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## **CRITERION 7**

**7.3.**

**Institutional Distinctiveness**

**Research Papers Published on Mini  
Dissertation Project Work of B.  
Pharm. Final Year Students in  
Various Journal.**



## GREEN SYNTHESIS OF NANOSILVER PARTICLES FROM FLESH EXTRACT OF *TERMINALIA CATTAPA*. LINN.

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### ABSTRACT

The branch of technology that deals with science, engineering and technology conducted at the nanoscale, which is about 1 to 100 nm is called nanotechnology. It provides the tools and technology platform for the investigation and transformation of biological system. Nanotechnology is the most captivating area of research in the field of material science. Nanosilver particles have been found tremendous application in the field of high sensitivity biomolecular detection, diagnostics, antimicrobials, therapeutics, catalysis and microelectronics. Synthesis of nanoparticles by using plant extract is the most adopted method of green, ecofriendly production of nanoparticles and also has a special advantage that the plants are widely distributed, easily available, much safer to handle and act as a source of several metabolites. *Terminalia cattapa* also known as Indian almond or tropical almond is the native throughout the tropical asia belongs to family. Combretaceae. It is widely cultivated and naturalized tree. Fresh flesh containing fruit of *Terminalia cattapa* was collected and aqueous extract was prepared. 1mM aqueous solution of silver nitrate was prepared. Silver nanoparticles were prepared by taking 1% of flesh extract and 9% of 1mM aqueous solution of silver nitrate solution. Through uv spectroscopy and scanning electron microscopy analysis the nanoparticles were characterize. And the antimicrobial activity test of silver nanoparticles of aqueous extract was studied. The silver nanoparticles of fruit flesh of *Terminalia cattapa* were synthesized. And characterization of the nanoparticles shows the 388 nm on uv spectrum. The SEM image shows the cylindrical shape and size of nanoparticles shows 10 to 35 nm. The

antimicrobial test shows the pronounced effect on gram positive bacteria i.e. staphylococcus. auricus bacterial strains.

Keywords: Nanotechnology, Silver Nanoparticles, *Terminalia cattapa* linn., Ultra violet spectroscopy, Scanning electron microscopy.

### 1. Introduction

The branch of technology that deals with science, engineering and technology conducted at the nanoscale, which is about 1 to 100 nm, is called nanotechnology. Nanoparticles have unique properties as a consequence of their size, distribution, and morphology and therefore are a very important component in the rapidly developing field of nanotechnology (S.Sree Gayathri, Dr. Rachel Regi Danial, Dr. Shenbagaradhai, 2015). Metal nanoparticles have a high specific surface area and a high fraction of surface atoms. Over the past few decades, the synthesis of metal nanoparticles is an important topic of research in modern material science. (Tamasa. Panighari, 2013). It is broadly applied in products that are directly comes in contact with the human body, such as shampoos, soaps, detergents, shoes, cosmetics products and toothpaste besides the medical and pharmaceutical application such as optical receptors, polarizing filters, catalysts, in chemical reaction, biolabelling and as antimicrobial agents. Use of silver nanoparticles is relatively new because of their high reactivity and large surface area to volume ratio. Silver nanoparticles are obtained by using conventional or unconventional methods, using two different approaches: "top-down" and "bottom-up". (Shakeel Ahmed, Mudasir Ahmed, Babu Lal Swami, Saiqa Ikram, 2016) (Figure 1). Chemicals used for nanoparticles synthesis and stabilization are toxic and lead to non-ecofriendly by-products. The need for environmental non-toxic



**CHAPTER 8****Ethnopharmacological Perspectives  
of the Traditional Herb *Tabermontana  
divaricate Linn.***SEEMA WAKODKAR,<sup>1</sup> DEBARSHI KAR MAHAPATRA,<sup>2</sup> SHILPA BORKAR,<sup>1</sup>  
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E-mail: seemausare@rediffmail.com (S. Wakodkar)<sup>2</sup>Department of Pharmaceutical Chemistry, Dadasaheb Balpande College  
of Pharmacy, Nagpur - 440037, Maharashtra, India**8.1 INTRODUCTION**

Herbals are the natural remedies against human diseases and find applications for centuries because they restrain variable components of therapeutic value; some are also used for a preventive reason. Across the globe, rising attention towards the herbal remedies has been included in the conventional medicinal plant practice. Traditional uses of medicinal plants cope up with diseases such as infantile convulsion, diarrhea, dysentery, malaria, epilepsy, fungal, and bacterial infections [1]. Herbal remedies are believed to be a "chemical factory" due to an abundance of chemical compounds like oleoresins, sesquiterpene, lactones alkaloids, glycosides, saponins, resins, and oils (essential and fixed) [2]. India acknowledged as one of the oldest, richest, and most diverse custom attitudes associated with the use of medicinal plants. The World Health Organization (WHO) encourages the efficacious, safe, less toxic, accessible, and reliable use of herbs [3]. Nowadays, there is mounting awareness in the chemical opus of plant-based medicines. Bioactive elements have been isolated and studied for pharmacological screening. During the last two decades, the pharmaceutical industry has made enormous

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speculation in chemical and pharmacological explorations where the globe puts effort to find out more potent drugs and a few new ones. commercial screenings test plants have successfully passed [4]





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Research Article

### Development of mosquito repellent gel formulations from various natural volatile oils: comparative study with the marketed formulation odomos®

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#### ABSTRACT

DEET based mosquito repellents were found to be comparatively harmful to the person suffering from urea cycle disorders such as ornithine transcarbamylase (OTC) deficiency and, are therefore, contraindicated in individuals. These situations lead to the budding necessity of natural mosquito repellents which will have inexpensive, effectual, non-toxic, environment-friendly, and biodegradable attributes. Inspired from the upcoming global need, a carbopol 940 based mosquito repellent gel formulation was prepared from the essential oils of *Cymbopogon nardus*, *Murraya Koenigii*, *Cymbopogon citratus*, *Tridax procumbens*, *Eucalyptus globules*, and *Azadirachta indica*, and further evaluating them for their appearance, pH, viscosity, spreadability, extrudability, swelling index, and accelerated studies. The mosquito repellent potential was evaluated and simultaneously compared with the positive control (Odomos®). In several developing nations, where the majority of the people do not have access to mosquito net, high-cost mosquito repellent creams, and miscellaneous physical methods, this gel formulation may be an effective, inexpensive, and easily accessible way to prevent mosquito-borne diseases, like malaria, dengue, etc. in the lower sections of the society.

**Keywords:** Mosquito, Repellent, Malaria, Gel, Formulation, DEET.

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#### INTRODUCTION

Globally, the tropical and sub-tropical regions are primarily affected by vector-borne diseases<sup>1</sup>. Mosquito is the sole vector for the transmission of malaria, dengue, and chikungunya which transmits more than 750 million people every year. Nearly 3 million lost their life annually, of which nearly 90% of the mortality lies in infants<sup>2</sup>. Currently, for the prevention of mosquito-borne diseases, the control of mosquito larval growth and personal protection from mosquito bites by the use of mosquito nets and mosquito repellent remained the chief methods<sup>3</sup>. Scientific innovations include mosquito vaccines, but it is still at a nascent level and is not yet recommended for human use<sup>4</sup>.

For the complete elimination of adult mosquito and mosquito larva across the planet, dichloro diphenyl trichloroethane (DDT) was sprayed a few decades back, however mosquitoes developed rapid resistance and over

the years, this became a rising problem for all individuals and there is an unmet need for the solution<sup>5</sup>. Many commercial brands have flooded the market with N, N-diethyl-meta-toluamide (DEET) based mosquito repellent. For meeting the challenges, a large population across the globe started purchasing these DEET based mosquito repellents<sup>6</sup>. Everything was going well until it was noticed that the chemical component causes toxicity with hyperammonemia and encephalopathy in children after ingestions and applications<sup>7</sup>. DEET was found to be comparatively harmful to the person suffering from urea cycle disorders such as ornithine transcarbamylase (OTC) deficiency and is therefore, contraindicated in individuals<sup>8</sup>.

These situations lead to the budding necessity of natural mosquito repellents which will have inexpensive, effectual, non-toxic, environment-friendly, and biodegradable attributes. Inspired from the upcoming global need, a carbopol 940 based mosquito repellent gel formulation was





# Standardization of Some Marketed Herbal Formulation Used in Diabetes

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## Abstract

Herbal Drugs have been used since ancient times as medicines for the treatment of range of diseases. The herbal medicine and their preparations have been widely used by the world population in developing and developed countries owing to its natural origin safety, efficacy lesser side effects or dissatisfaction with the results of synthetic drugs. They are effective in all types of diabetes including Polyuria, it has been standardized by modern scientific quality control processes both for the raw material and finished product obeying to WHO's guidelines. The evaluation of herbal formulations provides values for different parameters which will help to put forth new standards to these traditional antidiabetic formulations. These new standards will help to maintain consistency to various batches. The active constituents from various parts of plants will effectively increases the potency & efficacy of herbal formulations. These parameters will help to study pharmacological effect in comparison to modern antidiabetic drugs.

**Keywords:** Standardization, Antidiabetes formulation, Diabetes mellitus, WHO guidelines

## Introduction

The term "herbal drugs" denoted by means of plant or part of plants that have been converted into phytopharmaceuticals. These Herbs and products containing herb(s) have been in trade and commerce and are currently used for a variety of purposes<sup>1</sup>. Traditional herbal medicine and their preparations have been widely used by about 80% of the world population for the thousands of years in developing and developed countries owing to its natural origin safety, efficacy lesser side effects or dissatisfaction with the results of synthetic drugs. In the global context, herbal medicines flourish as the method of therapy of choice in many parts of the world. In recent years, the increasing demand for herbal medicines is being fueled by a growing consumer interest in natural products. Now it is finding new popularity as an alternative conventional medicine even in the industrialized countries and the adoption of crude extracts of plants for self-medication by the general public is in the increase. Phyto-therapeutic agents or phyto-medicines are standardized herbal preparations consisting of complex mixtures of one or more plants, which are used in most countries for management of various diseases.

According to the WHO definition, herbal drugs contain as active ingredients plant part or plant materials in the crude or processed state along with certain excipients, i.e. solvents, diluents or preservatives. The active principles responsible for their pharmacological actions are not usually known. The World Health Assembly has emphasized the need to ensure the quality of medicinal plant products by using modern control techniques and applying suitable standards<sup>2</sup>. The need for safety and efficacy has also escalated since the western interest has grown. Thus the need for standardization has come into view. The process of evaluation of the quality and purity of crude drugs by means of various parameters like morphological, microscopical, physical, chemical and biological observations is called standardization<sup>3</sup>. Standardisation of the herbal drug begins from the collection of the herbal drug to its packaging/ use as medicine.

## The Impediments in Standardization of Herbal Drugs

Variability in the chemical composition of the soil and changes in the climate influence the range of phyto-constituents present in the herbal drugs<sup>4</sup>. Growing

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Research Article

## Formulation and Evaluation of Anti-Acne Face Wash Gel using Guava Seed Extract

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### ABSTRACT

During the puberty, imbalance of internal constituents and hormonal balance may cause many skin problems. Acne is found as most common skin problem. Face and neck are the major affected area. Preventive approaches involve removal of oil from the face. Proper cleaning and washing require for this purpose. Various researches have been proved utility of herbal based formulations for cleaning purpose which also removes excess oil considering this fact present work was intended to prepare a face wash gel using *Psidium guajava* seed extract with antioxidant and antibacterial properties. Prepared gel was evaluated for various quality control parameters like: spreadability, pH, consistency and grittiness, etc. The results of quality control parameters were found to be satisfactory.

**Keywords:** Acne, Gel, Antimicrobial, *Psidium guajava*, Face-wash

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### INTRODUCTION

The herbal healing has been mentioned from the ancient era, from Vedas, and even from ancient religious work. Probably it is the oldest medical care system in the world. The herbal healing deals with use of herbs, herbs extracts or natural products for the betterment of health condition. Nowadays in western countries medical practitioners and mostly prescribing medicines containing plant extract. Developed countries also appreciating this traditional and ancient form of medicine. As a result, Indian herbal drugs are in demand and witnessing rapid growth in global market. Wide growth and demand for herbal cures, herbal skin care products and even herbal cosmetics were observed in recent years<sup>1</sup>. Although, herbal products are more acceptable with belief that they are safe possess many therapeutic properties and having no or less side effects as comparing to modern chemical entities. Skin being the most exposed and major part of our body to the pathogens. Hence require protection and prevention from skin diseases by utilization of formulations having antibacterial, antioxidant and anti-inflammatory and such other properties. During the puberty imbalance of internal constituents and hormonal balance may cause many skin problems. Acne is found as most common skin problem which is generally characterized by presence of inflammatory lesions, comedo, seborrhea etc. acne may cause long lasting, physical and detrimental

psychosocial effect associated with depression and anxiety without disease severity. Although these effects usually improved by treatment. Acne develop in presence of commensally bacteria *Propionibacterium acne*, *Staphylococcus epidermidis* and *Malassezia furfur* in the follicles. Long term uses of antibiotics for the treatment develop resistance to the drugs. To overcome this problem, herbal alternative solution for the treatment has been studied.

*Psidium guajava* Linn, a well known traditional medicinal plant used in various indigenous system of medicine, also known as Guava belonging to family Myrtaceae. It is represented by approximately 130-150 species<sup>2</sup> and widely distributed throughout the world<sup>3</sup>. All parts of the plants being used as medicine, the parts like fruits, leaves, bark and root have been used to treat diarrhea and used as stomachache, respiratory and gastrointestinal disorders as antispasmodic, anti-inflammatory, as cough sedative, in obesity, to control diabetes mellitus. Seeds possess antimicrobial<sup>4</sup>, anti-inflammatory<sup>5</sup>, anti-allergic<sup>6</sup>, and anti-carcinogenic activity<sup>7</sup>. Guava is yellow in color and owing to its abundance and reasonable price it is eaten by all sector by the society. The main guava fruit product are beverages, juices, and canned slices. The important constituents of guava are vitamins<sup>8</sup>, tannins, phenolic compounds, essential oils sesquiterpene alcohol and triterpenoids. The seed are the waste product of the industry and are not yet use for the



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# STUDIES OF PHYSICO-CHEMICAL PARAMETERS OF DRIPPING WATER FROM AIR CONDITIONING UNITS AND ITS BACTERIOLOGICAL ASPECTS

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## ABSTRACT

Conservation of water is very essential as it is the universal solvent, critical, limited resource. Careful use and protection of water resources is important task today because the consumption increases along with increase in population causing depletion of conventional sources. Sustainable water consumption resources by the society that cannot be disturbed by hydrological cycles or ecological components. An increase in water consumption sustainability can be achieved by various means such as, conservation, rain water harvesting, desalinization of sea water, water extraction from air etc. In this present work this sustainability is achieved by condensate dripping water from air conditioning units of domestic use, commercial stores, offices, hospitals and institutions. This is self sustained system based on absorbing moisture from air, compressing it and condensing to water molecules. The study was to estimate the quality of water condensate and its potential uses with bacteriological aspects.

Keywords : Dripping water, Air conditioner, Bacteriological aspects, water resources.

## 1. INTRODUCTION

Ecosystem, the lifeline of living beings which significantly uses the water compound. Almost 70% of water covered the earth surface. Only 2.5% of these are in the form of fresh water and rest is the form of ice and ground water. Less than 0.3% of all the fresh water is found in river, lakes and atmosphere<sup>(1)</sup>. The hydrological cycle such as evaporation, transpiration, condensation moves the water continuously throughout earth and also leads to precipitation over the land. Natural water resources are causing different pollution and impair water quality for drinking and other uses<sup>(2)</sup>. Also ground water level continuously decreases especially in hot summer season. So, quantifiable conservation of water and its utilities is necessary. Generally the dripping water from the air condition units operated commercially, domestically or in industries wasted by the users. The present study involves the physicochemical study of the dripping water from air condition units and to study the bacteriological aspect of water. In the air condition units, the compressed gas from the compressor compresses the air and allows condensation. The outside air is drawn in the air conditioning system, which get mixed with variable air pollutant, dust particles and may be with microorganism present in the surrounding atmosphere. Actually air conditioning is a form of air treatment whereby temperature, humidity, ventilation and cleanliness are all controlled within limits determined by the requirements of air conditioned enclosure. The moisture present in the air gets condensed in the form

of water and dripping started. This dripping water can be utilized for various purposes. AC units involve complex physics. When gases like air are cooled, they lose the ability to hold liquids. The water contained in the gas drops out, or condenses. Instead of holding this liquid, AC unit simply let it escape through the pipe you've been pondering. If the liquid around your unit smells and looks like water, it is probably just a sign of normal operation. AC manufactures claims that the liquid dripping from your AC isn't only water. It also contains whatever kinds of debris, dirt and dust made its way inside your unit. This commonly manifests as brown or blackish streaks and stains near the outlet.

The investigational parameters reveal the drinking quality of the dripping water and its bacteriological aspect. The sampling points for the study are selected such that the different sources from which dripping water is obtained through public, industrial and hospital air conditioning units. The investigation would seem beneficial if the air cooling system provided supply of clean air, and if minimizes cross infection<sup>(3)</sup>. The condensed water or dripping water picks up impurities in varying amounts, gases and bacteria, microbes from atmosphere and gets contaminated. The contamination may exceed the desirable limit and the presence of undesirable substances in the quantities which are harmful to vegetation or properly referred to as pollution. Quality of water depends upon quality and quantity of inorganic and organic salts present in water. The safe or wholesome water is referred as, it is chemically safe,



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## Investigating the Edema Reducing Characteristics of Hydroalcoholic Root Extract of *Lagerstroemia speciosa*

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### ABSTRACT

*Lagerstroemia speciosa* (Family: Lythraceae) is a semi-deciduous plant of medium-size (30-35 m) found in South and Southeast Asia. After searching several pharmaceutical databases, it was observed that no anti-inflammatory screening has been done so far on the root extract of *L. speciosa*. The present research was aimed at exploring the anti-inflammatory activity of root methanolic extract of *L. speciosa* (RELS) through *in vitro* HRBC (human red blood cell) membrane lysis model. The hydroalcoholic extract produced noteworthy activity (67.11%) as compared to diclofenac sodium, the standard drug (82.80%) when studied in hypotonicity-induced RBC membrane lysis method owing to the excellent antioxidant properties as well as targeting the inflammation-oriented molecular targets such as interleukins and cytokines. The initial investigation opened new avenues of natural products or herbal (natural) pharmacotherapeutics for treating various kinds of inflammation. However, further research exploration is essentially required to develop formulations that can be taken into therapeutic applications.

**Keywords--** Anti-inflammatory, Extract, Inflammation, *Lagerstroemia speciosa*, Root, Phytoconstituents

### INTRODUCTION

*Lagerstroemia speciosa* (Family: Lythraceae) is a semi-deciduous plant of medium-size (30-35 m) found across the globe, specifically the subtropical and tropical areas such as Bangladesh, India, Indonesia, Japan, Malaysia, Philippines, and Thailand [1-2]. Conventionally, the leaves, roots, and bark of the plant have been utilized in folk medicine as a remedy for treating ailments like febrifuge, diuretic, stimulant, mouth ulcers, decongestant, abdominal pains, etc. [3].

The root extract (methanolic) of this plant have demonstrated multifarious biological activities such as analgesic, anti-diarrheal, hepatoprotective, and thrombolytic [4]. The leaf extracts (methanolic, ethanolic, aqueous, hydroalcoholic, ethyl acetate, etc.) of this plant have expressed amazing pharmacological potentials such as analgesic, anti-cancer [5], anti-diabetic [6] (due to the presence of  $\alpha$ -glucosidase inhibitors [7],  $\alpha$ -amylase inhibitors [8]), anti-obesity, anti-oxidant, anti-inflammatory, anti-bacterial (*Escherichia coli*, *Salmonella typhimurium*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*) [9], anti-retroviral, anti-fibrotic, anti-ulcer, anti-rhinoviral, nephroprotective, cardioprotective, neuroprotective, anti-arthritic, and anti-gout [10-11]. The seed extract (methanolic) of this plant have displayed remarkable biological potentials like anti-oxidant [12], etc. The fruit extract (ethanolic) of this plant have presented special pharmacological prospects like anti-bacterial (*Pseudomonas aeruginosa*), anti-nociceptive, etc [13]. The flower extract (ethanolic) of this plant has shown noteworthy biological prospects like hepatoprotective, anti-oxidant, anti-aging, etc [14]. The bark extract (ethanolic) of this plant has exhibited significant biological activities like cytotoxic, anti-bacterial, etc [15].

After searching several pharmaceutical databases, it was observed that no anti-inflammatory screening has been done so far on the root extract of *L. speciosa*. The present research was aimed at exploring the anti-inflammatory activity of root methanolic extract of *L. speciosa* (RELS) through *in vitro* HRBC (human red blood cell) membrane lysis model.

### MATERIALS AND METHODS

#### Chemicals

All chemicals and solvents used for the study were of analytical grade and purchased from Sigma-Aldrich (Germany) through a local vendor at Nagpur. The double-distilled water apparatus







# Development of Wound Healing Ointment Formulation containing Active Extracts of *Tridax Procumbens*, *Calendula Officinalis*, *Murraya Koenigii*, and *Aloe Barbadensis*

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## ABSTRACT

The present research reflected towards exploring the plausible role(s) of the active extracts of *Tridax procumbens* (whole plant), *Murraya koenigii* (leaves), *Calendula officinalis* (flowers), and *Aloe barbadensis* (leaves) formulated as ointment products. The formulations were characterized by determining the pharmaceutical characteristics like skin irritancy test, pH, appearance, viscosity, spreadability, extrudability, swelling index, and washability. Further, wound healing activity was studied on Swiss albino rats. The phytochemical constituents such as alkaloids, flavonoids, glycosides, tannins, carbohydrates, sterols, saponins, proteins, and other miscellaneous phenolic components are believed to play a pivotal role in the healing of the wound in rats by significantly increasing the rate of wound closure and rate of epithelization. In comparison to the standard drug (betadine), both the formulations proved to be quite equi-efficacious. This finding provided an insight into the applications of the polyherbal formulations in the traditional treatment of serious wound conditions and also rejuvenating the ethnopharmacological principles in context to modern medicine.

**Key Words:** Wound Healing, *Tridax procumbens*, *Murraya koenigii*, *Calendula officinalis*, *Aloe barbadensis*, Honey.

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## INTRODUCTION

The process of wound healing is a very complex phenomenon where the skin or the affected organ after injury repairs itself [1]. Under normal conditions, the outermost layer of the skin (epidermis) and the inner or deeper layer (dermis) exist in steady-state symmetry and form a defensive barrier against the exterior environment [2]. If this defensive barrier is broken as a result of any trauma or injury, the normal physiologic function of wound

healing is instantly instigated [3]. The wound healing is initiated by growth factors act by autocrine-, paracrine-, and endocrine-signaling systems [4]. Apart from them, numerous growth factors are present, which aid in wound healing through varied mechanisms. Platelet-derived growth factor (PDGF) is accountable for the stimulation of connective tissue proliferation, epidermal growth factor (EGF) is responsible for stimulating the cutaneous tissue proliferation, and fibroblast growth factor (FGF) stimulates the fibroblast cells proliferation [5]. Several commercial

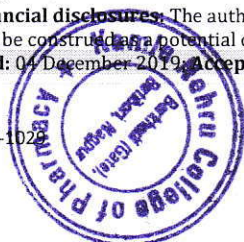
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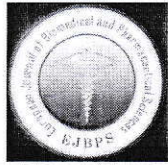
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**FORMULATION AND EVALUATION OF POLYHERBAL TABLET FOR THE  
TREATMENT OF THYROID DISORDER**

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**ABSTRACT**

**Objective:** The objective of the present study was to formulate polyherbal tablet for the treatment of thyroid disorders and to carry out evaluation of prepared polyherbal tablet. **Methodology:** Kanchanara, Guggul, Jatamansi, Trikatu, Brahmi, Amla, Amulthus, Chandrashoor, Methi and Giloy extracts were selected for the formulation of hypothyroid tablets to overcome the symptoms associated with thyroid disorders. The ethanolic extracts were subjected to qualitative chemical investigation to test for the presence of various phytochemical constituents in the extract and formulate hypothyroid tablet by wet granulation technique. Then film coating of tablets were carried out by Aquadry brown for taste masking and physical protection of tablets. Granules, uncoated tablet and coated tablets were evaluated for tests i.e. flow property, friability, dimension, hardness, disintegration time and drug content by HPTLC method. Microbial testing and stability study were performed to check the quality of product. Tablets were evaluated for determining its effects in the regulation of hypothyroidism using Albino wistar rat model. Serum triiodothyronine, thyroxine and thyroid stimulating hormone concentrations were tested as the end parameters of thyroid function in the study. **Results:** The tablets were evaluated for various parameters and the product were found to be within standard ranges and stable at stability and microbial testing and improves hypothyroidism activity in Albino rats. **Conclusion:** The hypothyroid tablet can find its application as thyroid supplement which can be given easily and safely to patients suffering from thyroid disorders.

**KEYWORDS:** Thyroid disorder, hypothyroidism, chemical investigation, triiodothyronine, thyroxine, albino wistar.

**INTRODUCTION**

Worldwide about 25% of prescribed drugs are derived from plants.<sup>[1]</sup> The maximum use of herbal medicines is for chronic therapies and health promotion and prohibit to life-threatening conditions.<sup>[2]</sup> On the basis of data of community studies the prevalence of hyperthyroidism in in male is 0.2% and in female is 2%, and about 15% of hyperthyroidism patients occurring in patients above 60 year of age. Similarly hypothyroidism occurrence is of around 0.3% to 0.4%, which increases with age and most commonly found that females are affected.<sup>[3]</sup> Thyroid gland secretions are the 2 thyroid hormones Triiodothyronine or T3 and Thyroxin or T4 as well as calcitonin. The production of triiodothyronine (T3) and thyroxine (T4) in the thyroid gland is regulated through hypothalamus and pituitary gland by a complex feedback mechanism. For ensuring stable levels of thyroid hormones hypothalamus monitors circulating levels of thyroid hormones and it responds to low levels through releasing thyrotropin-releasing hormone (TRH). Thyroid stimulating hormone (TRH) is then stimulated by pituitary gland. When there is increase in level of thyroid

hormone, TSH production decreases, which slows the release of new hormones from the thyroid gland.<sup>[4]</sup>

**Hypothyroidism:** Failure of thyroid gland, TRH, TSH deficiency, or both and scanty supply of iodine in diet lead to hypothyroidism.

**Primary hypothyroidism:** Lowered level of thyroid hormone along with raised TSH level in blood chances the primary hyperthyroidism; which usually stipulates the defective thyroid synthesis.

**Secondary hypothyroidism:** Low level of both TSH and thyroid hormone leads to secondary hyperthyroidism. This reflects that the pituitary gland is accountable for lowered thyroid functioning.

**Hashimoto's disease:** An autoimmune condition where antibodies bind to thyroid and avert the production of adequate levels of thyroid hormone. Additionally to antibodies binding with thyroid tissue, they may well



## Exploring Analgesic Prospective of Hydroalcoholic Extract of *Lagerstroemia speciosa* Root in Swiss Albino Rats

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### ABSTRACT

*Lagerstroemia speciosa* belonging to the family of Lythraceae is a medium to large size (30-35 m) plant of a semi-deciduous type that is majorly found in subtropical and tropical areas of the world such as South and South-East Asia. After exploring numerous pharmaceutical databases such as PubMed, Google Scholar, etc., it was observed that no analgesic screening of the root methanolic extract of *L. speciosa* have been performed to date in Swiss albino rats. The current investigation involved determining the analgesic potentials of root methanolic extract of *L. speciosa* (RELS) in acetic acid-induced writhing inhibition method in Swiss albino rats. The hydroalcoholic extract produced 41.77% inhibition of writhing at a dose of 500 mg/kg b.w. as compared to the standard drug which displayed 52.19% writhing inhibition at a dose of 25 mg/kg b.w. The presence of phytochemicals such as flavonoids, tannins, alkaloids, and phenolic principles may be believed to play a major role in expressing analgesia in the subjects. The preliminary exploration opened the latest possibilities of herbal or natural products-based analgesic pharmacotherapeutics. However, this supplementary investigation is fundamentally necessitated in developing pharmaceutical formulations for pain-relieving applications.

**Keywords--** Analgesic, Extract, *Lagerstroemia speciosa*, Root, Pain, Phytoconstituents

### INTRODUCTION

Pain is a discomfort that is felt by every living organisms residing in this globe [1]. Pain is usually classified into several categories based on the types (acute, sub-acute, and chronic) [2], biochemical origins (cytokines, growth factors, neuropeptides, neurotransmitters, etc.) [3], regions (gastric pain, neuropathic pain, rheumatoid arthritis

pain, osteoarthritis pain, etc.) [4], etc. Few of them are easily manageable while some of them are very complex in nature [5]. At present, a number of synthetic drugs (all non-steroidal anti-inflammatory drugs and opioid drugs) are available in the market for managing the pain (preferably known as 'painkillers'), but nearly all these candidates exhibit adverse effects on prolonged use [6]. This has shifted the patients towards safe and effective therapy, of which natural extracts are the primary choice in the mainstream of the population [7].

*Lagerstroemia speciosa* belonging to the family of Lythraceae is a medium to large size (30-35 m) plant of a semi-deciduous type that is majorly found in subtropical and tropical areas of the world such as South and South-East Asia [8]. The roots, leaves, bark, and stem have been reported in texts for their utility in the traditional folk medicine in the treatment of mouth ulcers, febrifuge, abdominal pains, diuretic, decongestant, stimulant, etc [9]. In modern research, the extracts (ethanolic, methanolic, hydroalcoholic, aqueous, ethyl acetate, etc.) of this plant have demonstrated anti-oxidant, analgesic, anti-cancer, anti-microbial, anti-diabetic, hepatoprotective, thrombolytic, anti-diarrheal, anti-inflammatory, anti-arthritis, anti-obesity, etc. activities [10-12].

Very limited exploration of the analgesic activity of this plant (in various extract forms) has been performed till date. The analgesic activity of the ethanolic root extract of *L. speciosa* has been reported in Swiss albino mice using acetic acid-induced writhing inhibition method [13], the analgesic activity of the aqueous ethanolic leaf extract has been reported in Wistar albino rats using formalin-induced pain [14], and anti-nociceptive activity of the methanolic leaf extract has been reported in Swiss albino mice using acetic acid-induced gastric pain model [15].

After exploring numerous pharmaceutical databases such as PubMed, Google Scholar, etc., it was observed that no analgesic screening of the root methanolic extract of *L. speciosa* has been performed to date in Swiss albino rats. The current

## Anti-anxiety Evaluation of Hydroalcoholic Root Extract of *Lagerstroemia speciosa* in Swiss Albino Rats

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### ABSTRACT

After going through numerous pharmaceutical databases for reviewing the present status regarding the exploration of anti-anxiety potentials of root hydroalcoholic extract of *Lagerstroemia speciosa* (Family: Lythraceae), no such reports have been found so far. Therefore, the necessity of anti-anxiety exploration was taken into account for investigating the above through the EPM model. The *L. speciosa* root hydroalcoholic extract demonstrated an excellent reduction of anxiety in the experimental animals. This exploration will definitely motivate the enthusiastic young researchers across the globe in exploring more therapeutically privileged plant extracts or phytoconstituents that will have tremendous anti-anxiety effects along with a higher margin of safety and least side-effects. The study also opened new avenues for formulation development or product development in the near future.

**Keywords:** *Lagerstroemia speciosa*, root, extract, anxiety, anti-anxiety, phytoconstituents.

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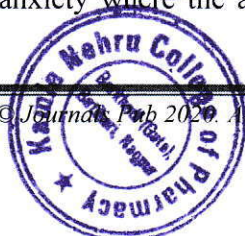
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### INTRODUCTION

Anxiety is defined as a feeling of uneasiness and dread, typified by bodily indications like sweating, palpitations, and stress [1]. It frequently involves the roles of the dopaminergic system and adrenergic system where serotonergic, GABAergic, etc. components play a dominant function in the precipitation [2]. In general, for evaluating the anti-anxiety activity, rotarod, elevated plus maze (EPM), hole board models, and open field are commonly used [3]. The principle of EPM model applied to any subject is exclusively based on height-induced anxiety where the animals

prefer to stay at a safe region (close arms) and therefore express a reduction in the motor (locomotion) activity [4].

In modern days, medical practitioners offer multiple options for treating the anxiety symptoms such as benzodiazepines (clonazepam, lorazepam, alprazolam, chlordiazepoxide, diazepam), atypical (buspirone), selective serotonin reuptake inhibitors (fluoxetine, sertraline, paroxetine, escitalopram), tricycles (imipramine, clomipramine), monoamine oxidase inhibitors (isocarboxazid, tranlycypromine, phenelzine, selegiline),



Research Article

# (E)-4-benzamido-N'-(2,4-dinitrophenyl) benzohydrazonic acid: A Novel Molecule with Remarkable Bactericidal Activity against Both Gram-positive and Gram-negative Microbes

Disha M Dhabarde<sup>1</sup>, Ranjit Kannake<sup>2</sup>, Manish A Kamble<sup>3</sup>, Jagdish R Baheti<sup>4</sup>,  
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## A B S T R A C T

After knowing the multifarious potentials of benzamide compounds, a multi-aromatic compound was designed for overcoming the challenges imposed by the pathogens. The present investigation aimed at exploring the anti-bacterial perspectives of a rationally developed therapeutically privileged molecule 4-benzamido-N'-(2,4-dinitrophenyl)-benzohydrazonic acid, produced through two-step chemical synthesis, against gram-negative microbial species (*Escherichia coli*) and gram-positive microbial species (*Staphylococcus aureus*). The novel benzamide-based Schiff's base compound expressed a fair anti-bacterial activity against anti-E. coli activity (ZOI = 17.4 mm, MIC = 500 µg/mL), the Gram-negative strain and anti-S. aureus activity (ZOI = 19.6 mm, MIC = 500 µg/mL), the Gram-positive strain as compared to ciprofloxacin (ZOI = 31.5 mm, MIC = 6.25 µg/mL), the standard drug. However, the study opened new opportunities towards anti-microbial drug development by deeply focusing and exclusively highlighting the unexplored class of hybrid-benzamides or benzohydrazonic acids. More pre-clinical studies and investigations at various levels are essentially required as well as the establishment of structure-activity-relationship (SAR) of the whole series is needed which will open avenues for better pharmacotherapy against a large number of resistant pathogenic strains.

**Keywords:** Benzamide, Benzohydrazonic acid, *Escherichia coli*, *Staphylococcus aureus*, Anti-microbial, Anti-bacterial

## Introduction

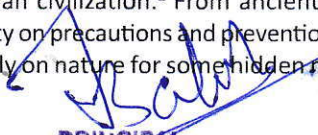
Microbes of all forms have imposed a serious threat to

the progress of human civilization.<sup>1</sup> From ancient times, humans relied majority on precautions and preventions, and later depended mostly on nature for some hidden medical

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