Section A-Research paper

ANTIOXIDANT ACTIVITIES AND PHYTOCHEMICAL ANALYSIS *LANATA CAMERA* LEAVES EXTRACTED

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ABSTRACT:
A significant part of the prevention and treatment of human diseases is played by antioxidant phytochemicals. Screening and identifying these chemicals from various plant species is the first step in realising their therapeutic potential. This study examined the presence of strong antioxidant phytochemicals in the invasive plant species *Lanata camera*. Total phenol, total flavonoid, and total alkaloid content of ***Lanata camara*** leaves extracts as well as antioxidant potential (total antioxidant activity, iron chelating activity, and enzymatic activity), were investigated (peroxidase and polyphenol oxidase).The extract had a high level of free radical scavenging activity however whole leaves extracts had a little greater quantity of antioxidants.Crude extracts were analysed chemically using FTIR, UV-Visible spectroscopy. The presence of numerous functional groups, such as N-H, C-H, -OH and C = O in the extracts from *Lanata camera* leaves as indicated by FTIR spectral analysis suggests the presence of multiple metabolites. As a result, extracts from *Lanata camera* leaves have the potential to play a significant role in the treatment of human ailments.

Keywords: *Lanata camera* leaves extract, Qualitative and Quantitative analysis, Fluorescence behavior, Histochemical analysis, UV-VIS and FT-IR spectral analysis.

INTRODUCTION:

Due to the detrimental consequences of oxidative stress human bodies produce more reactive oxygen species (ROS) than enzymatic and non-enzymatic antioxidants (such as tocopherol, ascorbic acid, flavonoids, glutathione and carotenoids) than enzymatic antioxidants (catalase, superoxide anion radicals). These imbalanced components must be damaging cells and leading to human sickness as a result [1]. Traditional medicine is increasingly being used by many individuals to prevent or treat a variety of ailments [2]. Some of the bioactive components present in medicinal plants that have anti-inflammatory, anti-oxidant, and antibacterial activities include tannins, alkaloids, polysaccharides, terpenoids, steroids, flavonoids, sponins and glycosides[3] [4]. Similar to this, many phytochemicals belonging to different chemical families have been employed to have inhibitory effects on a range of disorders [6]. It is especially important to identify their active constituents and to present scientific data in order to better understand the qualities and quantities of these phytochemicals and other components given the significance of phytochemicals and other components of medicinal plants as well as their widespread use by members of the local community and medical professionals for a variety of ailments [7]. A substance known as an antioxidant can prevent the oxidation of other molecules, such as oxygen species (ROS).. The antioxidant effect is brought about by phenolic compounds like phenolic acid, phenolic diterpenes and flavonoids. These compounds redox reaction properties which can absorb and neutralise free radicals by quenching singlet and triplet oxygen are the mechanism by which antioxidant compounds work. Antioxidants are therefore essential for shielding the organism from the cell damage brought on by reactive oxygen species. [8][9]. According to metabolic processes phytochemical contents can be categorised into three groups phenolics (flavonoids and tannins) nitrogen and sulfur-containing compounds (alkaloids, cyanogenic, glycosides and glucosinolates), and terpenoids [10]. Plants produce secondary metabolites including alkaloids, steroids, tannins and phenolic chemicals which are then deposited in certain areas or all throughout the plant Since the beginning of time mankind have employed medicinal herbs for a variety of purposes as we are well aware of their significance in the medication development process[11] [12]. These results imply that leaf extracts might be the finest natural antioxidant source for a range of advantages to human health [13]. These advantages are outlined above as well as the availability of special qualities for phytochemical active ingredients obtained from organic sources like plants. The current study investigated the phytochemical components of an extract of *Lanata camera* (Unni chedi) leaves as a result.

Gathering the materials:

The chemicals nitro blue tetrazolium (NBT), ethylene diamine tetraacetic acid (EDTA), sodium nitroprusside (SNP), trichloroacetic acid (TCA), thiobarbituric acid (TBA), potassium hexa cyano ferrate [K3Fe(CN)6], and L-ascorbic acid were supplied by Sisco Research Labs Pvt. Ltd., India. Every other substance, including solvents, is of analytical quality and marketed for use. The plant material is fully developed. On the campus of Tamil University in Thanjavur District, Tamil Nadu, India, leaves from the solitary herb Lanata camara were collected. The leaves were recognised and verified by Dr. S. John Britto, Director of the Rabinat Herbarium and the Institute for Molecular Systematics at St. Joseph's College in Trichy, Tamil Nadu, India. A voucher specimen has been placed at the Rabinat Herbarium of St. Joseph's College in Thiruchirappalli, Tamil Nadu, India (RCS001).

Preparation of various solvent extracts:

To get rid of any pollutants the *Lanata camera* leaves were gathered and repeatedly cleaned with distilled water. The leaves were air dried and then ground into a coarse powder. The powder was extracted with various extracts for 48 hours (ethanol, petroleum ether, methanol, and aqueous). After the alcohol was completely removed under reduced pressure a semi-solid extract was produced. Until it was required the *Lanata camera* leaves extract (LCLE) was kept in the fridge. It was decided to use dosages of 20, 40, 60, and 80 g/ml

for in vitro antioxidant activity.

RESULT AND DISCUSSION:

Statistical analysis:

Triplicates of three to five different experiments were carried out.. Using a nonlinear regression technique the IC50—the amount of extract required to reduce the concentration of free radicals by 50%—was calculated. The study of plant chemistry (chemical analysis) is known as phytochemistry. Plant chemicals have been the subject of qualitative and quantitative investigation. A standard or evaluation criterion for pharmaceuticals is the presence or absence of a chemical. Antioxidants are chemicals that inhibit the oxidation of biological tissues and cells by oxygen species and free radicals. Plant foods assist the body resist oxidative stress and provide a number of health benefits by maintaining a balance between oxidants and antioxidants in the body. Among the antioxidants found in plant-based foods include glutathione and various nutrient- and non-nutrient-based antioxidants.

***Lanata camera* leaf extracts phytochemical analysis:**

Qualitative research:

Secondary metabolites have been found to possess a wide range of biological and medicinal activities. Due to their medicinal effectiveness and minimal toxicity these substances have caught the attention of pharmacists [14]. Based on the medicinal potential of secondary metabolites the phytochemical properties of *Lanata camera* leaves were examined and shown in table .1. In all of the leaf extracts from *Lanata camera* phytochemicals such as flavonoids, polyphenols, steroids, saponins, terpenoids, triterpenoids and other substances were discovered of all the extracts, methanol extract reveals the most chemicals that are present in leaves.

Table.1 Preliminary phytochemical analysis in *Lanata camera* leaves

S.No	Secondary Metabolites	Methanol extract	Ethanol Extract	P.E Extract	Aqueous Extract
1	Tannin	+	+	-	+
2	Phlobatannin	+	-	-	-
3	Saponin	+	+	+	+
4	Flavonoids	+	+	+	+
5	Steroids	++	+	+	+
6	Terpenoids	+	+	+	+
7	Triterponids	+	+	+	+
8	Alkaloids	+	+	-	-
9	Carbohydrate	+	-	++	-
10	Protein	-	-	-	+
11	Anthroquinone	-	-	+	+
12	Polyphenol	+	+	+	-
13	Glycoside	-	-	+	+

"+" indicates presence of the compounds; "-" indicates absence of the compounds, "++" indicates the high concentration and P.E=petroleum ether.

Quantitative analysis of *Lanata camera* leaves:

The leaves of the *Lanata camera* were studied and statistically placed on a table. 2. There were considerable levels of total phenol (210.8412.24), saponin (25.21.50), alkaloids (62.41.74)and flavonoids (162.3010.11). The aforementioned phytochemical components were assessed using traditional methods. Among the several phytoconstituents phenol had the highest concentration.

Analyzing the inorganic components of Lanata camera leaves qualitatively:

Researchers looked at the inorganic elements present in *Lanata camera* leaves and listed them in a table .3. Iron was not present but the leaves did include calcium, sodium, potassium, sulphate, phosphate, chloride, nitrate and magnesium. These components are believed to be essential for the growth and development of the body.

Table.2 Quantitative Analysis of *Lanata camera* leaves Methanolic Extract:

S.No	Secondary Metabolites	Result (mg/gm)
1.	Total Phenol	210.84±12.24
2.	Alkaloids	62.41±2.74

3.	Saponin	25.21±1.50
4.	Flavonoid	162.30±10.11

Values are expressed as Mean ± SD for triplicates

Table.3 Qualitative inorganic elemental analysis in *Lanata camera* leaves

S.No	Inorganic elements	Result
1.	Calcium	+
2.	Magnesium	+
3.	Sodium	+
4.	Potassium	+
5.	Iron	-
6.	Sulphate	+
7.	Phosphate	+
8.	Chloride	+
9.	Nitrate	+

"+" indicates presence of the compounds; "-" indicates absence of the compounds.

Fluorescence behaviour of powdered *Lanata camera* leaves:

Both UV and daytime light were used to study the fluorescence of whole *Lanata camera* leaves. The fluorescence examination of *Lanata camera* leaves powder was carried out using a variety of chemical reagents including H_2SO_4, HCl, HNO_3, CH_3OH, NaOH, and others. The findings from testing the powders under short (245 nm) and long (400 nm) UV light are shown in Table.4 and Plates (1), (1), and (1) (365 nm).

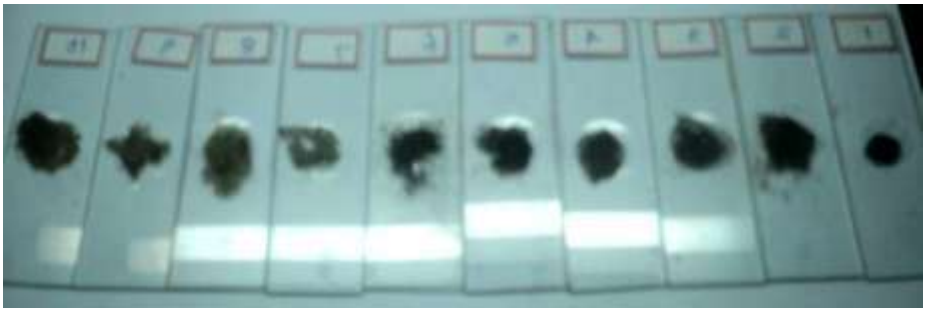

Plate 1.a. Observation under day light

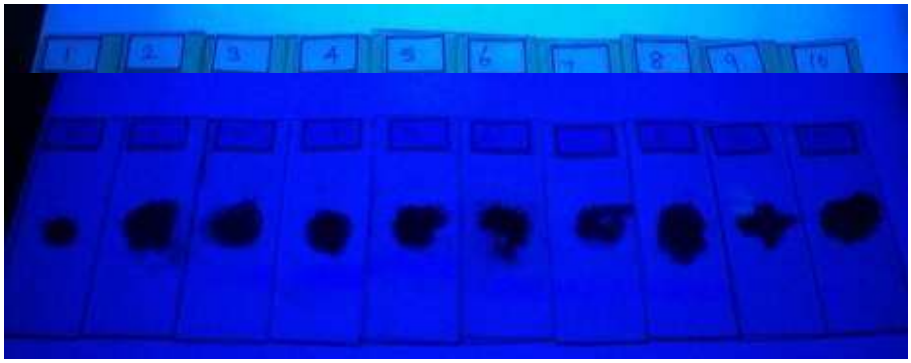

Plate 1.b. Observation under UV light in short wave length (245 nm)

Plate 1.c. Observation under long wave length (365 nm)

Plates.1: Fluorescence behavior of leaf powder of *Lanata camera* on treatment with different chemical reagents

Table.4: Fluorescence behavior of leaf powder of *Lanata camera* on treatment with different chemical reagents

S.No	Test	Visible Light	Short UV	Long UV
1	Plant powder	Black	Brown	Dark Brown
2	Plant powder treated with water	Light Brown	Brown	Dark Brown
3	Plant powder treated with Hexane	Dark Green	Dark Brown	Dark Brown
4	Plant powder treated with Chloroform	Dark Brown	Black	Black
5	Plant powder treated with Methanol	Brown	Brown	Black
6	Plant powder treated with Acetone	Dark Brown	Dark Black	Dark Black
7	Plant powder treated with 1N NaOH (water)	Light Brown	Dark Green	Dark Brown
8	Plant powder treated with 1N HCl	Light Brown	Dark Green	Dark Brown
9	Plant powder treated with sulphuric acid with an equal amount of water	Light Brown	Dark Green	Dark Brown
10	Plant powder treated with Nitric acid dilute with an equal amount of water	Dark Brown	Dark Green	Dark Black

Histochemical study of powdered *Lanata camera* leaves*:*

Several chemicals and reagents were used to create powdered Lanata camera leaves. The powdered Lanata camera leaves were treated with phloroglucinol and diluted hydrochloric acid to produce red colour, which indicates lignin, yellow colour, which discloses flavonoids, and brown colour, which indicates alkaloids. A light microscope was used to examine the ground-up plant material (Table.5 and Plates 2).

Table .5 Histochemical analysis for *Lanata camera* leaves powder

S.No	Charecterisation	Observation	Result
1	Flavonoids	Yellow	+
2	Alkaloids	Reddish Brown	+
3	Tannin	Dark Blue to Black	+
	Steroids	Violet to Blue	+
5	Polyphenol	Blue green/Red	+

(+) Presence

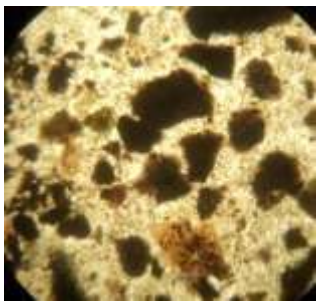

Plate 2.a. Flavonoids

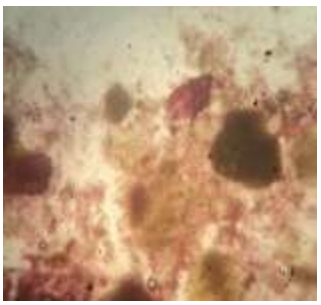

Plate 2.b. Alkaloids

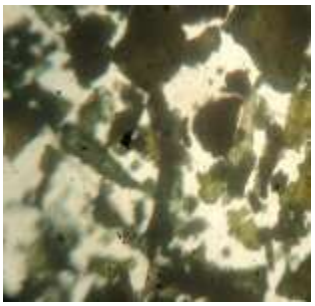

Plate 2.c. Tannin

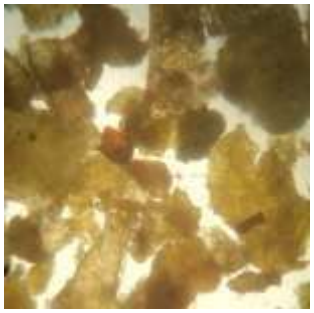

Plate 2.d. Steroids

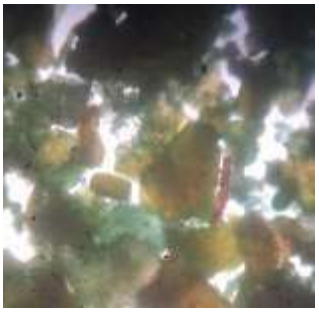

Plate 2.e. Polyphenol

Plates 2: studies on the histochemistry of plant powder

UV-VIS spectral analysis of Lanata camera leaves:

Based on a comparison of the spectra of seeds and flowers, it was found that the Lanata camera contained phenolic and alkaloids because peaks at 224-657 nm indicated their presence [15]. The extract also contained some comparable alkaloid, flavonoid, and glycoside compounds (Figure.1 and Table.6).

Figure 1: UV-Vis Spectral Analysis of Extracts from Lanata Camera Leaves:

Table 6 shows the UV-VIS peak values of Lanata camera leaves' extract.

S.No.	Wave length (nm)	Absorption Peak
1	224.3	3.890
2	334.4	0.544
3	418.7	0.639
4	657.0	0.257

Fourier Transform Infrared Spectroscopy analysis of Lanata camera leaves extract:

An unknown mixture of plant extracts can be identified and characterised by chemicals or functional groups (chemical bonds) using the FT-IR technique (Fig.2 and Table.7)

Figure 2: FT-IR study of a leaf extract from a Lanata camera

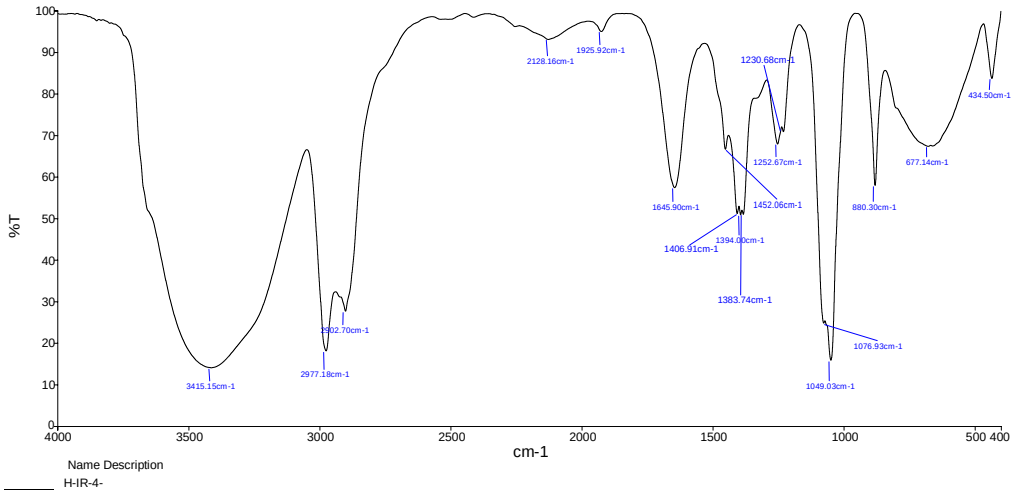

Table .7:FT-IR Peak Values of Extract of *Lanata camer*

S.No.	Peak Values	Bonds	Functional groups
1	3415	O-H stretch, H-bonded	Alcohols, phenols
2	2977	O-H stretch	Carboxylic acids
3	2902	O-H stretch	Carboxylic acids
4	2128	C≡C- stretch	Alkynes
5	1645	C=C- stretch N-H bend	Alkenes 1° amines
6	1452	C-C stretch(in-ring) C-H Bend	Aromatics Alkanes
7	1406	C-C stretch(in-ring)	Aromatics
8	1252	C-H Wag(-CH2X	Alkyl halides
9	1230	C-H Wag(-CH2X	Alkyl halides

The appearance of peaks at 224-657 nm revealed the presence of phenolic and alkaloids in the Lanata camera according to UV-VIS spectroscopic research. Similar alkaloid, flavonoid, and glycoside compounds have been found for the extract[15]. based on an analysis of the spectrums of seeds and flowers (Figure.2 and Table.7)

Due to their status as unproven drugs that are often believed to be safe, natural pharmaceuticals have recently witnessed a resurgence in popularity. Another concern that draws attention to this is the occurrences of dangerous nature of artificial medication that is deemed to be damaging to family members and the environment. Although natural medications have the benefits of being easy to use, affordable, and having few to no negative effects, they are susceptible to adulteration [16]. A chemical that slows or stops the oxidation of substitute substances could be considered an inhibitor. They shield cells from harm caused by unstable molecules called free radicals. By removing radical intermediates and altering themselves, antioxidants halt these chain events and block alternative oxidation processes. Because free radicals are vital to all organic chemistry and an essential component of aerobic life and metabolism, the majority of illnesses are associated with aerophilic stress [17]. The leaves of Lanata camera appear to have a variety of disease-fighting abilities. Lanata camera leaves have been used to test the antioxidant activity of phytochemicals in vitro and in silico.

Phytochemicals were examined in Lanata camera leaves:

Analyses, both qualitative and quantitative:

Plants are crucial for the growth and development of both humans and animals since they are abundant in macromolecules like sugar, lipids, oils, minerals, vitamins, and water. Plants contain compounds called phytochemicals. According to its literal meaning, the Greek word "phyto" denotes a plant. The role that phytochemicals play in plant metabolism determines whether they are categorised as primary or secondary elements. Many essential metabolic components, such as chlorophyll, common amino acids, carbohydrates, proteins, pyrimidines, and purines from nucleic acids are necessary for plant growth and development. an an an an an an an an an an an a. the world. Pollinator attraction, disease and predator prevention, and other duties are examples of supplemental work [17][18]. We looked into the phytochemical characteristics of Lanata camera leaves. All of the extracts contained flavonoids, polyphenols, steroids, saponins, terpenoids, and triterpenoids. Methanol extract had the highest levels of the leaf-specific chemicals compared to the other extracts. Large levels of total phenol, saponin, alkaloids, and flavonoids were found during the quantitative examination. Lanata camara leaves are abundant in phytochemicals, which are vital for disease prevention. [19], [20], [21].

The majority of phenolic compounds have been studied for their pharmacological efficacy against oxidative stress-mediated disorders like inflammation, cardiovascular diseases, and antiulcer, anticancer, antioxidant, antispasmodic, cytotoxic, and antidepressant properties [22]. Flavonoids are polyphenolic compounds that are found in large quantities around the world. Flavonoids were crucial to the development of many effective medical treatments in ancient cultures, and they remain so today. More than 4,000 flavonoids have been identified, and they can be found in fruits, vegetables, and beverages like coffee, tea, and fruit juices [23].

The wide range of pharmacological and biological properties that flavonoids exhibit has recently drawn a lot of attention. The capacity of flavonoids to act as potent antioxidants that protect the body against reactive oxygen species is one of their most crucial properties. The favourable effects flavonoids are thought to have include inhibition of enzymes, anti-inflammatory action,

oestrogenic activity, antibacterial activity, antioxidant activity, anti-allergic activity, cytotoxic anticancer activity, and vascular activity [24][25]. Particularly in view of the well-established biological effects of extracts containing tannin, the demand for identifying new compounds has increased. Treatment for stomach and duodenal malignancies included the use of astringents, as well as diarrhoea medicines, diuretics, antiseptics, antioxidants, anti-inflammatory, and hemostatics [26]. A group of chemical molecules known as terpenoids is composed of isoprene units with five carbons. Most terpenoids can be separated from one another by their basic carbon skeletons and functional groups. All living organisms include this kind of natural lipid, making it the most diverse class of natural goods. Terpenoids exhibit a variety of medicinal effects, such as hepaticidal, antimalarial, anticarcinogenic, anti-ulcer, antibacterial, or diuretic ones [27].

Qualitative investigation of inorganic elements in the Lanata camera:

To meet the needs of their daily activities, all humans require a diversity of complex organic and inorganic chemicals in their diet. Water, lipids, proteins, vitamins, and minerals are the nutrients that are most important to consume [28]. Every element is necessary, and the loss of even one could cause abnormal bodily growth. Plants are a rich source of all the nutrients that people need. A plant's nutritional value and elemental content are connected. While some elements offer extra benefits, others are required for growth, the building of structures, reproduction, or as components of molecules with physiological function [29]. Since it is frequently important to describe the concentration and kind of minerals contained in food on the label, the quantity or quality of mineral elements present in plants must be measured. Food quality is influenced by the amount and type of minerals it contains in several different ways. Minerals are essential for preventing and mitigating degenerative diseases and processes, in addition to enhancing one's capacity for work and learning. While some minerals, such as calcium, phosphorus, potassium, and sodium, are essential for a healthy diet, others, such as lead, mercury, cadmium, and aluminium, can be dangerous. As it is evident that mineral nutrition is crucial for optimum health, The Ayurveda Pharmacopoeia of India now includes determinations of As, Ca, Fe, Mg, Na, K, Zn, Ni, Co, and other elements [30][31].

***Lanata camera* leaves' fluorescent behavior:**

Fluorescence is the mechanism through which numerous chemical elements in a plant produce light. Several chemicals shine in the visible spectrum in daylight. Several substances that are opaque to sunlight shine when they are subjected to UV light. Other reagents can commonly be used to convert non-fluorescent compounds into their fluorescent derivatives or breakdown products. Fluorescence analysis is one pharmacognostic method that can tell real samples from adulterants [32]. Fluorescence analysis can be used to study plant fragments or unfinished pharmaceuticals in powdered, solution, or extract form. Even though it's usually unknown exactly what chemicals produce the fluorescence properties, the procedure's advantages of simplicity and speed make it a helpful analytical tool for the identification of plant samples and unfinished pharmaceuticals. As a result, it becomes a crucial pharmacognostical metric that is widely employed to qualitatively evaluate specific drugs. We looked at the fluorescence of powdered Lanata camera leaves. Lanata camera leaf powder displays brown, light green, and dark black colours under regular daylight, short (245 nm) and long (365 nm) UV light, as well as after being treated with a variety of chemical reagents, including AlCl3, H2SO4, HCl, NH3, HNO3, CH3OH, and NaOH.

An analysis of the histochemistry of powdered Lanata camera leaves:

Histochemical techniques have been applied to examine the structure and development of important storage compounds such as proteins, lipids, starch, phytin, and minerals such as calcium, potassium, and iron as well as the time course of deposition and distribution of these substances [33]. It is well known that various markers can be used and that histochemistry plays a significant role in resolving important biosystematics problems. The use of histochemical features to determine taxonomy is now widespread, according to botanical literature. The results of this study show that when Lanata camellia leaf powder was treated with phloroglucinol and diluted HCl, a red colour indicating lignin was produced; when it was treated with diluted ammonia and H2SO4, a yellow colour indicating flavonoids was produced; and when it was treated with dragant draught reagent, a brown colour indicating alkaloids was produced. A light microscope was used to analyse the powdered processed plant material. The subsequent review supported our findings.

Light microscopy was used to do histochemical tests on the plant, and a UV lamp was used to examine the fluorescence study. The thallus's tannic, phenolic, and phenol molecules responded favourably to histochemical studies. Under visible and ultraviolet (UV) light, a fine powder and numerous solvent extracts of Turbinaria ornata prepared with petroleum ether, benzene, chloroform, acetone, ethanol, and water were studied. When the powdered components were exposed to various reagents, such as 50% nitric acid, 50% sulfuric acid, 1N HCl, and 1N NaOH, colour changes were observed. The question of whether histochemical and fluorescence analyses may be utilised to swiftly identify prospective medicinal plants and any bioactive substances that may be present in a particular plant has been researched [34]. Histochemical techniques were employed to determine the phytochemical constituents of the medicinally significant portions of Boswellia ovalifoliolata. Boswellia ovalifoliolata's leaf, stem, stem bark, and root include secondary metabolites such as tannins, polyphenols, crystals, and grains of starch that are scattered throughout each of these parts (FeCl3, Iodine solution toluidine blue reagent and HCl). The results demonstrated that tannins, starch grains, polyphenols, and crystals are present in Boswellia ovalifoliolata's epidermis, endodermis, midrib, cortex, and vascular bundle of leaves, stem, stem bark, and root [35]. Histochemical studies can be used to identify medication adulteration and establish a taxonomic hierarchy.

An analysis of Lanata camera's UV-VIS spectrum reveals:

One of the techniques most frequently employed in pharmaceutical analysis is UV-visible spectroscopy. By comparing the intensities of two UV-visible light beams, which are measured by ultraviolet-visible spectrophotometers, it is necessary to determine how much UV or visible radiation absorption the substance in the solution has [36]. Spectroscopy is a technique for determining how molecules interact with electromagnetic radiation. Light has an energy range of 150–400 kJ mol1 in the near-

ultraviolet (UV) and visible (VIS) parts of the electromagnetic spectrum. Light energy is used to promote electrons from their ground state to their excited state. When the absorption of light is estimated as a function of its frequency or wavelength, a spectrum is created. In delocalized aromatic complexes, molecules containing electrons absorb light in the near UV (150-400 nm) or visible (400-800 nm) ranges.

Spectroscopic approaches have developed as an essential resource for secondary metabolite profiling as well as the qualitative and quantitative study of pharmaceutical and biological materials. Standardized UV (or UV-vis) spectroscopy has been used to examine flavonoids for many years. The UV spectrum properties of individual flavonoids have been studied, including the number of aglycone hydroxyl groups, the degree of glycosidic substitution, and the type of aromatic acyl groups present. Since every flavonoid has at least one aromatic ring, they can all absorb UV radiation. Flavonoids exhibit two absorbance bands in their UV-vis spectra, having peaks at 240 nm (band II) and 300 nm (band III) (band I). Flavonoids are made up of three rings—A, B, and C—with different substitutions. Band I absorption appears to more clearly represent changes in the B and C ring substitutions than band II absorption, which frequently reflects changes in the A ring substitution [37, 38]. More oxygenation, particularly hydroxylation, causes the suitable band to shift to longer wavelengths. UV-visible absorbance spectra can be used to determine the flavonoid class for each isolated chromatographic peak. Peaks at 236 nm were discovered during the UV-VIS spectroscopic investigation. Flavonoids and phenolic chemicals often have a spectral range of 210–290 nm. The presence of flavonoids in the plant extract is demonstrated by UV-VIS spectroscopy. The spectra of tannins and flavonoids, which are phenolic chemicals, typically range from 210 to 290 nm [39]. Alkaloids, flavonoids, and glycosides have been found in the leaf extract of Lanata camara, according to a UV-visible spectroscopic examination. The maximum absorption occurs at a wavelength between 200 and 300 nm. It was discovered to have visible absorption and form a yellow crystalline powder, both of which are indicators of the existence of coloured flavonoids fraction A [40]. The remaining portions created the white, crystalline powder. These data also showed that one molecule has an absorption maximum at 218, 282, and 306 nm, and the second chemical has an absorption maximum at 278 and 306 nm [41, 42], validating the investigation to isolate two novel aporphine alkaloids from Litsea bark.

Analysis of a leaf extract from the Lanata camera using Fourier Transform Infrared Spectroscopy (FT-IR):A Fourier transform infrared (FT-IR) spectroscopy is a non-invasive, high-resolution analytical method that generates an infrared absorption spectrum that functions as a molecular fingerprint. There is proof that FT-IR may be used to separate, categorise, and distinguish between microbial strains that are closely related, plants, and other species [43]. For the past few years, FT-IR has gained importance in pharmacological research. FTIR spectroscopy is a physicochemical analytical technique that presents a picture of a tissue's metabolism at a certain moment rather than quantifying the levels of individual metabolites [44]. An FTIR spectrum is formed by the vibrations of bonds inside chemical functional groups, and it can be considered as the sample's biochemical or metabolic "fingerprint."

For the characterisation and identification of chemicals or functional groups (chemical bonds) present in an unknown combination of plant extracts, FT-IR has been demonstrated to be a useful approach [45]. In the FTIR spectrum, the extract from Lanata camera leaves exhibited substantial absorption between 4000 and 400 cm1. Alcohols and phenols (O-H stretch, H-bonded), carboxylic acids (O-H stretch), alkynes (C-C stretch), alkenes and amines (C-C-stretch, N-H bend), and aromatic compounds are represented by the peak at 3415. (1452). Alkyl halides (C-H Wag (-CH2X)), 1252 alkanes (C-C stretch (in-ring) C-H Bend), 1406 aromatics (C-C stretch (in-ring)), 1230 alkyl halides, and 1076 aliphatic amines are all indicated in the structure (C-N stretch) The digits 1049 and 1076 stand for aliphatic amines (C-N stretch). Alkene-1,2-amine, aromatic compound, and aliphatic amine (C-N stretch) are each represented by the numbers 880, 677, and 1049, respectively (C-H "oop"). Analysis of Albizia lebbeck leaves using FT-IR Mr. Benth Nazneen Bobby With prominent peaks at 3654, 3307, 2918, 2849, 1643, 1454, and 510, respectively, an FTIR analysis of Albizia lebbeck leaves revealed the presence of amide, alkynes, alkanes, carboxylic acids, alkenes, aromatics, and alkyl halides compounds. Alcohols, phenols, alkanes, carboxylic acids, aromatics, ketones, and alkyl halides were present in dry ethanolic extracts of Albizia lebbeck leaves, with prominent peaks at 3370, 2955, 2925, 2853, 1739, 1463, and 506 in that order [46]. FT-IR spectroscopy was used to analyse the functional groups present in the raw powder of the stem, leaves, roots, and flowers of Aerva lanata (L.) Juss.ex Schult. Phenol, alkanes, aldehydes, secondary alcohols, amino acids, aromatic amines, and halogen compounds were all confirmed to be present by FT-IR analysis [48].

CONCLUSION:

This conclusion was achieved after examining the phytochemical properties of Lanata camara plant leaves. Every extract contained flavonoids, terpenoids, triterpenoids, steroids, polyphenols, and saponins. The methanol extract, when compared to the other extracts, has the highest amounts of the specific chemicals present in the leaves. The leaves of Lanata camara contain high levels of alkaloids, total phenol, and flavonoids, according to quantitative analysis. Flavonoids, alkaloids, tannins, steroids, and polyphenol phytochemicals were discovered in a histochemical analysis of powdered Lanata camara leaves. The leaves of Lanata camara have significant amounts of inorganic elements like calcium, sodium, potassium, sulphate, phosphate, chloride, nitrate, and magnesium, according to qualitative examination. To identify the functional groups of alcohol, phenol, alkenes, carboxylic acids, ketones, aromatics, esters, ethers, and aliphatic amines in the leaves of Lanata camera, spectroscopic (FT-IR) analysis was used. The experimental study adds to the expanding body of research that shows an extract from Lanata camara leaves has therapeutic promise for treating disorders brought on by stress. Alkaloids, flavonoids, tannin, terpenoids, and steroids are among the medicinal phytochemicals found in Lanata camara leaves and are principally responsible for the plant's antioxidant benefits. By establishing the phytochemicals and antioxidant activity of the Lanata camara leaves, the findings of this scientific inquiry support the veracity of the plant's traditional use by the indigenous peoples of south India.

Conflict of interest:

The authors have no conflicts of interest regarding this investigation**.**

Acknowledgements:

The authors are thankful to the faculties of department of chemistry, Periyar Maniyammai Institute of Science and Technology (Deemed to be University), Periyar Nagar, Vallam, Thanjavur and Secretary and Correspondent A.V.V.M. Sri. Pushpam College (Affiliated to Bharathidasan University), Poondi, Thanjavur (Dt), Tamil Nadu, India.

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