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Lantana camara: A Botanical Treasure with Multidimensional Impacts

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ABSTRACT

Lantana camara, belonging to the Verbenaceae family, is a plant recognized for its extensive distribution and notable medicinal attributes, as well as its unique morphological characteristics and taxonomic complexity. Originally from the Americas, it has become an invasive species in various regions globally. This review delves into the essential features of *Lantana camara*, emphasizing its morphology, taxonomy, medicinal applications, and industrial relevance. The plant displays a diverse array of morphological traits, such as vibrant inflorescences, ovate foliage, and woody stems, which aid in its identification and ecological adaptability. In terms of taxonomy, *Lantana camara* is marked by significant variability, with a multitude of cultivars and hybrid varieties presenting challenges to its classification. *Lantana camara* is recognized in traditional medicine for its wide-ranging therapeutic benefits, which encompass anti-inflammatory, antimicrobial, antidiabetic, and anticancer properties. The plant's medicinal effectiveness is attributed to its bioactive constituents, such as alkaloids, flavonoids, and triterpenoids. In addition to its health-related uses, *Lantana camara* has attracted interest in several industrial applications, including bioremediation, the extraction of essential oils, and as a potential fiber source for textiles. Although it poses challenges due to its invasive characteristics and ecological consequences, *Lantana camara* offers significant prospects for sustainable resource utilization in both pharmaceutical and industrial domains.

Keywords: *Lantana Camara*, Pharmacology, Extraction, *L. camara* leaves, Wild Sage.

INTRODUCTION

Medicinal plants are a significant source of chemicals with therapeutic value. Medicinal herbs have been utilized for centuries to treat a variety of illnesses. These plants can yield a range of bioactive compounds for the creation of more advanced medicinal products when analyzed systemically. Recent years have seen an increase in interest in the pharmacological analysis of diverse plants utilized in various traditional medical systems. In recent decades, numerous traditionally recognized plants have been thoroughly examined using advanced scientific methods and reported to have a variety of therapeutic benefits, including larvicidal, hepatoprotective, antifungal, anticancer, anti-inflammatory, antidiabetic, anthelmintic, antibacterial, and antioxidant properties. [1-3]

Lantana camara is also known as common lantana, Wild Sage, Surinam Tea Plant, Spanish flag and West Indian lantana is a species of flowering plant in the verbena family (Verbenaceae), native to the American tropics. *L. Camara* is a well known medicinal plant in traditional medicinal system and recent scientific studies have emphasized the possible use of *L. Camara* in modern medicine. Diverse biological features, such as antimicrobial, nematicidal, anticancer, insecticidal, analgesic, anti-inflammatory, anticonvulsant, CNS-depressant, antihyperglycaemic, antimalarial, hepatotoxic, and antihypertensive activities, have been reported for *Lantana camara Linn*. [4]

Fig No. 1- Flowers and leaves of *Lantana camara* [5]

Table No. 1 - Information of *Lantana camara*

Name	***Lantana camara***
Synonyms[5]	*Lantana aculeate* *Camara vulgaris* *Lantana armata* *Lantana scabrida* *Lantana tiliifolia*
Regional Name [6]	Maharashtra- Ghaneri, Tantani West Bengal- Putush Kerala - Kongini Assam - Gu phool Manipur - Thirei Nepal - Banfada Hindi Name- Caturang Kannada- Kadu gulabi, Chitrangi, Hunnigida Sanskrit Name- Nadibhallataka Oria Name- Nagaboyari, Naguari Telugu Name- Pulikampa, Gabbuseeki
Botanical Name	*Lantana camara*
Family	Verbenaceae
Genus	Lantanas
Useful part	Leaves, Flowers, Roots, Seeds, Ash
Phytoconstituents [7]	Steroids, terpenoids, flavonoids, quinones, carbohydrates, alkaloids, and phenols.
Biologically active components[7]	13-docosenamide, alpha-hydroxyisocaproic acid, cyclo(L-prolyl-L-valine), and 2,5-piperazinedione
Vitamins[7]	Vitamin A, Vitamin C, and Vitamin E

MATERIALS & METHODS

HISTORY [8]

The *Lantana camara* is indigenous to Mexico. In 1809, it made its first appearance in India from Sri Lanka. Lantana has been a weed in Australia for about 160 years. In 1841, lantanas were brought to Australia as ornamental garden plants. They proliferated, escaped captivity, and established themselves in the wild in less than 20 years. Its initial range has grown to include about 50 countries, where it has become an invasive species. When Dutch explorers brought it to Europe and extensively cultivated it there, it first left the Americas. The Portuguese brought it to Goa, and it swiftly spread

throughout Asia and Oceania, where it gained a reputation as a poisonous plant.

MORPHOLOGY [9]

Table No. 2- Morphology of *Lantana camara*

Size	**Perennial shrub grow up to 6 meter tall**
Stems	Quadrangular stems that are often armed with pickles
Leaves	Oppositely arranged on stem, Oval/ broadly lance shaped, Rough to touch, yellow green to green color
Flowers	Small, multi-colored arranged in dense, flat-topped clusters Color- Flowers can be yellow, orange, white, pale violet, pink, red Smell- tutti-frutti smell with peppery undertone
Fruits	Size- Round, Fleshy, two-seeded drupe that is about 5mm wide Color- Green when unripe and turns purple then black blue
Thorns	Along the length of main stem and branches of plant

Fig no. 2- Flowers of *L. camara* [4]

Fig no. 3- Leaves of *L. camara*[10]

Fig no. 4- Fruits of *L.camara* [10]

Fig no. 5- Whole plant of *L. camara* [11]

TAXONOMY [12]

Table No. 3- Taxonomy of *Lantana camara*

Species	***Lantana camara***
Genus	Lantana
Family	Verbenaceae
Domain	Eukaryota
Kingdom	Plantae
Phylum	Spermatophyta
Subphylum	Angiospermae
Class	Dicotyledonae
Order	Lamiales

GEOGRAPHY [13]

Table No. 4- Geography of *Lantana camara*

Native Range	**Native to tropical regions of Central and South America, but its original distribution is unclear.**
Naturalized range	In around 60 countries including Australia, India, South Africa and many oceanic islands.
Habitat	Roadsides, Degraded lands, riparian zones, Pastures, Parklands, Plantations, Forest edges, and gaps.
Growth	Grow up to 2-4 meters tall and forms dense thickets. Has four angled stems and often armed with pickles.
Impact	Invade native vegetation in woodlands and savannas and can reduce invertebrate diversity.

CULTIVATION AND COLLECTION [14-15]

Lantana camara, sometimes known as lantana, is a hard and adaptable plant used for ornamentation, hedging, and even erosion prevention. However, it can be problematic in certain areas. Cultivating and collecting lantana need to be done correctly to avoid environmental hazards.

Cultivation of *Lantana camara:*

1. **Site Selection**

Climate: *Lantana* expands in tropical and subtropical environment, but it can survive a variety of situation, including drought.

Soil: It requires well-drained soil with a pH of 5.5–7.5. Sandy or loamy soil is good.

Sunlight: Fully sun exposure is ideal for maximum development and flowering, even though it can take partial shade.

2. **Planting:**

Propagation: Gather ripe seeds from dried berries. Immerse them in water for 24 hours before planting for increased germination. Use semi-hardwood cuttings around 4-6 inches long. Dip the cut end in rooting hormone and plant in an adequately drained potting mix.

Spacing: Keep plants 2-3 feet apart to allow for adequate development and air circulation.

Timing: Plant during the warm growth season, usually in the spring or early summer.

3. **Watering**

Water regularly throughout the developing period (first 6-8 weeks). Once developed, *lantana* is resistant to drought and requires little water. Avoid overwatering as it can cause decay in the roots.

4. **Fertilizing**

Apply a balanced, slow-release fertilizer (10-10-10) once every month during the growing season. Avoid over fertilizing because it can inhibit flowering.

5. **Trimming**

Regular trimming leads to bushy growth and continuous blooming. Remove faded flowers to prevent seed formation and reduce its spread.

6. **Pest and Disease Control**

Lantana is resistant to most pests, but may occasionally encounter aphids, spider mites, or whiteflies. Use insecticidal soap or neem oil to manage infestations. To prevent fungal diseases, ensure proper air circulation and avoid waterlogged soil.

Collection of *Lantana camara:*

1. **Harvesting Flowers and Leaves**

Timing: Flowers and leaves should be picked early in the morning because they are fresh and dew-free.

Method: Use clean scissors or shears to cut healthy stems.

2. **Collecting Seeds**

Collect the berries after they have matured and become black on the plant. After drying, carefully crush the berries to extract the seeds.

3. **Storing Seeds**

Seeds should be carefully cleaned and dried before storage. Seeds can be stored in an

airtight container in a cold, and in dry place for up to six months.

4. **Drying Plant Material**

Spread flowers and leaves in a single layer on a clean surface in a shaded, ventilated area. Avoid direct sunlight to retain their color and active compounds.

5. Storage

Once dried, store the plant material in labeled, airtight containers away from moisture and light.

GENERAL EXTRACTION PROCESS:

1) **Soxhlet Extraction**[16]

Materials used- Lantana camara leaves (dried and powdered),Solvent (e.g., ethanol, methanol, or hexane),Soxhlet extractor, Heating mantle, Rotary evaporator.

Procedure: Weigh a specific amount of the powdered leaves. Place the powdered material in a filter paper or thimble made of cellulose and keep it into the Soxhlet extractor. Add the selected solvent into the boiling flask and connect it to the Soxhlet apparatus. Heat the system to maintain the solvent at its boiling point. The solvent vaporizes, condenses, and repeatedly washes the plant material. Continue the extraction for a specified period until the solvent in the siphon tube becomes colorless. After extraction, concentrate the solvent using a rotary evaporator to obtain the crude extract. Dry the extract in a vacuum desiccator or oven at low temperature.

2) **Maceration Process:**[17]

Materials used: Polar solvents (e.g., ethanol, methanol, or water) for polar compounds, Non-polar solvents (e.g., hexane, petroleum ether) for non-polar compounds like essential oils, sealed container.

Procedure: Weigh the powdered *Lantana camara* leaves and mix them with the selected solvent in a ratio of 1:10 or 1:20 (w/v), depending on the solubility of the compounds. Place the mixture in a clean, sealed container and allow it to soak for 24-72 hours at room temperature, stirring occasionally to maximize extraction efficiency. After maceration, strain the mixture through a muslin cloth, filter paper, or vacuum filtration. Collect the filtrate (liquid extract).To obtain a concentrated extract, evaporate the solvent from the filtrate using a rotary evaporator at low pressure and temperature (<40°C).

3) **Cold Percolation Process:** [18]

Materials used: Ethanol or methanol for general phytochemical extraction, Water for polar compounds, Hexane for non-polar compounds (e.g., essential oils), **percolator** (a vertical glass or metal cylinder with a stopcock at the bottom).

Procedure: Add a layer of cotton or filter paper at the bottom of percolator to prevent clogging. Place the powdered leaves in the percolator, making sure they are loosely packed to enable solvent flow. Moisten the material with a little amount of the chosen solvent and allow it to sit for 4-6 hours to swell and assist extraction. Add the solvent carefully to the percolator until the material is completely submerged. Close the stopcock and let the mixture macerate for 24 hours at room temperature. Open the stopcock to collect the percolate at a slow and controlled rate. Continue adding fresh solvent to maintain a constant level above the material. Collect the extract until the solvent clears or the desired endpoint is reached (usually evidenced by a loss of color or a reduction in phytochemical yield in tests).

4) **Ultrasonic Assisted Extraction (UAE):** [16]

Procedure: Load the Plant Material and Solvent: The powdered *Lantana camara* leaves are combined with the specified solvent in a glass beaker or container. Setup the beaker in the ultrasonic bath or

use the sonicator probe to send ultrasonic waves through the mixture. This causes cavitations, which destroys the cell walls and allows the release of chemicals. After extraction, the fluid is filtered to remove any solid plant material. This can be done with fine filter paper or a centrifuge. The extract is then concentrated, often using a rotary evaporator, to remove excess solvent.

5) **Supercritical Fluid Extraction (SFE):** [17]

Procedure: CO_2 is introduced into an extraction vessel and pressed over its critical point (usually around 1000-5000 psi) to achieve a supercritical condition. This produces a solvent with unique characteristics that can dissolve a wide spectrum of chemicals found in plant material. Supercritical CO_2 is used as a solvent to extract bioactive chemicals from powdered *Lantana camara* leaves, including terpenoids, flavonoids, essential oils, alkaloids, and fatty acids. Extraction period: The extraction period varies between 30 minutes and 3 hours, depending on the plant material, chemicals of interest, and pressure/temperature conditions. After extraction, CO_2 pressure is gradually lowered to release extracted chemicals. The extract is collected in a separate container, and the CO_2 gas is vented or recycled back into the system. The extracted chemicals are typically liquids, and the solvent can be evaporated or eliminated as needed.

6) **Microwave assisted percolation**: [19]

Procedure: Collect *lantana camara* leaves, rinse with distilled water, shade-dry the leaves and grind into a fine powder using a mechanical grinder, store the powdered leaves in an airtight container. Weigh dried leaf powder; mix the powder with cow urine in a suitable microwave-safe container. Place the mixture in a domestic microwave oven operating at 2450 mhz frequency with a power output of 900 w. Heat the mixture for 6 minutes to facilitate extraction. After that, filter the mixture through muslin cloth followed by whatman filter paper no. 1 to obtain the cow urine extract.

7) **Steam Distillation Process:** [20]

Procedure: Heat the water in the boiler to create steam. Steam should be directed into the chamber where the plant material is stored. The steam enters the plant material and causes the essential oils to evaporate. The heat helps to break down the cellular structure of the leaves, allowing the volatile compounds to be released. The steam carrying the volatile oils travels into the condenser, where it cools and condenses back into liquid form. The condensed liquid contains both water and essential oils. Because essential oils are often lighter than water, they will float to the surface, allowing for easier separation. The distillate is collected in a separating funnel or distillation receiver. The water phase (often called hydrosol or plant distillate) can be separated from the oil phase. The essential oil will form a layer on top of the hydrosol, and it can be drained or decanted off. The collected essential oil may require additional purification or drying. To assure the oil's purity, any leftover water can be removed with a drying agent (such as anhydrous sodium sulfate).

8) **Cold Extraction:** [21]

Procedure: Collect fresh *Lantana camara* leaves, Air-dry the leaves in the shade at room temperature for about one week, and Grind the dried leaves into a coarse powder using a grinder. Place powdered leaves into a brown glass container, solvent to the container, seal the container and let it stand at room temperature for three days, shaking it occasionally to facilitate extraction. After three days,

decant and filter the extract to remove solid residues. Concentrate the filtered extract using a rotary vacuum evaporator to remove the solvent. Repeat the extraction process using solvents of increasing polarity to ensure a comprehensive extraction of phytochemicals. The sequence of solvents typically used is: n-hexane, ethyl acetate, acetone, methanol, and ethanol.

9) Reflux Extraction: [16]

Procedure: Collect fresh leaves of *Lantana camara*, wash distilled water to remove dust and impurities. Dry the leaves at room temperature or in an oven at a low temperature, grind the dried leaves into a fine powder using a grinder. Choose an appropriate solvent (e.g., methanol, ethanol, or water) based on the desired phytochemical profile. Weigh the powdered leaf and transfer it to a round-bottom flask. Add the selected solvent to the flask; Set up the reflux apparatus, ensuring a condenser is attached to prevent solvent loss. Heat the mixture at the solvent's boiling point (e.g., 60–70°C for ethanol) for 2–4 hours under continuous reflux. Allow the mixture to cool. Filter the extract using Whatman filter paper to remove plant debris. Concentrate the filtrate using a rotary evaporator or by placing it in a water bath at low temperature to evaporate the solvent.

Table No.5- Difference between extraction methods

Method	Solvents used	Temperature	Extraction Time	Solvent Consumption	Yield	References
Soxhlet Extraction [16]	Ethanol, Methanol, Acetone, Hexane	Moderate to High	Medium (6-8 hours)	High	High	Jamal M, et al; A comparative study for extraction methods (2018)
Maceration [17]	Ethanol, Methanol, Water, Chloroform	Room Temperature	Long (1-3 days)	High	Medium	Akinmoladun F, et al; Phytochemical Analysis and Antioxidant properties of *Lantana camara* (2020)
Cold Percolation [18]	Ethanol, Methanol, Water, Hexane	Room Temperature	Long (1-3 days)	Moderate	Medium	Vankatesh S, et al; Antihyperglycemic and antioxidant activities of L. camara leaves, (2021)
Ultrasonic Assisted Extraction (UAE) [16]	Ethanol, Methanol, Water	Room to Moderate	Short (1-120 hours)	Moderate	High	Jamal M, et al; A comparative study for extraction methods (2018)
Supercritical Fluid Extraction (SFE) [16]	CO_2 (Supercritical), Ethanol	High (31–50°C)	Short (1-120 hours)	Low	Very High	Liu Dongfeng Preparation method of Lantana camara volatile oil (2015)
Microwave Mediated Extraction [19]	Cow urine, Hexane, Ethyl acetate	High (60-80°C)	Very short (5-20 minute)	Low	Medium	Shirpurkar Y Et al; Microwave Mediated Extraction of

						L.camara with cow urine; (2023)
Steam Distillation [20]	Water (For essential oil)	High	Very short (3-5 hours)	Low	Medium	Dua V, et al; Isolation of repellent ingredients from *L. camara;* (2003).
Cold Extraction [21]	N-hexane, ethyl acetate, acetone, methanol, and ethanol.	Room Temperature	Long (1-7 days)	Moderate	Medium	Ganatra S, et al; Preliminary Phytochemical and TLC Profiling of *L. camara* (2016)
Reflux Extraction [16]	methanol, ethanol, or water	Moderate to High	Very Short (2-4 hours)	Moderate	Medium	Jamal M, et al; A comparative study for extraction methods (2018)

Soxhlet and Reflux are suitable for exhaustive extraction of bioactives. Cold Percolation and Cold Extraction preserve thermolabile compounds. Ultrasonic and Supercritical Fluid are efficient and advanced but require specific setups. Steam Distillation focuses on volatile compounds like essential oils.

PHYTOCHEMICAL SCREENING:

Table No. 6- Phytochemical screening of *L. camara*

Phytochemical	**Test Method**	**Observed Presence in *Lantana Camara* Leaves**	**References**
Alkaloids [22]	Mayer's Test, Wagner's Test	Present (identified by yellow precipitate in Mayer's test, reddish-brown in Wagner's test)	Harborne, J. B. (1998) "Phytochemical Methods"
Flavonoids [23]	Alkaline Reagent Test, Shinoda Test	Present (yellow color in alkaline reagent test, red color in Shinoda test)	Ali, M. S., et al. (2015) "Phytochemical Screening of *Lantana camara*"
Tannins [24]	Ferric Chloride Test	Present (formation of blue-black precipitate)	Briskin, D. P. (2000) "Medicinal Plants"
Saponins [25]	Foam Test, Hemolysis Test	Present (formation of foam, hemolysis of red blood cells)	Ncube, N. S., et al. (2008) "Phytochemical Screening of Medicinal Plants"
Glycosides [26]	Bornträger's Test, Keller-Killiani Test	Present (red/brown color in Bornträger's test, reddish brown at the junction of layers in Keller-Killiani test)	Sofowora, A. (1993) "Medicinal Plants and Traditional Medicine"
Terpenoids [27]	Salkowski Test, Copper Acetate Test	Present (red/brown color in Salkowski's test, green color in Copper Acetate test)	Patel, D. K., and Patel, K.(2021); Phytochemical and Medicinal Study of *Lantana camara Linn*. (Verbenaceae) – A Review
Phenols [22]	Ferric Chloride Test, Lead Acetate Test	Present (blue-green color in Ferric Chloride test, white precipitate in Lead Acetate test)	Harborne, J. B. (1998) "Phytochemical Methods"
Proteins [22]	Biuret Test	Present (formation of purple color)	Harborne, J. B. (1998) "Phytochemical Methods"
Carbohydrates [26]	Benedict's Test, Molisch's Test	Present (red precipitate in Benedict's test, purple ring in	Sofowora, A. (1993) "Medicinal Plants and Traditional Medicine"

		Molisch's test)	
Steroids [27]	Liebermann-Burchard Test	Present (blue-green color formation)	Vyas, S. G., et al. (2016) "Phytochemical Analysis of *Lantana camara*"
Anthraquinones [22]	Bornträger's Test	Present (red/brown color after heating)	Harborne, J. B. (1998) "Phytochemical Methods"
Resins [25]	Alcoholic Resin Test	Present (formation of precipitate)	Ncube, N. S., et al. (2008) "Phytochemical Screening of Medicinal Plants"

THERAPEUTIC PROPERTIES:

A) Antibacterial Activity:

Ethanolic extracts of *L. Camara* roots and leaves demonstrated strong antibacterial activity against *E. coli, Bacillus subtilis, and P. Aeruginosa*, while *Staphylococcus aureus, Proteus vulgaris, Pseudomonas aeruginosa, Víbriocholareae,* and two multi-resistant strains of *S. Aureus* and *E. coli* were all susceptible to the extracts' antimicrobial activity. The maximum activity against Gram-negative *Salmonella typhi* and Gram-positive *Bacillus cereus* was demonstrated by the leaf extract of *L. Camara*. [28]

B) Anti-inflammatory Activity:

The leaves of the *lantana camara* plant contain chemicals that have anti-inflammatory properties. The inclusion of flavonoid chemicals, saponins, and tannins is assumed to be the cause of the anti-inflammatory properties of betel leaf extract. Flavonoids work to prevent inflammation by blocking capillary permeability and by blocking the metabolism of arachidonic acid, which lowers the generation of prostaglandins. Additionally, flavonoids suppress the release of lysosomal enzymes, which act as mediators of inflammation. The growth of the inflammatory process can be prevented by blocking these inflammatory mediators. [29]

C) Antifertility Activity:

Flavonoid, saponin, and triterpenoid chemicals found in *L. Camara* leaves have antifertility characteristics because they can suppress the release of FSH and LH, making them antiestrogenic. This causes the uterine wall to deteriorate and difficulties with the process of implantation in female rats. [30]

D) Mosquito Controlling Activity:

There have been reports of the mosquito-larvicidal properties of methanol and ethanol extracts of *L. Camara* leaves and flowers against *Ae. Aegypti* and *Culex quinquefasciatus* mosquito larvae[12]. It has been reported that the essential oil extracted from *L. Camara* leaves has adulticidal properties against the mosquitoes *Aedes aegypti* and *Culex quinquefasciatus*. Against both mosquito species, both extracts demonstrated strong larvicidal efficacy. [31]

E) Antihyperglycemic Activity

Methanol extract of *L. Camara* leaves was shown to have antihyperglycemic properties in rats with diabetes induced by alloxan. In rats with alloxan-induced diabetes, oral treatment of the methanol extract of L. Camara leaves (400 mg/kg body weight) caused the blood glucose level to drop to 121.94 mg/dl. [32]

Rats with streptozotocin-induced diabetes (Wistar albino rats) were used to test the hypoglycaemic potential of the methanol extract of *L. Camara* fruits. In streptozotocin- induced diabetic rats, extract therapy at doses of 100 and 200 mg/kg body weight caused a dose-dependent drop in serum glucose levels. Improvements in body weight, hba1c profile, and liver cell regeneration were also observed after extract administration. [33]

F) Antioxidant Activity

In in-vivo experiments, the ethanolic extract of *L. Camara* demonstrated strong antioxidant activity. The amount of lipid peroxidation in the urolithic rats' kidneys was reduced by the extract administration. The DPPH radical scavenging assay and the Nitric oxide free radical scavenging assay were used for the in vitro investigations. In both tests, the extract demonstrated strong antioxidant qualities. [34]

By using the 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging assay along with decreasing power activity, the antioxidant activity of *L. Camara* leaves was reported. Although leaf extracts showed a high antioxidant effect, younger leaves showed more antioxidant activity than older or more developed leaves. [35]

G) Antimutagenic Activity

The antimutagenic properties of 22β-acetoxylantic acid and 22β-dimethyl acryloyloxyl antanolic acid were demonstrated by *L. Camara*. Using Swiss mice, the micronucleus test was used to determine the antimutagenicity. When mice were given Mitomycin C to induce mutagenesis, both substances demonstrated strong antimutagenic activity. [36]

H) Antifungal Activity

L. Camara, a medicinal plant, has significant antifungal potential. The antifungal capability was tested against alternaria sp., a harmful fungus that causes illnesses in vegetables. The food poison plate approach was utilized to perform the antifungal activity with three different concentrations of extract i.e. 10mg/ml, 15mg/ml and 20mg/ml. At 20mg/ml, the plant demonstrated considerable antifungal efficacy against alternaria sp. [33]

Another study found that ethanolic and hot water extracts were effective against wood-destroying fungus, specifically known as white and brown rot fungi. Both extracts demonstrated considerable antifungal action; however the ethanolic extract at a low dosage (0.01%) was more effective. [37]

I) Antiulcerogenic Activity

The methanol extract of *L. Camara* leaves shown antiulcerogenic efficacy against aspirin, ethanol, and cold-resistant stress-induced stomach ulcers in rats. Pre-treatment with the extract (200 and 400 mg/kg body weight) significantly protected rats from ulcers caused by aspirin, ethanol, and cold stress. The extract shown dose-dependent antiulcerogenic efficacy in all models. [38]

J) Hemolytic Activity

Lantana camara is considered hazardous to livestock, particularly ruminants (cattle, sheep, and goats), due to its hemolytic qualities. Saponins, flavonoids, and triterpenoids found in the plant can cause red blood cell membranes to rupture, resulting in hemolysis and hemolytic anemia. *Lantana camara* is sometimes utilized in veterinary toxicology investigations to better understand plant toxicity processes and how they influence animal blood cells. The hemolytic effects can serve as a model for investigating the effects of plant-derived chemicals on erythrocyte membranes as well as the physiological implications of hemolysis. [39]

K) Antimotility Activity

The plant contains bioactive compounds like alkaloids, flavonoids, terpenoids, tannins, and saponins, which are known to have antispasmodic and antimotility properties. Lantana camara may work by interacting with receptors that control gut motility, such as cholinergic or serotonergic receptors. It may also limit

the release of some mediators, such as acetylcholine, which slows stomach contractions. By slowing gut motility, *Lantana camara* can help in the symptomatic management of diarrhea. In cases of IBS with predominant diarrhea, the antimotility effects may provide relief. [40]

L) Antifilarial Activity

Lantana camara contains secondary metabolites such as flavonoids, terpenoids, phenolic compounds, alkaloids, and saponins that have shown antiparasitic properties. These compounds may target the filarial parasite's metabolic pathways, leading to reduced viability or death of the parasites. Extracts from the plant, particularly leaves and flowers, exhibit larvicidal activity, which is effective in killing the larval stages of filarial worms. They also demonstrate microfilaricidal effects, reducing the population of microfilariae in host blood.[41]

M) Anticancer Activity

In MDA-MB-231 cells, *L. Camara* leaf extract produced cytomorphological alterations and a growth-inhibiting effect in a dose-dependent manner. Additionally, the extract caused nuclear condensation and G0/G1 cell-cycle arrest. Apoptosis-induced cell death was verified by flow cytometry analysis. Additionally, *L. Camara* leaf extract decreased MDA-MB-231 cell migration. The aforementioned findings were corroborated by M-RNA expression levels. [41]

Lantana camara inhibits cancer cell proliferation by interfering with cell cycle progression and signaling pathways, such as PI3K/Akt and MAPK. The plant's compounds can inhibit angiogenesis (formation of new blood vessels), cutting off the nutrient supply to tumors. [36]

N) Wound Healing Activity

Compounds in the plant aid in lowering inflammation, which is essential for the early stages of wound healing. An important factor in wound healing is infection, which can be avoided in exposed wounds by using *lantana camara's* demonstrated antibacterial action. Antioxidants in the plant may aid in lowering oxidative stress, which can obstruct the healing process. According to some research, *Lantana camara* speeds up the healing process by encouraging the development of new tissue and cells. It might have analgesic properties that assist lessen wound pain, which can enhance the healing environment as a whole. [42]

POTENTIAL USES:

The plant has been utilized to produce biogas when combined with cow manure, and the seeds provide extra nutrients when fed to sheep together with wheat straw. Some households utilize it. The stems are used to construct furniture like tables and chairs, or the tiny branches are gathered to form brooms. They are also occasionally used as fuel and mulch. The plant's roots that contain compounds are occasionally utilized in the rubber sector. On the stems of *L. Camara*, the sulfate process is used to make writing and printing paper, make temporary shelters, and make baskets that are used as fuel for cooking and heating. As an ornamental plant, the nursery industry in Australia is a fantastic source of revenue. It might offer many native birds the food and refuge they need for the winter. Many endangered bird species use their tickets when their native habitat is inaccessible, and it is an important supply of fluids for many moth and butterfly species. Additionally, it can be applied to stop soil compaction and erosion. This plant's organic materials are utilized to renovate grasslands. [43-45]

INDUSTRIAL USES: [46]

1) Adulticidal action against various mosquito species is exhibited by the essential oil extracted from the leaves. This species can therefore be used in addition to synthetic insecticides for oil-based pesticides.
2) Acid extracts of the shoots show antibacterial activity against Escherichia coli.
3) People use *lantana* biomass directly for a number of reasons, the most significant of which is as additional fuel wood for heating and cooking.
4) Even though lantana stems are thin, its wood is strong and long-lasting, making it suitable for a variety of crafts including wickerwork.
5) There is a material in *lantana* roots that might be utilized to make rubber.
6) The scientific community is investigating the plant's potential use beyond its use as a component in perfumes.
7) Introduced as a garden ornamental in the majority of countries.
8) In addition to being used as an antiseptic for wounds, the leaf oil is used to treat skin irritations.
9) Lantanine, an alkaloid that resembles quinine and has potent antipyretic and antispasmodic effects, is found in the bark of the stem and roots.
10) Pulp, paper fibre, fuel wood, fertilizer, and emerging roofing materials are all possible uses for lantana biomass (NAS, 1981). Its straw is used to make manure and biogas products.
11) It might make a useful raw material for the pulp and paper industries. The stalks, which contain cellulose (30.6%), lignin (14.0%), furfuroids (21.6%), and ash (3.50%), have been tested as raw materials for paper pulp.
12) Due to the scarcity and high cost of bamboo resources, as well as the invasion of bamboo forests by lantana, the Soliga of Karnataka are now using lantana in their wicker craft.
13) If the sulfate procedure is used to lantana stems, pulp for writing and printing paper can be produced.

TOXICITY:

High doses of *L. camara* were poisonous to sheep, cattle, goats, horses, and rodents, among other animals. Lantadene A, B, D, and icterogenic acid, the plant's active ingredients, demonstrated toxicity. Poisoning symptoms include liver enlargement, kidney swelling, photosensitization, jaundice, lack of appetite, and occasionally death.

Anorexia, depression, eyelid enlargement, sloughing of the epidermis, and skin itching are some of the negative effects of plant ingestion, as demonstrated by the case study of *L. camara* poisoning in a young Sirohi goat. In order to treat the purgative toxicity, a liver tonic electrolyte, parental vitamin B complex and extract-based antihistaminic and oral activated charcoal were administered. [47]

Because *L. camara* is highly poisonous, it exclusively affects animals like sheep, goats, cattle, pigs, and horses. There was no evidence of toxicity in humans. In certain nations, people consume the plant's ripe fruit. Unripe fruit can occasionally cause acute poisoning in people. [48]

PHARMACEUTICAL FORMULATION OF *LANTANA CAMARA*:

Table No. 7- Pharmaceutical Formulation of *Lantana camara*

Sr. No.	Pharmaceutical Formulation	Extracts	Therapeutic Properties	Authors
1	Topical Gel [49]	Leaves	Anti-inflammatory	Pawar et al. (2013)
2	Cream [50]	Leaves	Anti-itching agent	Rathod et al. (2024)
3	Herbal Oil [51]	Leaves	Anti-inflammatory	Liu Dongfeng et al. (2015)

4	Emulgel [52]	Leaves	Wound healing	Sultana et al. (2016)
5	Candy [53]	Leaves	Hemorrhoid	Khadgale et al. (2024)
6	Microspheres [54]	Leaves	Antithrombin, Thrombolytic	Smita et al. (2023)
7	Oral suspension [55]	Leaves, Flowers	Anti-tussive	Usmari et al. (2020)
8	Gel [56]	Flower	Mosquito repellant	Jadhav et al. (2024)
9	Silver nanoparticles [57]	Leaves	Anti bacterial	Prakash et al(2021)
10	Handwash [58]	Leaves	Washing and cleaning hands	Bhor et al (2018)
11	Transdermal Patches [59]	Leaves	Wound Healing	Magfirh et al (2022)
12	Natural colorant [60]	Flower	Colorant for food, juices etc	Annegowda et al (2020)
13	Ointment [61]	Flower	Alternative of Povidone-iodine which has wound healing action	Satyajit et al. (2017)

CONCLUSION

Lantana camara, a widely spread plant, has received attention for its several therapeutic applications. Traditional medicine has traditionally used this plant for its antibacterial, anti-inflammatory, antioxidant, and analgesic qualities. Recent research supports its potential for healing skin infections, wounds, and fevers, as well as enhancing overall health. Furthermore, *Lantana camara's* bioactive components show promise in the creation of medicinal medicines. While its medical potential seem intriguing, it is crucial to note that the plant is hazardous to humans and animals in certain dosages, necessitating vigilance and additional research to ensure safe use.

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REFERENCES

1. Venkatadri R; Guha G; Kumar R; Lazar M. Evaluation Of Cytotoxic Potential Of Acorus Calamus Rhizome. *ResearchGate*. Ethnobotanical Leaflets. 13 (6); 2009: 832-839; https://www.researchgate.net/publication/50874098_Evaluation_of_Cytotoxic_Potential_of_Acorus_calamus_Rhizome
2. Adama K; Adama B; H Tamboura; T Amadou; Laya S. In Vitro Anthelmintic Effect Of Two Medicinal Plants (Anogeissusleiocarpus And Danielliaoliveri) On Haemon Chuscontortus, An Abosomal Nematode Of Sheep In Burkina Faso *; African Journal of Biotechnology* 2009. 4690-4695; https://www.ajol.info/index.php/ajb/article/view/62438
3. Kalita,S; Kumar,G; Karthik.L;Rao. K. A Review On Medicinal Properties of *Lantana camara* Linn. *Research journal of Phrmacy and Technology*. 2012; 711-715; https://www.researchgate.net/publication/229150310_A_Review_on_Medicinal_Properties_of_Lantana_camara_Linn 711- 715.
4. Wikipedia contributors. (2024, December 22). *Lantana camara*. Wikipedia, the Free Encyclopedia. https://en.wikipedia.org/w/index.php?title=Lantana_camara&oldid=1264560901.
5. Munir A."A Taxonomic Review Of *Lantana camara L.* And *L. montevidensis* (Spreng.) Briq. (Verbenaceae) In Australia". *Journal of the Adelaide Botanic Gardens*. 1996. 17: 1–27. https://www.jstor.org/stable/pdf/23873894.pdf
6. India Flora Online. (n.d.). *Indian Institute of Sciences*. Ac.In. Retrieved December 30, 2024, from https://indiaflora-ces.iisc.ac.in/herbsheet.php?id=6974&cat=13
7. Chadha H; Saruchi S; & Kumar V. Phytocompound Profiling And GC-MS

Analysis Of *Lantana camara* Leaf Extract. *Journal of the Indian Chemical Society*,2024; 101(11), 101379. https://doi.org/10.1016/j.jics.2024.101379

8. Wagh, A; Ingale, Y; Narkhedkar, P; & Bhujbal, O; "*Lantana camara*: A Valuable Medicinal Plant." *Ijnrd.org*. 2023; a462-a475; from https://www.ijnrd.org/papers/IJNRD2303050.pdf
9. Thomas, S. E. *Lantana camara (Lantana)* [Data set]. In *CABI Compendium*.2015; CABI Publishing.
10. Girish K. Antimicrobial Activities of *Lantana camara Linn*; *ASPCR*.2017; 10(3);57-67; https://images.app.goo.gl/oJ42ZDkzpN31pw8G8
11. Tsammalex - *Lantana camara* (west Indian Lantana). (n.d.). Clld.org. Retrieved January 2, 2025, from https://tsammalex.clld.org/parameters/lantana camara
12. Dr. Giuseppe MAZZA; *Lantana camara; Monaco Nature Encyclopedia*; 2018; https://images.app.goo.gl/J9sbVVnhNWVprsUW7
13. Girish. Negi; Sharma S; Subash C.R. Vishvakarma, Samant S; Maikhuri R; Prasad R; & Palni L;Ecology and Use of *Lantana camara* in India; *The Botanical Review*; 2019; 109-130; https://doi.org/10.1007/s12229-019-09209-8
14. Mungi, N. A., Qureshi, Q., & Jhala, Y. V.Expanding Niche And Degrading Forests: Key To The Successful Global Invasion Of *Lantana camara* (Sensu Lato). *Global Ecology and Conservation*, 2020; *23*(e01080), e01080. https://doi.org/10.1016/j.gecco.2020.e01080
15. Medicinal Plants: Utilization and Conservation" by I.K. *Sharma"Ethnobotany of India*, Volume 4" edited by T. Pullaiah
16. Jamal, M; Amir, M; Ali, Z; Mujeeb, M; A Comparative Study For The Extraction Methods And Solvent Selection For Isolation, Quantitative Estimation And Validation Of Ursolic Acid in the Leaves of *Lantana camara* by HPTLC Method;*Future Journal of Pharmaceutical Sciences*; 2018; 4(2);229-233; https://www.sciencedirect.com/science/article/pii/S2314724517301723#:~:text=camara.,camara%20leaves%20for%20routine%20analysis
17. Akinmoladun, F. O., Olaleye, T. M., Komolafe, T. R., Olapade, O. J."Phytochemical Analysis And Antioxidant Properties Of *Lantana camara*." *Journal of Medicinal Plants Research,2020;* 14(6), 263–271.
18. Venkatesh S [1, *], Latha R [2], Anaswara R Nath [1], Jincy T C [1], Muhammed Shibli P C [1] and Suresh A;Antihyperglycemic And Antioxidant Activities Of Ethanolic Extract Of *Lantana camara* Leaves; *International journal of frontiers in life science research;2021;* 01(02),005–015. https://frontiersrj.com/journals/ijflsr/content/anti-hyperglycemic-and-anti-oxidant-activities ethanolic-extract-lantana-camara-leaves
19. Shirpurkar y; venkatesan j; Microwave-Mediated Extraction Of *Lantana camara* (L) With Cow Urine; *Asian Journal of Pharmaceutical and clinical research*; 2023; 16(02); 187-191; https://mail.innovareacademics.in/journals/index.php/ajpcr/article/download/48752/29250
20. Dua V; Pandey A; *Singh R; Sharma V; Subbarao S ;* Isolation of repellent ingredients from *Lantana camara* (Verbenaceae) flowers and their repellency against *Aedes* mosquitoes; *Journal of Applied Entomology*;2023; https://doi.org/10.1046/j.1439-0418.2003.00789.x
21. Ganatra S; Gurubaxani S; Preliminary Phytochemical and TLC Profiling of *Lantana camara* Leaf Extracts; *Journal of Chemical and Pharmaceutical Research*;2016; 8(5):614-617; https://www.jocpr.com/articles/preliminary-phytochemical-and-tlc-profiling-of-lantana-camara-leaf-extracts.pdf
22. Harborne, J.B.Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis (3rd ed.). *Springer Science & Business Media*. ISBN 1998; 978-0-412-57260-9. https://www.researchgate.net/profile/Br-Rajeswara-Rao/post/How-do-I-choose-solvents-for-extraction-process-of-plant-extract/attachment/59d622f379197b80779814

87/AS%3A304351921278977%401449574560991/download/Phytochemical+methods-Harborne.pdf
23. Ali, M. S., Rahman, M. M., and Islam, M. R. "Phytochemical Screening of *Lantana camara"*. *Journal of Pharmacognosy and Phytochemistry*, 2015; 4(1), 96-102.
24. Briskin, D.P."Medicinal Plants and Phytomedicines: Linking Plant Biochemistry and Physiology to Human Health." *Plant Physiology*, 2000; 124(2), 507-514. https://pubmed.ncbi.nlm.nih.gov/11027701/
25. Ncube, N. S., Afolayan, A. J., & Okoh, A. I. Assessment techniques of antimicrobial properties of natural compounds of plant origin: current methods and future trends. *African Journal of Biotechnology*, 2008; 7(12), 1797-1806. https://www.researchgate.net/publication/258027767_Assessment_techniques_of_antimicrobial_properties_of_natural_compounds_of_plant_origin_Current_Methods_and_Future_Trends
26. Sofowora, A. *Medicinal Plants and Traditional Medicine in Africa* (2nd ed.). Ibadan, Nigeria: Spectrum Books Limited. 1993;191-289; https://www.scirp.org/reference/referencespapers?referenceid=1964413&utm_source=chatgpt.com
27. Patel, D. K., and Patel, K; Phytochemical and Medicinal Study of *Lantana camara* Linn. (Verbenaceae) – A Review; *Asian Journal of Pharmaceutical and Clinical Research*; 2021; 14(9); 10.22159/ajpcr.2021.v14i9.42444
28. Reddy,M; *Lantana Camara* Linn. Chemical constituents and medicinal properties: A review. *Saspublishers.com;445-448;* from https://saspublishers.com/media/articles/SAJP26445-448.pdf
29. Apriliana, R., Aldi, Y., & Oktavia, S. Effects Of Anti-Inflammatory And Antioxidant Activities Of *Lantana (Lantana camara L*). *International Journal of Pharmaceutical Sciences and Medicine*, 2021; *6*(8), 144–151. https://doi.org/10.47760/ijpsm.2021.v06i08.010
30. Harlis, W. O., Jamili, Ruslin, &Malarangen, R. Toxicity of Patiwala Leaf Extract (*Lantana camara Linn*.) as Antifertility Against Pregnancy in Rat (Mus musculus L.) Preimplantation Stage. *Pakistan Journal of Biological Sciences: PJBS*, 2023; *26*(2), 72–80. https://doi.org/10.3923/pjbs.2023.72.80
31. Barros L; et al; Safety Assessment And Antioxidant Activity Of *Lantana montevidensis* Leaves: Contribution To Its Phytochemical And Pharmacological Activity, *excli journal*, 2017; 16: 566-582 – issn1611-2156. https://pmc.ncbi.nlm.nih.gov/articles/PMC5491919/
32. Ganesh T et al. Pharmacognostic And Anti-Hyperglycemic Evaluation Of *Lantana Camara* (L.) Var. Aculeate Leaves In Alloxan-Induced Hyperglycemic Rats. International *Journal of Research in Pharmceutical Sciences*.2010; 1 (3);247-252. https://ijrps.com/home/article/view/2912
33. Venkatachalam T et al. Antidiabetic activity of *Lantana camara* Linn Fruits in Normal and Streptozotocin-induced Diabetic Rats. *Journal of Pharmacy Research*.2011; 4 (5); 1550-1552.
34. Mayee R, Thosar A.Evaluation Of *Lantana camara* Linn. (Verbenaceae) For Antiurolithiatic And Antioxidant Activities In Rats. *International Journal of Pharmaceutical and Clinical Research*.2011; 3 (1); 10-14. https://www.researchgate.net/publication/282726503_Evaluation_of_lantana_camara_Linn_Verbenaceae_for_antiurolithiaticand_antioxidant_activities_in_rats
35. Bhakta D, Ganjewala D. Effect Of Leaf Positions On Total Phenolics, Flavonoids And Proantho-Cyanidins Content And Antioxidant Activities In *Lantana camara* (L). *Journal of Scientific Research.* 2009; 1 (2); 363-369.DOI: 10.3329/jsr.v1i2.1873
36. Barre JT et al. A Bioactive Triterpene From *Lantana camara. Phytochemistry*. 1997; 45 (2); 1997: 321-324. https://pubmed.ncbi.nlm.nih.gov/9162177/
37. D. Srivastava, P. Singh; Antifungal Potential Of Two Common Weeds Against Plant Pathogenic Fungi-Alternaria Sps, *Asian J. Exp. Biol. Sci*. 2 (2011) 525–528. https://www.researchgate.net/publication/287174337_Antifugal_potential_of_two_common_weeds_against_plant_pathogenic_fungi-Alternaria_sps

38. S. Tripathi, K. Rawat, S. Dhyani, H. Pant; Potential Of *Lantana camara* Linn. Weed Against Wood Destroying Fungi., *Indian Forester*. 2009; 135- 403. https://www.indianforester.co.in/index.php/indianforester/article/view/361
39. Thamotharan G et al.Antiulcerogenic Effects Of *Lantana camara* Linn. Leaves On In Vivo Test Models In Rats. *Asian Journal of Pharmaceutical and Clinical Research*.2010; 3 (3); 57-60. https://www.researchgate.net/publication/261946311_Antiulcerogenic_effects_of_Lantana_camara_Linn_leaves_on_in_vivo_test_models_in_rats
40. Kalita S et al. Phytochemical Composition And In Vitro Hemolytic Activity Of *Lantana camara* L. (Verbenaceae) Leaves. *Pharmacologyonline*. 2011; 1: 59-67; https://www.researchgate.net/publication/215434077_Phytochemical_Composition_and_In_Vitro_Hemolytic_Activity_of_Lantana_Camara_L_Verbenaceae_Leaves
41. Sagar L, Sehgal R and Ojha S.Evaluation Of Antimotility Effect Of *Lantana camara* L. Var. Acuelata Constituents On Neostigmine Induced Gastrointestinal Transit In Mice. *BMC Complementary and Alternative Medicine*. 5; 2005: 18. https://bmccomplementmedtherapies.biomedcentral.com/articles/10.1186/1472-6882-5-18
42. Misra N et al. Chemical Constituents And Antifilarial Activity Of *Lantana camara* Against Human Lymphatic Filariid Brugiamalayi And Rodent Filariid Acanthocheilonemaviteae Maintained In Rodent Hosts. *Parasitology Research*. 2006; 100 (3); 439-448. https://pubmed.ncbi.nlm.nih.gov/17061115/
43. A.Pal, S.Sanyal, S. Das, T.k. Sengupta. Effects Of *Lantana camara* Ethanolic Leaf Extract On Survival And Migration Od MDA-MB- 231 Triple- Negative Breast Cancer Cell Line. *Journal of herbal medicine*. 2025; https://www.sciencedirect.com/science/article/abs/pii/S2210803323002154#:~:text=Results-,L.,for%20triple%2Dnegative%20breast%20cancer
44. Nayak BS et al. Evaluation Of Wound Healing Activity Of *Lantana camara* L. - A Preclinical Study. Phytotherapy Research. 2009; 23 (2); 241-245. https://www.researchgate.net/publication/23308594_Evaluation_of_Wound_Healing_Activity_of_Lantana_camara_L_-_A_Preclinical_Study
45. Sharma OP, Makkar HP, Dawra RK. A Review Of The Noxious Plant *Lantana camara*.*Toxicon; 1988;* 26:975-87; https://www.sciencedirect.com/science/article/pii/0041010188901961
46. Khanna LS, Prakash R. Theory and Practice of Silvicultural Systems. *India: International Book Distributions*; 1983; p. 400; https://g.co/kgs/Lfxi84v
47. Singh V, Agrawal M, Nagda RK, Sharma MC, Mordia A. A Case Study of *Lantana camara* Poisoning In Sirohi Goat. *Int J Rec Sci Res;* 2018; 27953-5
48. Gujral GS, Vasudevan; P. *Lantana camara* L. a problem weed. *J Sci Ind* Res 1983;42:281-6.
49. Pawar, D. P., & Shamkuwar, P.Formulation And Evaluation Of Herbal Gel Containing *Lantana camara* Leaves Extract. *Asian Journal of Pharmaceutical and Clinical Research*, 2013; *6*(3), 122–124. https://journals.innovareacademics.in/index.php/ajpcr/article/download/129/92
50. Rathod, P., Pujari, A., Chetankumar, M., & Kolageri, S. Formulation and Evaluation of Herbal Cream Using *Lantana camara* Plant. *Humanjournals.com.2024;* https://ijppr.humanjournals.com/wp-content/uploads/2024/09/21.Praveen-Rathod1-Aishwarya-Pujari1-Chetankumar-M1-Shivanand-Kolageri.pdf
51. Liu Dongfeng. Preparation Method Of *Lantana camara* Volatile Oil And Application Thereof For Diminishing Inflammation And Easing Pain (Patent No. CN:104257903:A*). In Patent* (CN:104257903:A). 2015; https://g.co/kgs/YTxfuyw
52. Sk Shaheda sultana, Swati S; Formulation And Evaluation Of Herbal Emulgel Of *Lantana camara* Leaves Extract For Wound Healing Activity In Diabetic Rats;*Indo American journal of pharmaceutical research*.2016;.https://www.researchgate.net/publication/326507114_formulation_and_evaluation_of_herbal_emulgel_of_lantana_camar

a_leaves_extract_for_wound_healing_activity_in_diabetic_rats
53. Khandgale.s.s; Formulation Development And Evaluation of Herbal Candy Containing *Lantana camara* Leaves Extract For Treatment of Hemmorhoid; *Ijpsjournal.com*.2024; from https://www.ijpsjournal.com/article/Formulation-Development-and-Evaluation-of-Herbal-Candy-Containing-Lantana-Camara-Leaves-Extract-for-Treatment-of-Hemorrhoid-
54. Mujbaile, S., Khobragade, D., & Mundhada, D.Formulation and Optimisation of Microspheres of Leaves extract of *Lantana camara* 32 Design Approach. *International Journal of Pharmaceutical Quality Assurance*, 2023; 14(02), 268–273. https://doi.org/10.25258/ijpqa.14.2.04
55. Nukala Umasri*1, Sepuri Vijayalaxmi1, Kousar Begum2, Dr. B. Chandra Sekhara Rao2; *Lantana camara*: A Herbal Extract Oral Suspension Formulation and Evaluation For Its Anti-Tussive Activity; *European Journal of Biomedical AND Pharmaceutical sciences.2017;* https://www.ejbps.com/ejbps/abstract_id/3547
56. Athukorala, N. U. N., Digoarachchi, D. A. G., Gajadeera, G. A. D. Y., Perera, K. R. T., Zakeer, M. N. M., Ranathunge, R. M. T. B., & De Silva, H. H. V. K. N. Formulation Development And Mosquito Repellence Testing Of Pharmaceutical Gels Containing *Lantana camara* Flower Extract. *Pharmaceutical Journal of Sri Lanka*,2023; 13(1), 1–13. https://doi.org/10.4038/pjsl.v13i1.89
57. Prakash, G. Formulation and Characterization of Silver Nanoparticles Loaded with Aqueous Extract of *Lantana camara* Linn Leaves; *Future Journal of Pharmaceuticals and Health Sciences*, 2021; 1(2), 63–70. https://doi.org/10.26452/fjphs.v1i2.248
58. Bhor RJ, Bhadange SD, Gaikwad RJ, Bhangale CJ. Formulation And Evaluation By Phytochemical Analysis Of Herbal Handwash. *Asian J Pharm Res* 2018;7:111-21.
59. Magfirah, & Indah kurnia utami. Formulation And Evaluation Of Transdermal Patches Of Leaf Ethanol Extract *Lantana camara* Linn With Ethyl Cellulose-Poly Vinyl Pyrolidone Polymer Variations. *World Journal of Advanced Research and Reviews,2022;* 15(3), 284–289. https://doi.org/10.30574/wjarr.2022.15.3.0915
60. Annegowda HV, Tripathy A, Majumdar SP, Harish M. Application Of *Lantana camara* Flower Extract As A Natural Coloring Agent With Preservative Action. *Asian J Biol Sci. 2020;* 13:361-9. https://scialert.net/fulltext/?doi=ajbs.2020.361.369
61. Satyajit S, Rath B, Pradhan S, Pattnaik S. Wound Healing Activity Of Topical Formulation Of *Lantana camara* Linn. Flower Water Distillate In Wistar Rats. *Indian J Pharm Pharmacol.2017;* ;4:29-33. https://www.ijpp.org.in/article-details/3846

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