

## EFFECTS, PHARMACOLOGICAL ACTIONS, PHYTOCHEMICAL COMPONENTS, AND THERAPEUTIC APPLICATIONS OF RUELIA ASPARULLA

Arshu Patel\*, Jatin Kudnar, Manish Ahire and Suyog Karande

India.

Article Received on  
06 February 2024,

Revised on 26 Feb. 2024,  
Accepted on 17 March 2024

DOI: 10.20959/wjpr20247-31620



\*Corresponding Author

Arshu Patel

India.

### ABSTRACT

Ruellia is a genus of flowering plants in the Acanthaceae family that is also referred to as wild petunias or ruellias. There are over 250 genera and 2500 species in this genus. Many of the species have medicinal, anti-inflammatory, anti-spasmodic, antioxidant, analgesic, and antidiabetic qualities. Glycosides, alkaloids, flavonoids, and triterpenoids are the components of phytochemicals that are present. Treatments for flu, asthma, fever, bronchitis, high blood pressure, eczema, and diabetes have long been associated with this genus. Many Ruellia genus members have long been used for medicinal purposes, and the majority of them have been studied for their biological qualities. More research is needed to identify and isolate the active

compounds in these plants that give them their various functions, and to get these plants onto the commercial health market so that the community can benefit from their potential.

### INTRODUCTION

Since plants have been utilized as medicines since the dawn of human civilization and are said to possess healing qualities, it is presumed that they contain therapeutic qualities. Medicinal plants are still a fascinating source of natural remedies for a range of medical ailments.<sup>[1]</sup> An estimated 150,000 plant species have been examined; many of these include useful medicinal substances, and in recent years, there has been a progressive increase in the use of novel plant chemicals for pharmaceutical applications.<sup>[2]</sup> In addition, they provide a lot of contemporary medications. Since the beginning of time, they have been crucial to the treatment of human health. Plants create several compounds with biological activity as a defense against pathogens and environmental stressors. In human existence, herbs play a

more significant role and meet daily demands. Herbal items are a reliable source of traditional and contemporary medications that are widely utilized to treat a variety of medical conditions. Plants have long been a source of inspiration for the development of novel drugs, and medications made from many plants have enhanced human health and wellbeing.<sup>[2]</sup>

Native to Brazil, *Ruellia asperula* (also known as *Stephanophysum asperulum*) is a medicinal plant that grows in the caatinga and cerrado vegetation types (20). This plant's flowers, leaves, and roots are typically macerated and used to treat uterine inflammation, fever, flu, asthma, and bronchitis. About 250 genera and roughly 2500 species make up the dicotyledonous flowering plant taxon known as the Acanthaceae (*Acanthus* family). Some of these are epiphytes, but the majority are tropical plants, shrubs, or twining vines. A few number of species are found in temperate climates. The primary producers are in Africa, Brazil, Central America, Malaysia, Indonesia, and Africa. *Ruellias*, also referred to as wild petunias, are a genus of flowering plants. There are 250 species in this genus, which are found in both tropical and temperate regions of the two hemispheres.<sup>[1]</sup>

Among the Acanthaceae, *Ruellia* is one of the most underappreciated genera of medicinal plants. *Ruellias*, also referred to as wild petunias, are a genus of flowering plants. Certain species of *Ruellia* have been incorporated into Indian Ayurvedic and Ayush systems, as well as employed in traditional medicine formulations by various groups.<sup>[1]</sup> utilized as an anti-oxidant, anti-diabetic, gastroprotective, antibacterial, analgesic, and anti-diabetic agent against the nasopharyngeal epidermis. *Ruellia asperula* is a common species among the several species of *Ruellia*; it is used to treat fever, illness, uterine irritation, asthma, and bronchitis. *Ruellia prostrata* is another species of *Ruellia*, and it is used to cure eczema, facial paralysis, and chronic rheumatism with its leaves. As a diuretic, anti-diabetic, antipyretic, analgesic, antioxidant, anti-hypertensive, gastroprotective, and treatment for gonorrhea, *Ruellia asparulla* has been widely utilized. Research on the phytochemical characteristics of *Ruellia tuberosa* has shown the presence of flavonoids, sterols, alkaloids, and triterpenoids. *Ruellia patula* fresh leaves are mashed and then submerged in water till the mixture turns black. After decanting it, the ear is treated with the solution. *Ruellia hygrophila* possesses analgesic and antispasmodic properties.<sup>[4]</sup>

### **Morphology of *Ruellia Asparulla***

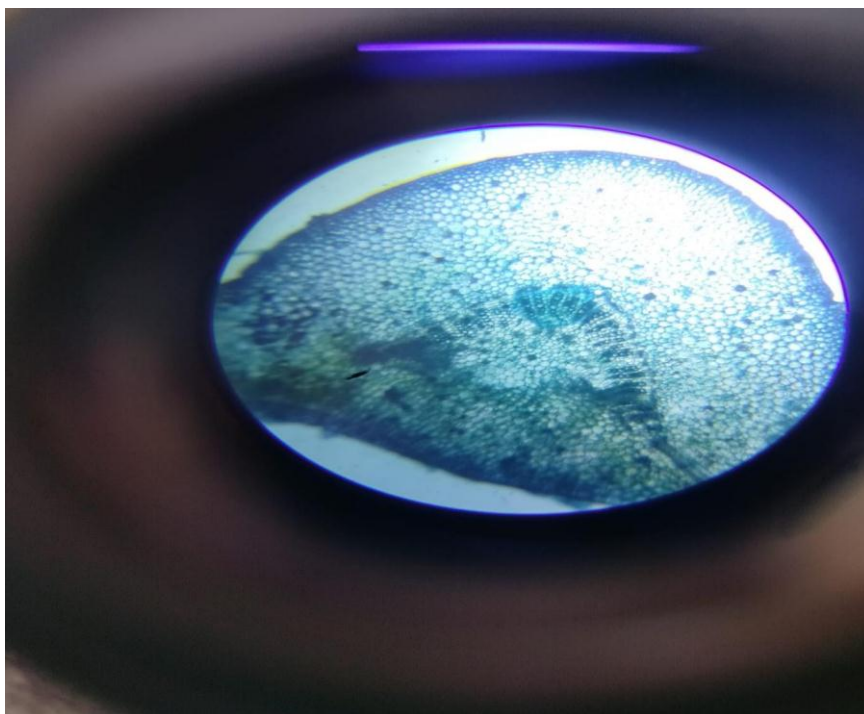
**Roots:** Many rhizomatous or tuberous, meaty, cylindric plants grow from roots. White colors taste pleasant at first.

**Stem:** Hairy, branching, woody to semi-woody nodes that are rather quadrangular in immature internodes that are 5-7 cm long, 4 mm in diameter, and thin, hard adventitious roots.<sup>[6]</sup>

**Leaf:** Base tapering margin they entire oval, acute or obtuse hairy on vein; simple, opposing, petiolate, ridge join opposite petiole 0.2-1.5cm long; blade 5-9cm long, 2-5 cm wide, oblong and ovate.

**Flowers:** Mostly blue, arranged in cymes, occasionally cleistogamous, actinomorphic or somewhat irregular pedicellate, with tubular stamens that adenate to the perianth through longitudinal slits.<sup>[6]</sup>

**Microscopy:** The powder has no flavor or odor and is moss green in hue. It revealed the existence of strong fiber walls, parenchymatous cells, stomatous epidermal cells, unicellular and multicellular trichomes, and chlorophyll tissues. Many calcium oxalate square and prismatic crystals were also visible in the powder.<sup>[9]</sup>



### Pharmacological activities of *Ruellia Asparulla*

#### 1. Antioxident activities

The antioxidant capacity of several *Ruellia asparulla* stem extract extracts was examined using a variety of in vitro techniques, including the 2, 2-diphenyl-1-picrylhydrazyl (DPPH)

assay, assays for scavenging free radicals, and the hydrogen peroxide-induced luminol chemiluminescence assay. The antioxidant activity of the methanol extract and its four fractions—water, ethyl acetate, chloroform, and n-hexane—was assessed. According to the findings, *Ruellia asparulla* has strong antioxidant properties.<sup>[1]</sup>

## 2. Gastroprotective and analgesic activity

According to reports, when rats were given alcohol-induced stomach lesions, the aqueous extract of *Ruellia asparulla* roots demonstrated a potent and dose-dependent gastroprotective effect. Additionally, the extract exhibited moderate analgesic and minor erythropoietic effects. Based on the data, it was determined that root extracts of *Ruellia asparulla* have gastroprotective properties.<sup>[1]</sup>

## 3. Anti-ulcer activity

Two doses, 250 mg/kg (low dose) and 500 mg/kg (high dose), were chosen after a preliminary ethyl acetate extract of *Ruellia asparulla* was examined for acute oral toxicity in accordance with the economic cooperation and development criteria.

The typical medication was ranitidine (20 mg/kg). The stomach volume, total acidity, and free acidity all significantly decreased in the ethyl acetate extract. Only at a high dose (500 mg/kg) did there exist a significant ( $p < 0.01$ ) elevation in stomach pH in comparison to the control group.<sup>[1]</sup>

## 4. Antimicrobial activity

*Ruellia asparulla* extracts in n-hexane, dichloromethane, ethyl acetate, and methanol were tested for their ability to inhibit both Gram positive and Gram negative bacteria. The fractions containing ethyl acetate and methanol demonstrated the highest levels of antibacterial activity against *Pseudomonas aeruginosa* and *Staphylococcus aureus*.<sup>[1]</sup>

## Phytochemical constituents of *Ruellia asparulla*

### Glycosides

*Ruellia asparulla* whole plant extract produced the novel glycoside 2-O- $\alpha$ -galactopyranosyl glycerol hexaacetate. *Ruellia asparulla* has produced two lignan glycosides that have been identified as 5,5'-dimethoxylariciresinol-9- $\alpha$ -D-glucopyranoside (reupaside) and lyoniresinol-9 $\alpha$ -D-glucopyranoside with ethyl- $\alpha$ -D-galactopyranoside,  $\alpha$ - and  $\beta$ -D-glucose, and  $\beta$ -D-fructose.

## Alkaloides

Tetramethylputrescine was extracted from *Ruellia* rose roots and aerial portions. *Ruellia asparulla* aerial portions have been reported to contain tylocrebrine, a phenanthrene alkaloid with anti-inflammatory and anti-cancer properties.<sup>[21]</sup>

## Theuraupctic applications of *Rullia Asparulla*

It has been widely utilized as an antioxidant<sup>8</sup>, diuretic, anti-diabetic, antipyretic, analgesic, anti-hypertensive, and gastroprotective. The majority of *Ruellia* plant species are widely utilized for their anti-inflammatory, antipyretic, gastroprotective, antibacterial, analgesic, antioxidant, and anticancer properties against the nasopharyngeal epidermis. *Ruellia asperula* is used to treat asthma, bronchitis, fever, illness, and inflammation of the uterus. *R. prostrata* is used to cure a variety of conditions, including hemiplegia, dermatitis, chronic rheumatism, facial paralysis, and colic infections in children. Its leaf juice is also a useful medicine for these conditions.

## CONCLUSION

The review elaborates on the biological and phytochemical investigations, as well as the medicinal usage in various diseases, with a focus on the genus *Ruellia*. This genus's phytochemical and biological characteristics have been thoroughly investigated. Future research is needed to identify the biologically active substances that are causing these effects and could potentially be used as medications to treat various illnesses.<sup>[1]</sup>

## AKNOWLEDGEMENT

I am grateful for the support and direction provided in writing this article by the Pravara Rural College of Pharmacy team, as well as my esteemed mentor, Dr. Arshu Patel sir. I would also like to express my gratitude to my buddy Mr. Manish Ahire for his assistance in drafting the manuscript, coming up with the main idea, and overseeing the entire piece.

## REFERENCE

1. GENUS *RUELLIA*: PHARMACOLOGICAL AND PHYTOCHEMICAL IMPORTANCE IN ETHNOPHARMACOLOGY, KHURRAM AFZAL<sup>1\*</sup>, MUHAMMAD UZAIR<sup>1</sup>, BASHIR AHMAD CHAUDHARY<sup>1</sup>, ASHFAQ AHMAD<sup>2</sup>, SAMINA AFZAL<sup>1</sup> and MALIK SAADULLAH.
2. Plants as Sources of Anti-Inflammatory Agents Clara dos Reis Nunes,<sup>1</sup> Mariana Barreto Arantes,<sup>1</sup> Silvia Menezes de Faria Pereira,<sup>1</sup> Larissa Leandro da Cruz,<sup>1</sup> Michel de Souza

- Passos,<sup>2</sup> Luana Pereira de Moraes,<sup>1</sup> Ivo José Curcino Vieira,<sup>2</sup> and Daniela Barros de Oliveira<sup>1</sup>.
3. Determination of Anti Mitotic and Anti-Ulcer Activity of *Ruellia Tuberosa* Dr. Juluri Krishna Dutta Tejaswi, Department of Pharmaceutical Analysis, Jogaiah College of Pharmacy, Palakol, West Godavari (AP), India.
  4. Updates on Ethnomedicinal Uses and Biological Activities of Genus *Ruellia*, Jagtap T. D.<sup>1</sup>, Shirsat, R. P.<sup>2</sup>, Koche, D. K.
  5. Screening of phytocomponents in ethanolic extract of *Ruellia prostrata* leaf using GC-MS technique Vimala Suji JJ1, Velavan S2.
  6. Phytochemical analysis and antimicrobial activity of *Ruellia patula* L. against pathogenic microorganisms. S. rama devi, B. Kaleeswaran, P. Nataranjan.
  7. Antibacterial and antifungal activities of *Ruellia tuberosa* (L.) leaf and stem extract S. Gopika <sup>1</sup>, K. Prabu.
  8. Update on ethnomedical use and biological activities of genus *Ruellia*, Jagtap. T.D, Shirsat R.P, Koche D.K.
  9. Pharmacognostic and preliminary phytochemical studies of *Ruellia tuberosa* L. (Whole plants), B Arirudran, A Saraswathy, Vijayalakshmi Krishnamurthy.
  10. Chemical constituents and biological activities of Genus *Ruellia*, Mamdouth Nabil Samy, Sachiko Sugimoto, Katsuyoshi Matsunami, Hideaki Otsuka and Mohamed Salah Kamal.
  11. Phytochemical screening, invitro antioxidant activity and in silico antidiabetic activity of aqueous extract of *Ruellia tuberosa* L., Anna Safitri, Fatchiyah Fatchiyah, Dewi Ratih Tirto Sari, Anna Roosdiana.
  12. Nasir E., Ali S.I.: Flora of West Pakistan. Tech. Rep. No. 1-190. Pakistan.
  13. Agricultural Research Council, Islamabad 1971-1991. Agra M.D.F., Silva K.N., Basilio I.J.L.D., Freitas P.F.D., Barbosa-Filho J.M.: Braz. J. Pharmacog., 2008; 18: 472.
  14. Rajan M., Kumar P.V.K., Kumar S., Swathi K.R., Haritha S.J.: J. Chem. Pharm. Res., 2012; 4: 2860.
  15. Phakeovilay C., Disadee W. L.: J. Nat. Med., 2013; 67: 228.
  16. Krishna Chaitanya B and Alekhya Ravella. Hypolipidemic and Anti Oxidant Activity of *Ruellia Tuberosa* Linn, International Journal of Pharmacy and Biological Sciences, 2012; 2(3): 63-74.
  17. Alam M. A. Shraful and Subhan Nusrat. Antinociceptive and anti-inflammatory properties of *Ruellia Tuberosa*, Pharmaceutical Biology, 2009; 47(3): 209-214.
  18. Chwan-Fwu Lin and Yu-Ling Huang. Bioactive Flavonoids from *Ruellia Tuberosa*,

- Journal of Biomed Science and Research, 2006; 17(3): 103-109.
19. Rajan and V. Kishor Kumar. Antidiabetic, Antihyperlipidemic and Hepatoprotective activity of Methanolic extract of *Ruellia Tuberosa* Linn leaves in normal and Alloxan induced diabetic rats, *Journal of Chemical and Pharmaceutical Research*, 2012; 4(6): 2860-2868.
  20. Bauri R.K., Tigga M.N., Saleebkullu S. A review on use of medicinal plants to control parasites. *J. Nat. Prod. Resour.*, 2015; 6: 268–277.
  21. Azab A.N., Nassar A., Azab A.N. Anti-Inflammatory Activity of Natural Products. *Molecules*, 2016; 21: 1321. doi: 10.3390/molecules21101321.
  22. [www.wikipedia.org/wiki/Ruellia\\_asparula](http://www.wikipedia.org/wiki/Ruellia_asparula).
  23. CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITIES OF GENUS *RUELLIA* Mamdouh Nabil Samy, Sachiko Sugimoto, Katsuyoshi Matsunami, Hideaki Otsuka and Mohamed Salah Kame.