World Journal of Pharmaceutical Science and Research
www.wjpsronline.com
Research Article
ISSN: 2583-6579
SJIF Impact Factor: 5.111
Year - 2025
Volume: 4; Issue: 3
Page: 838-855

FORMULATION AND EVALUATION OF ANTIOXIDANT HERBAL GEL FROM *PYRUS COMMUNIS*

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Article Received: 05 May 2025 | | ***Article Revised: 26 May 2025*** | | ***Article Accepted: 17 June 2025***

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How to cite this Article: Mohd. Riyaz, Reetika Gupta, Ashok Kumar, Dr. Amandeep Singh (2025) FORMULATION AND EVALUATION OF ANTIOXIDANT HERBAL GEL FROM PYRUS COMMUNIS. World Journal of Pharmaceutical Science and Research, 4(3), 838-855.

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ABSTRACT

The present project has been undertaken with the aim to formulate and evaluate of polyherbal gel containing Pear (*Pyrus communis*), Orange (*Citrus sinensis)* and Alovera (Aloe barbadensis) as a cleansing agent, anti-acne and skin nourishing. Natural remedies are believed to be more acceptable in the way that they are suffer with fewer side effects than the synthetic ones. Herbal formulation has growing demand in the world market. The plant has been reported in literature having good antimicrobial, anti-inflammatory, refreshing activity, cleansing agent and anti-oxidant. The formulations are prepared by using varied types of concentration of extract prepared formulation which are evaluated for various parameters like color, appearance, consistency, washability, pH and Spreadability, Extrudabilty, skin irritation and compared with marketed formulation. It has a wide spectrum of antioxidant activity against acne prone skin. The prepare gel is formulated by using propyl paraben as gelling agent, herbal extracts are the medicinal agents in formulation. Hydroxypropyl methylcellulose is used as a co-solvent, sodium benzoate as a preservative and required quantity of distilled water as a vehicle. On the basis of the results obtained in the present study we conclude that the gel formulation of polyherbal contents showed good activities towards the declared evaluations. Herbal drugs have great growth potential in the global market and natural product research continues to explore traditional medicines to develop new novel drugs system. The present study aimed to investigate antioxidant potential of gel formulated with *Pyrus communis* peel extract and *Citrus sinensis* peel extract. *Citrus sinensis* is one of the extensively studied plants in the Rutaceae family and is a popular and commonly used ingredient in Traditional Chinese Medicine with preparations derived from peels, young fruit, mature fruit, flower, and other tissues. The plant is also known for numerous activities such as antioxidant, antibacterial, ant diabetic, antifungal, ant osteoporosis, hypocholesterolemic, ant obesity, etc. due to the presence of phenolic acids, flavonoids, and essential oil components.

KEYWORDS: Polyherbal gel, Antioxidant activity, Pyrus communis, Citrus sinensis, Aloe barbadensis.

INTRODUCTION

The skin, an organ in direct touch with the environment, shields the body from environmental harm and environmental deterioration, including ultraviolet (UV) rays. However, excessive exposure to UV rays on the skin of the face accelerates skin aging. UVA and UVB make up the two categories of UV light.[1] The epidermis absorbs UVB rays, whereas the endodermis does similarly for UVA rays. In contrast to UVA radiation, which, when absorbed, can hasten the formation of free radicals, UVB rays produce sunburn, which can be avoided with photo protection or stated as a sun protection factor number.[2]

Herbal Medicine

Ever since the birth of the mankind, there has been a relationship between life, disease and plants. However there is no record that people in prehistoric times used synthetic medicines for their aliments but they tried to make use of the things they could easily procure.[3] The most common thing they could find was there in environment like the plants and the animals.[56] World Health Organization (WHO) has defined the herbal medicines to be finished, labelled. Medicinal products that contain active ingredients, with aerial or underground parts of the plants or other plant material or combination.[4] Herbal formulations have reached the widespread acceptability as therapeutic agents like antimicrobial, anti-diabetic, anti-ageing, ant arthritic, anti- depressant, anti-anxiety, anti-inflammatory, and anti-HIV, treatment of cirrhosis, asthma, migraine, Alzheimer's disease and memory enhancing activities.[5] The opioids or nonsteroidal anti-inflammatory drugs, which are widely used to reduce the inflammation of various types, suffer from severe side effects like redness, itching etc.[57] As a result, a search for other alternatives seems to be necessary which would be more beneficial for the health and have no side effects.[6]

SKIN

The skin, being the body's largest organ, is both highly exposed and sensitive, serving as a crucial interface with the external environment.[58,59] Its intricate structure plays a significant role various functions, including barrier maintenance, substance penetration, absorption, and immune response. Thus, a through grasp of the skin's anatomy is essential for comprehending its protective mechanisms and how it reacts to chemical, particles, or other forms of damage.[60] Many receptors within the skin have the ability to detect sensations such as touch, pain, and heat. The skin has three layers as following Epidermis, Dermis and fat of sub cutis (hypodermis).[7]

FUNCTIONS OF SKIN

1. **Protection:** It is an anatomical barrier from pathogens and damage between the internal and external environment in bodily defence; Langerhans cells in the skin are part of the adaptive immune system. Perspiration contains lysozyme that break the bonds within the cell walls of bacteria.[61,62]
2. **Sensation:** It contains a variety of nerve endings that react to heat and cold, touch, pressure, vibration, and tissue injury; see somatosensory system and haptic.[63]
3. **Heat regulation:** The skin contains a blood supply far greater than its requirements, which allows precise control of energy loss by radiation, convection and conduction. Dilated blood vessels increase perfusion and heat loss, while constricted vessels greatly reduce cutaneous blood flow and conserve heat.[64,65]
4. **Control of evaporation:** The skin provides a relatively dry and semi-permeable barrier to fluid loss. Loss of this function contributes to the massive fluid loss in burns.[8]
5. **Aesthetics and communication:** Others see our skin and can assess our mood, physical state and attractiveness.

GEL

A gel is a semi-solid that can have properties ranging from soft and weak to hard and tough. Gels are defined as a substantially dilute cross-linked system, which exhibits no flow when in the steady state, although the liquid phase may still diffuse through this system.[66] Gels are mostly liquid by mass, yet they behave like solids because of a three-dimensional cross-linked network within the liquid.[9] It is the cross-linking within the fluid that gives a gel its structure (hardness) and contributes to the adhesive stick (tack). In this way, gels are a dispersion of molecules of a liquid within a solid medium.[67] The word gel was coined by 19th-century Scottish chemist Thomas Graham by clipping from gelatine. The process of forming a gel is called gelation.[10]

IDEAL PROPERTIES OF GEL[68]

- Ideally, the gelling agent must be inert, safe and cannot react with other formulation constituents.
- It should have suitable anti-microbial agent.
- The topical gel must not be sticky.
- The ophthalmic gel must be sterile.

ADVANTAGES OF GEL[31,32]

- Non-greasy application
- Being easy to formulate with active ingredients
- Adhering well to the application site
- Being washable and non-toxic
- Stability over time
- Ability to target affected area for rapid treatment and relief
- Preventing unwanted side effects through bypassing the digestive sys
- Easy spreading

DISADVANTAGES OF GEL

- Some drugs aren't absorbed easily through the skin
- There's a possibility of an allergic reaction
- The effect of gels initiates slower (but lasts longer)
- Additives in the gel may irritate the skin
- Application site must be monitored for reactions.

APPLICATION

- Many substances can form gels when a suitable thickener or gelling agent is added to their formula.
- This approach is common in manufacture of wide range of products, from foods to paints and adhesives.
- Fibre optic communications, a soft gel resembling hair gel in viscosity is used to fill the plastic tubes containing the fibres.
- The main purpose of the gel is to prevent water intrusion if the buffer tube is breached but the gel also buffers the fibres against mechanical damage when the tube is bent around corners during installation, or flexed.
- Additionally, the gel acts as a processing aid when the cable is being constructed, keeping the fibres central whilst the tube material is extruded around it.[11]

MATERIALS AND METHODS

S. No.	INGREDIENTS	USES
1.	Pyrus communis (Peels Extract)	Active Pharmaceutical Ingredient
2.	Citrus sinensis (Peels Extract)	Antioxidant Activity
3.	Gelatin	Gelling Agent
4.	Propyl Paraben	Preservative
5.	Hydroxypropyl methylcellulose	Gelling Base
6.	Methyl Cellulose	Thickening Agent
7.	Triethanolamine	Neutralizing Agent
8.	Aloe Vera gel	Moisturising Agent

PEAR

BOTANICAL NAME: *Pyrus communis*

FAMILY: Rosaceae

SYNONYMS: common pear, European pear

MORPHOLOGICAL CHARACTERISTICS

- **Size and Growth Habit**: The common pear grows up to the heights of 10-20 m, though in cultivation, it is often maintained at 3-5 m. It exhibits a pyramidal and crown head.[12]
- **Leaves:** The leaves of the tree are alternately arranged with ovate to elliptical in shape. The size measures 2.5-10 cm in length and 3-5 cm in width.[69] The margin is finely serrated with glossy dark green surface above and paler and dull below.
- **Flowers:** The flowers are white or pale pink in color and the inflorescence is arranged in corymbs on spur-like branches. The flowers are 5-petaled, measuring 2-3 cm in diameter.[70]
- **Fruit:** The fruit is typically pear-shaped with a rounded bell at the bottom and a smaller neck or stem end.[71] The fruit is green when unripe and turns yellow upon ripening with juicy and sweet taste.
- **Bark and Branches:** The bark is grey-brown with shallow furrows and flat-topped scaly ridges while the branches are formed short, stiff spurs and can be spiny.

CHEMICAL CONSTITUENTS

- **Sugars and Organic Acids:** Fructose is predominant in the pulp, seeds and peel along with sorbitol in the leaves. Malic acid is the organic acid present in more concentration than citric and shikimic acid.
- **Phenolic Compounds**: Arbutin is phenolic glycoside present in the fruit and leaves, while flavonoids like quercetin, kaempferol are present in the plant in varying concentration. Chlorogenic acid is present in the peel and flesh which has antioxidant activity.[13]

USES

The primary use of the plant is for its sweet and juicy fruit, which is consumed fresh worldwide. Pears are used in beverages like pear cider and pear brandy while the fruit can also be incorporated in culinary dishes [72]. Pears are traditionally used to address mild digestion, diarrhea and constipation, while it protects against oxidative stress due to its antioxidant properties. It also possess anti-inflammatory and antibacterial properties along with management of blood sugar.[14]

ORANGE

BOTANICAL NAME*:* *Citrus sinensis*

SYNONYMS: Orange, sweet orange

FAMILY: Rutaceae

MORPHOLOGICAL CHARACTERISTICS

- **Size and Growth Habit:** The plant is small to medium sized evergreen tree. The height of the plant is typically 7-15 feet, but can reach up to 30 feet. The plant is dense with rounded canopy.
- **Leaves:** The leaves of the plant are simple, alternate and glossy dark green with the shape of the leave from ovate to elliptical with a pointed tip.[73] The margin is entirely smooth and the petiole or leaf stalk is winged, though not as prominently as in some citrus species. The odor of the leaves is aromatic due to oil glands.[33]
- **Flowers:** The flowers of the plant are known as citrus blossoms and are white and fragrant. The flower is hermaphroditic which contains both male and female parts. It occurs singly or in small clusters.[34] It has five petals, white and slightly waxy with numerous stamen and a superior ovary.
- **Fruit:** The fruit of the orange is a hesperidium which is a modified berry typical of citrus. The fruit is round to oval shaped with a smooth to slightly textured orange when ripe. The pulp is segmented, juicy and sweet. The seeds may or may not be present depending on the variety.[15]
- **Bark and Branches:** The branches are woody, cylindrical stem with greenish young branches. The older bark becomes brown and slightly rough. It may have short, sharp spines at the leaf axils.

CHEMICAL CONSTITUENTS

1. **Nutrients:** It contains Vitamin C, Vitamin A, B1, B6 and Folate which is powerful antioxidant and essential for immune function. The essential minerals are Potassium, calcium, magnesium and phosphorus.[16]
2. **Sugars and Carbohydrates:** The major sugars are sucrose, fructose, glucose and dietary fibre, especially pectin, a soluble fibre.
3. **Flavonoids and Polyphenols:** The major flavonoids are hesperidin, and rutin which have antioxidant, anti-inflammatory and cardiovascular benefits.

ALOE VERA

BOTANICAL NAME: Aloe barbadensis miller

SYNONYMS: Aloe, Musabbar, Kumari

FAMILY: Asphodelaceae (Liliaceae)

MORPHOLOGICAL CHARACTERISTICS

- **Size and Growth Habit:** The height of the plant is typically up to 60-100 cm and is perennial, with succulent herb. It can take up to several years to reach full size, especially in dry or indoor conditions.
- **Leaves:** The Rosette formation of the leaves is at the base. The shape is thick, fleshy, lanceolate (sword-shaped), and tapering to a point. The margins are Spiny or serrated with small white teeth. The color of the leaves is green to grey-green, often with white spots in young plants. The structure includes succulent leaves filled with clear gel and a yellowish latex near the rind.
- **Flowers:** The inflorescence have spike or raceme on a tall stalk and the color of the flower is yellow, orange, or reddish tubular flowers. The structure includes typically six tepals (three petals and three sepals look alike).

- **Fruit:** The type of fruit is capsule and contains numerous seeds, although flowering and fruiting are less common in indoor settings.

CHEMICAL CONSTITUENTS

1. **Vitamins:** It contains Vitamin A, Vitamin C, Vitamin E, Vitamin B12, Folic acid and choline.
2. **Enzymes:** The enzymes present in the plant are amylase, lipase, cellulose, carboxypeptidase and catalase which helps to reduce inflammation.
3. **Anthraquinones:** The phenolic compounds are aloin, emodin, barbaloin, Isobarbaloin and these have laxative and anti-microbial properties.
4. **Lignin:** It helps in the penetration of other ingredients into the skin.
5. **Saponins:** Have cleansing and antiseptic properties.

GELATIN: Gelling Agent

Gelatin is a natural, protein-based substance derived from the collagen found in animal connective tissues, such as skin, bones, and cartilage (usually from cows or pigs).

Key Properties of Gelatin

1. Colourless or pale yellow.
2. Odourless and tasteless.
3. Soluble in hot water.
4. Forms a thermo-reversible gel (melts when heated, solidifies when cooled).
5. Rich in amino acids, especially glycine and proline.

Uses of Gelatin

1. Food Industry

Used in preparation of jellies, gummies, marshmallows, and desserts where it gives structure and texture. It is used in yogurt and dairy products and also used in meat and aspic products. It is used as a confectionery to stabilize foams and emulsions.

2. Pharmaceutical Industry

It is used in capsule in both hard and soft Gelatin capsules. In suppositories and lozenges it acts as a base and helps in controlled release. In coatings and microencapsulation to protect active ingredients and improves bioavailability.[17]

PROPYL PARABEN: Preservative

Chemical name: Propyl 4-hydroxybenzoate

Formula: C10H12O3

Type: Paraben (a class of esters of p-hydroxybenzoic acid)

Propyl paraben is a synthetic preservative commonly used in cosmetics, pharmaceuticals, and food to prevent the growth of bacteria, mold, and yeast.

Uses of Propyl Paraben

1. **Cosmetics and Personal Care Products:** It is used as lotions and creams, shampoos and conditioners, deodorants and antiperspirants, makeup and foundations and sunscreens.
   Purpose: Prevents growth of bacteria, yeast, and mold to extend product shelf life and maintain safety.
2. **Pharmaceuticals:** Propyl paraben is used in tablets and capsules, syrups and suspensions, topical ointments and creams and eye drops and nasal sprays.
   Purpose: Ensures the stability and sterility of medicinal formulations.

HYDROXY PROPYL METHYL CELLULOSE: (Gelling Base)

Hydroxypropyl methylcellulose (HPMC) is a semi-synthetic, inert, and viscoelastic polymer that's commonly used in various industries.[35] Chemically, it's derived from cellulose, a natural polymer found in plant cell walls. The name reflects its structure: it's cellulose that's been chemically modified with Hydroxypropyl and methyl groups. It is non-ionic, biodegradable, and generally considered safe and non-toxic.[18]

Uses of HPMC

1. **Pharmaceutical Industry**: It is used as a tablet binder and coating agent, controlled drug release (used in sustained-release formulations) and for preparation of capsule material (vegetarian capsules).
2. **Food Industry:** It is used as a thickener, stabilizer, and emulsifier as well as in bakery products for moisture retention and texture improvement. It also acts as a fat replacer in low-fat foods.

METHYL CELLULOSE: (Thickening Agent)

Methylcellulose (MC) is a semi-synthetic, chemically modified cellulose polymer made by treating natural cellulose with methyl chloride.[36] It is non-toxic, water-soluble, and forms a gel when heated and a solution when cooled, which is the opposite of most gels.

Uses of Methyl Cellulose

1. **Pharmaceuticals:** It is used as a laxative (bulk-forming), as a Tablet binder, film coating, and thickening agent. It also helps with controlled drug release.
2. **Food Industry:** It is also used as a thickener, emulsifier, stabilizer, and fat replacer while it is very common in ice cream, sauces, and baked goods and is usually labelled as E461 in food products.
3. **Cosmetics and Personal Care:** In cosmetics it is used as a thickener in lotions, shampoos, and creams and helps to maintain consistency and texture.

TRIETHANOLAMINE: (Neutralizing Agent)

Triethanolamine (TEA) is a clear, colorless to pale yellow, viscous liquid that is both a tertiary amine and a triol (has three hydroxyl groups). Its chemical formula is $C_6H_{15}NO_3$.

Key Properties

1. Amphiphilic: Has both hydrophilic (water-loving) and lipophilic (oil-loving) parts
2. Acts as a weak base
3. Can neutralize acids
4. Soluble in water and alcohol

Uses of Triethanolamine

1. **Cosmetics and Personal Care**: It is used to adjust pH in creams, lotions, and shampoos and acts as an emulsifier to help oil and water mix. It also helps to stabilize formulations.
2. **Pharmaceuticals**: It is used in topical preparations as a pH balancer and emulsifier and sometimes used in ointments and creams.[52]
3. **Industrial Applications:** It is used in metalworking fluids, coolants, and cleaners as well as in cement grinding aids to improve efficiency. It is also a component in surfactants and emulsifiers.[53]

FORMULATION METHOD

Table 2: Ingredients and Quantity Used.

S. No.	INGREDIENTS	QUANTITY
1.	Pyrus communis (Peel Extract)	3 grams
2.	Citrus sinensis (Peel Extract)	1.5 grams
3.	Alovera gel	1.5 grams
4.	Gelatin	1.5 grams
5.	Propyl paraben	1 grams
6.	Hydroxypropyl Methylcellulose	2.5 grams
7.	Methyl cellulose	1.5 grams
8.	Triethanolamine	0.20 grams
9.	Distilled water	100 (q.s.)

STEPS FOR PREPARATION

Collection and preparation of plant peels

- Thoroughly wash the fruits under running water to remove any contaminants.
- Peel the pear and oranges and cut the peels into uniform pieces to ensure even drying.
- Spread the peels in a single layer, dry the peels in a shaded area for 3 -4 days. [54]

Figure 1: Pear peel.

Figure 2: Orange peel.

Grinding and weighing

- Once dried, grind the peels into a coarse powder using a mortar and pestle.
- Weigh 25grams of the dried peel powder accurately.[37,38]

Extract preparation

The extract was prepared using soxhlet extraction method. The solvent used is ethanol. Place the 25 grams of powdered peels into the thimble of the Soxhlet extractor.[55,56] Add 500 milliliters of ethanol (605 conc.) into the round bottom

flask attached to the extractor. Assemble the Soxhlet apparatus and begin the extraction process by heating the solvent to its boiling point. Allow the extraction to proceed for 6 hours.[19]

Concentrate the extract by evaporating the solvent under reduced pressure.

Figure 3: Orange peel (Extract).

Figure 4: Soxhlet (Extraction).

Figure 5: Pear peel Extract.

Gel Preparation

Ingredients

- Pear peel extract
- Orange peel extract
- Aloevera gel
- Gelatin
- Propyl Paraben
- Hydroxypropyl Methylcellulose
- Methyl Cellulose
- Triethanolamine
- Distilled Water

Procedure: 1.5 g of gelatin was dispersed in 50 ml of distilled water kept the beaker a side to swell the gelatin to form gel. Take 5ml of distilled water and required quantity of propyl paraben were dissolved by heating on water bath solution was cooled and HPMC and CMC added.[39] Further required quantity of both the extract was mixed to the above mixture and add this solution into the gelatin gel with continuous stirring and add Triethanolamine was added drop wise to the formulation for adjustment of required skin pH and to obtain the gel at required consistency.[20]

PRELIMINARY PHYTOCHEMICAL SCREENING OF EXTRACT

1. Detection of Tannins

Ferric Chloride Test: Boil 0.5 g of powdered pear leaves in 20 ml of distilled water and filter. Add 0.1% ferric chloride to the filtrate.[40] A brownish-green or blue-black coloration indicates the presence of tannins.

2. Detection of Phenols

Lead Acetate Test: Dissolve 0.5 g of the extract in distilled water and add 3 ml of 10% lead acetate solution. The formation of a bulky white ppt indicates the presence of phenols.

3. Detection of Terpenoids

Salkowski Test: Mix 5 ml of the extract with 2 ml of chloroform, then add 3 ml of concentrated sulphuric acid to form a layer. A reddish-brown coloration at the interface indicated the presence of terpenoids.[41]

4. Detection of Alkaloids

Mayer's Test: Add a few drops of Mayer's reagent to the extract. The formation of white or yellowish precipitate indicates the presence of alkaloids.[21]

5. Detection of Saponin

Frothing Test: Mix 0.5 g of the extract with 10 ml of distilled water and shake vigorously. The formation of stable, persistent froth indicates the presence of saponins.[42]

EVALUATION PARAMETERS

1. Organoleptic Properties

- Appearance: All the formulation of antioxidant gel was pale yellow/yellow in colour.[43]
- Consistency: The consistency was checked by applying on the skin.
- Greasiness: The greasiness was assists by the application on the skin and the slide.

2. pH Determination

1gm of gel was accurately weighed and dispersed in 10 ml of distilled water. The pH of these dispersions was measured using pH paper.[22]

3. Spreadability

For the determination of spreadability excess of sample was applied in between two glass slides and was compressed to uniform thickness by placing 1000 gm weight for 5 minutes [44]. Weight (50 gm) was added to the pan. The time required to separate the two slides i.e., the time in which the upper glass slide moves over the lower plate was taken as measure of spreadability (S).[27]

4. Irritancy test

The skin irritation test is crucial to evaluate the safety and dermal compatibility of an herbal gel before it's used on humans.[45] Here's a standard method, often used in research and cosmetic testing. Clean the skin area with alcohol or sterile water and apply a small amount (0.5–1 g) of the herbal gel onto a cotton/gauze pad. Now fix it to the cleaned area using hypoallergenic medical tape and leave it undisturbed for 24 hours. After removal, observe the area for signs of: redness, swelling, itching, rashes and burning sensation.[23]

5. Washability Test

The washability test is a simple yet important evaluation to determine how easily the herbal gel can be removed from the skin using water.[46] This helps assess user convenience and cosmetic acceptability. Apply a small, measured amount

of gel (about 1 gram) on a selected area of the skin and allow it to dry partially or fully, depending on intended use. After a set time (5–10 minutes), attempt to wash it off using plain water with gentle rubbing for 30–60 seconds.[23]

6. Absorption Test

The absorption test helps determine how quickly and efficiently an herbal gel is absorbed into the skin after application.[47] This parameter is important for assessing the gel's performance and user comfort. Clean the selected skin area with water and pat dry and apply a measured quantity of the gel (e.g., 1 gram) over a specific area.[48] Start the timer immediately and gently spread the gel using a fingertip in circular motion until it appears absorbed. Note the time taken for the gel to fully absorb (i.e., when the area becomes non-sticky and dry to touch).[24]

7. Homogeneity Test

The homogeneity test is conducted to ensure the uniform distribution of all ingredients within the gel, especially the active herbal extracts.[49] A homogeneous gel appears consistent in texture, color, and feel, with no phase separation, clumps, or particles.[50,51] Take a small quantity of gel using a clean spatula and spread it gently on a clean glass slide or on the inner forearm. Observe visually and/or under a magnifying lens for: Uniformity in color, even distribution of herbal particles, smoothness of texture and absence of lumps, air bubbles, or grittiness.[25]

RESULTS

PHYTOCHEMICAL ANALYSIS

Sr. No.	Test	Observation
1.	Ferric chloride test	Deep blue-black coloration
2.	Lead acetate test	Formation of white precipitate
3.	Salkowski Test	Reddish-Brown Coloration
4.	Mayer’s test	No Change
5.	Frothing test	Formation of Froth

1. Organoleptic Properties

- Appearance: Yellow
- Odor: Aromatic

2. pH Determination

The pH of the herbal gel was calculated using pH paper and the result was found to be = 6.0.

Serial no	Test	Result
1.	Color	Yellow
2.	Odor	Aromatic
3.	Texture	Smooth
5.	Skin irritancy	No irritancy effect
6.	pH	6
7.	Spreadability	Good
8.	Washability	Good (easily washable)
9.	Smoothness	Good
10.	Absorption	Good

DISCUSSION

As we performed all evaluation parameters tests, the results are also found for every single tests of the gel formulation. Evaluation of antioxidant herbal gel has been performed with parameters given for the evaluation purpose of the gel. It is evaluated by all factors like physiochemical as well as physiological factors. The formulation was developed by using pear and orange peel extract as well of Aloevera and Gelatin as gelling agent. The formulations were pale yellow to yellow in colour and had some aromatic odor.[30] The pH of all formulations ranged 6 which is slightly alkaline and which is totally suitable for all type of skins as per topical formulations.[26] The spreadability of gel was found good confirming that this gel may spread smoothly and uniformly. The formulations were glossy and translucent, the homogeneity of the formulation was good. We found our formulation has good homogeneity and consistency as well. Herbal cosmetic produces are assumed to be safe for longer period of time. However, quality control for efficacy and safety of herbal cosmetic products is of paramount importance; and quality control tests must therefore be carried out for this preparations [74]. Stability studies and patch test are well known methods which will prove its efficacy and efficiency of the cosmetic herbal formulations Applicability of the herbal formulation was proved to be satisfactory from the results of the viscosity and spreadability. An herbal gel was successfully formulated using herbal extract of pear and orange known for their antioxidant properties.[28] The herbal gel exhibited strong antioxidant activity, supporting the choice of plant materials. The presence of flavonoids and phenolic compounds likely contributed to the observed effect. No signs of redness, itching, or inflammation were observed in skin patch tests conducted on human volunteers/animal models, indicating the gel is safe for topical use.[29]

CONCLUSION

Results of the studies revealed that the prepared antioxidant herbal gel formulation which comprised of ethanolic and methanolic extract of Pyrus communis (pear) and Citrus sinensis (orange) in different concentrations respectively produced no skin irritation after performing patch test . Also the physical analysis and stability studies of the prepared antioxidant herbal gel proved potency and efficacy. Thus, this formulation can be used safely on human skin. The effective activity exhibited by the polyherbal formulation may be attributed synergistic action of the plants constituents present in the formulation. The given content contains herbal extract which has antioxidant property. Active compound of the plants includes mainly vitamin C which tends to possesses antioxidant property. Composition of the herbal gel prepared from aqueous as well as alcoholic extraction of plant and to keep skin healthy, clear, glossy, a balanced nutrition is required. The prepared polyherbal gel formulation has good antioxidant activity, so the gel can be useful for treatment of acne prone skin, pigmented skin. This polyherbal gel has natural constituents which has beneficial effect on skin care and treatment. The herbal plants which is used in this formulation can be available very easily in environment. For those peoples who prefers herbal topical formulations over than chemical ones this formulation will be the good and effective one. This polyherbal gel formulation can be used not only for treat the pigmentation or acne but also for healthy skin benefits and having lustre to the skin. Formulation of this polyherbal gel has good stability profile. In the present work, an attempt has been made to formulate and evaluate the combination of herbal drugs and incorporation in gel formulation. Gel containing crude extracts of *Pyrus communis* peel, and *Citrus sinensis* peel extract with different concentrations was prepared which is having good antioxidant. It can be summarized that the prepared formulations showed satisfactory rheological characteristics, release behavior, appearance, pH, spreadability and antioxidant activity.

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