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Jatropha Curcus Gel

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Abstract: *Jatropha curcas is a plant known for its healing properties. In this study, a gel was made using an extract from the leaves of this plant. The goal was to test if the gel could help fight germs and heal wounds. The gel was made using a safe, jelly-like substance called carbopol. Tests showed that the gel had a good texture, proper thickness, and was easy to apply on the skin. When checked in the lab, the gel was able to kill bacteria like Staphylococcus aureus and E. Coli. It also helped wounds heal faster in animals compared to those not treated with the gel. These results show that Jatropha curcas gel could be a natural and useful treatment for skin infections and wounds.*

Keywords: Herbal gel, Wound healing, Antibacterial, Antimicrobial activity, Flavonoids, Tannins, Anti-inflammatory, Topical formulation, Medicinal plant, Natural remedy, Skin infection treatment, Phytochemicals, Gel formulation, Traditional medicine

I. INTRODUCTION

Jatropha curcas is a small tree or shrub that grows in hot, dry places. It is a strong plant that can live even in poor soil where other plants may not grow well. People grow Jatropha mostly for its seeds, which have oil inside them.
This oil can be used to make biofuel, which is a type of fuel that can be used in vehicles instead of petrol or diesel. That makes Jatropha important for making clean energy.

Jatropha curcus plant

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Jatropha is also used in traditional medicine, and sometimes planted as a fence around farms. But the plant is poisonous, especially the seeds, so it should not be eaten. Because it has many uses and grows easily, Jatropha is seen as a useful plant for the future

Scientific Classification

Kingdom: Plantae
Family: Euphorbiaceae
Genus: Jatropha
Species: J. Curcas
Common Names
Physic nut
Purging nut
Barbados nut
Botanical Characteristic
Height: Typically grows 3–5 meters tall.
Leaves: Broad, green, and lobed with 3–5 segments.
Flowers: Small, yellow-green; plant is monoecious (both male and female flowers on the same plant).
Fruits: Green capsule-like fruit, which turns yellow or black as it matures, containing 2–3 black seeds.
Native Range and Habitat
Native to Central America and Mexico, but now naturalized in many tropical and subtropical regions around the world.
Grows well in poor, arid soils, making it suitable for marginal lands.
Uses
Biofuel Production
Seeds contain 30–40% oil.
Oil can be processed into biodiesel, a renewable energy source.
Medicinal
Traditionally used for treating inflammation, wounds, and skin diseases (with caution—plant is toxic).
Agricultural
Used as a live fence and for erosion control.
Industrial
Seed cake can be used as fertilizer after detoxification.

3.Antibacterial –

Antibacterial means something that can kill or stop the growth of bacteria.
Bacteria can cause infections, especially in cuts or wounds. Antibacterial substances help keep these germs away so you don't get sick.
It has natural chemicals that can kill harmful bacteria on the skin.
This helps to prevent infections and keeps wounds do we find antibacterial things?
In some medicines, creams, or gels (like herbal gels).
In natural plants like Jatropha curcas, neem, and aloe vera.

4.Antimicrobial activity –

Jatropha curcas gel helps fight tiny germs like bacteria and fungi that can cause infections on your skin.
The gel has natural stuff from the plant that can kill germs or stop them from growing.
This keeps cuts and wounds clean and safe from infection.

5.Flavonoids –

Flavonoids are natural chemicals found in the leaves of the Jatropha curcas plant.
They are important because they help the gel to fight germs, reduce swelling, and heal wounds.
Flavonoids work as antioxidants, which means they protect the skin cells from damage.
Because of flavonoids, the gel helps the skin to repair faster and stay healthy.

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6.Tannins –

Tannins are natural things in the Jatropha plant leaves.
They help the gel stop bleeding by making cuts close faster.
Tannins also kill germs that can make wounds worse.
This helps wounds heal faster and keeps the skin safe.

7.Anti-inflammatory –

The gel helps reduce swelling, pain, and redness on the skin.
It makes hurt or itchy skin feel better.
It stops the skin from getting too swollen or sore.
This helps wounds or bites heal faster and feel less painful.

8.Topical formulation –

Topical means something you put on the skin.
A gel is a soft, jelly-like cream that spreads easily on the skin.
To make Jatropha curcas gel, leaf extract is mixed with a gel base like carbopol or aloe vera.
This gel can be applied directly to wounds, cuts, or skin infections.
It helps the skin heal, stops germs, and reduces swelling right where you put it.

9.Medicinal plant –

Jatropha curcas is a plant used in traditional medicine.
It grows in warm places and has green leaves, seeds, and sap.
People use parts of this plant to help heal wounds, fight infections, and reduce swelling.
It has natural chemicals like flavonoids, tannins, and saponins that help protect and heal the skin.
Besides healing, it is sometimes used to treat pain and inflammation.

10.Natural remedy –

Jatropha curcas gel is a natural medicine made from plant leaves.
It is used to treat wounds, cuts, burns, skin infections, and swelling.
The gel has natural healing powers because it contains helpful plant chemicals like flavonoids and tannins.
It helps the skin heal faster, kills germs, and reduces pain and swelling.
It is safe to use on the skin and has very few side effects because it's made from nature.

11.skin infections treatment-

Skin infections happen when germs (like bacteria or fungi) enter through cuts, wounds, or bug bites.
This can cause redness, swelling, pain, pus, or itching.
Jatropha curcas Gel Helps:
It has natural chemicals that kill germs.
It reduces swelling and pain.
It helps the skin heal faster.
The gel also protects the skin from getting worse.
Its uses
Wash the infected area gently.
Apply a small amount of Jatropha gel.
Use 1–2 times a day until the skin looks better.

12. Phytochemicals –

Phytochemicals are natural chemicals found in plants.
In Jatropha curcas gel, these chemicals help heal the skin and fight germs.
Main Phytochemicals in Jatropha curcas:
Flavonoids – Help reduce swelling and kill germs.
Tannins – Help stop bleeding and fight bacteria.
Saponins – Clean wounds and help heal faster.
Alkaloids – Reduce pain and fight infection.

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Glycosides – Help protect skin cells and support healing.
They make the gel antibacterial, anti-inflammatory, and wound-healing.
They are safe, natural, and have very few side effects.

13.Gel formulation –

Gel making progress

Jatropha curcas gel is made by mixing plant extracts with a jelly-like base. This makes it easy to apply on the skin for healing.

Steps to Make the Gel:
Collect leaves of Jatropha curcas.
Dry and crush the leaves into powder.
Extract the useful parts using water or alcohol.
Prepare the gel base using ingredients like Carbopol 940, water, and glycerin (for smoothness).
Mix the extract into the gel base.
Add a small amount of preservative to keep it fresh.
Stir well until it becomes a smooth gel.
It's easy to apply on the skin.
Helps with wound healing, infections, and swelling.
Made from natural plant ingredients, so it's gentle on the skin.

14.Traditional medicine –

Jatropha curcas is a plant used in traditional medicine for many years.
People in villages and tribal areas used its leaves, sap, and seeds to treat skin problems.
used traditionally:
Leaves were crushed and applied on cuts, wounds, burns, and swelling.
The juice from the leaves was used to kill germs and reduce pain.
The gel form today is made by using the same leaf extract in a smoother, easier way.

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It was natural, easy-to-use use, and worked well on skin problems.
People used it because it helped heal fast and prevent infection without modern medicine.

Formulations of gel –

Ingredient	Quantity
Distilled water	50 ml
Carbopol	2 g
Methyl paraben	0.1 g
Triethanolamine	2 ml
Glycerin	2.5 ml
Jatropha curcus extract	1 ml
Colouring agent	4.5 ml
Rose Water	4.5ml

Procedure for Gel Preparation:
Distilled Water – 50 ml
Carbopol – 2 grams (helps make the gel thick)
Methyl Paraben – 0.1 gram (preservative)
Triethanolamine – 2 ml (used to make the gel form)
Glycerin – 2.5 ml (keeps skin soft)
Jatropha curcas – 1 ml (for medicinal properties)
Coloring agent – 4.5 ml
Rose water – 4.5 ml (for fragrance)
Steps to Make the Gel:
Mix Carbopol in Water:
Take about 50 ml of distilled water in a beaker.
Slowly add Carbopol powder while stirring so that no lumps form.
Let it sit for 30 minutes to fully absorb the water.
Add Methyl Paraben:
Mix methyl paraben in a little warm water until it dissolves.
Add this to the Carbopol mixture.
Add Glycerin and Jatropha:
Now, add glycerin and Jatropha extract to the mixture.
Stir well.
Add Color and Rose Water:
Add the coloring agent and rose water.
Mix everything well
Make the Gel:
Slowly add triethanolamine while stirring.
The mixture will turn into a gel as you add it.
Finish:
Add the rest of the distilled water to make the total 50 ml if needed.
Store in a clean container.
Test -
Basic Checks (Physical Tests)
Look and feel: Is the gel smooth? Any lumps or color changes?
Smell: Does it have any bad or unusual odor

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pH Test: We check if the gel's pH is safe for the skin (not too acidic or too basic).
Thickness (Viscosity): To make sure the gel is not too runny or too thick.
Spread Test: To see how easily it spreads on the skin.
Germ Test (Microbial Test)
We test if the cream has any harmful bacteria or fungi in it.
Also check if the added preservatives are stopping germs from growing.
Storage Test (Stability Test)
We store the cream in hot, cold, and normal temperatures.
This helps us see if it stays the same over time or changes color, smell, or separates into layers.
Ingredient Check (Herbal Content)
Test if the useful parts from Jatropha (like natural oils or healing compounds) are present.
Also check for toxic substances (like phorbol esters) to make sure it's safe.
Skin Safety Test
A small amount is applied on the skin (like on the arm) to see if it causes redness, itching, or any reaction.
Done carefully on volunteers or using lab tests on skin-like materials.
Filtration process of Jatropha curcas leaves-
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