ml	4.5ml
Tee tree oil	**1drop**	2drop	2drop	2drop
Lavender oil	**2drop**	2drop	2drop	2drop

Fig no. 15 Formulated Batches

Procedure

1.Aqueous Phase Preparation
Take required amount of purified water.
Add glycerin and mix thoroughly.
2.Addition of Herbal Extracts
Add Neem, Tulsi, Haldi, and Amarkand extracts one by one. Stir continuously for uniform mixing.
3.Surfactant Addition
Add mild surfactant (Decyl glucoside).
Avoid foaming (stir gently).
4.Essential Oils Addition
Add tea tree oil and lavender oil.
Mix properly.
5.Preservative Addition
Add sodium benzoate/potassium sorbate.
Ensure complete dissolution.
6.pH Adjustment
Adjust pH to 5.5–6.5 (skin-friendly).
Use citric acid if needed.

Preparation of Wet Wipes

Cut non-woven fabric into required size (e.g., 15 × 20 cm). Immerse wipes in prepared polyherbal solution. Allow uniform absorption.
Remove excess liquid (slight pressing).
Pack in airtight container or sachets.

7.Evaluation Parameters of Polyherbal Wet Wipes

1. Organoleptic Evaluation

Appearance: Colour, clarity, and presence of any particles

Odor: Characteristic herbal odour

Texture: Smoothness and softness of the wipe

2. pH Determination

pH of the wet wipe solution is measured using a calibrated pH meter. Acceptable range: 5.5–6.5 (skin-friendly).

3. Moisture Content

Determines the amount of liquid present in the wipe.

Ensures wipes are neither too dry nor excessively wet.

4. Thickness of Wipe

Measured using a micrometer or vernier caliper.

Ensures uniformity and strength.

5. Spreadability / Wetting Ability

Assesses how uniformly the solution spreads over the fabric surface. **6. Skin Irritation Test**

Performed on suitable animal model / human volunteer (as per ethical guidelines). Evaluates redness, itching, or inflammation.

7. Antimicrobial Activity

Tested against selected microorganisms:

Staphylococcus aureus, Escherichia coli, Candida albicans.

~~[Type here]~~

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Fig 8. pH Test Fig 9.Skin irritation Test

Fig no.10 Spreadability Test

8.Conclusion

Wet wipes are pre-moistened, disposable personal care products widely used for cleansing, hygiene, and skincare purposes. They offer convenience, portability, and ease of use, making them suitable for daily applications such as hand cleaning, facial cleansing, and antibacterial protection. With increasing awareness about skin health and hygiene, the demand for safe and effective wet wipes has significantly increased.

Conventional wet wipes often contain synthetic chemicals, alcohols, artificial fragrances, and preservatives that may cause skin irritation, dryness, or allergic reactions, especially with frequent use. This has led to a growing interest in herbal and natural alternatives that are safer, eco-friendly, and biocompatible.

Polyherbal formulations involve the use of multiple medicinal plant extracts to achieve synergistic therapeutic effects. Medicinal plants such as neem (Azadirachta indica), tulsi (Ocimum sanctum), turmeric (Curcuma longa), and amarkand (Eulophia herbacea) are well known for their antimicrobial, anti-inflammatory, antioxidant, and skin-protective properties. These natural ingredients have been traditionally used in skincare and wound healing.

9.Referance

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