Aathiyoga Indian Journal of Ancient Medicine and Yoga

eISSN : 3048-9822 (Online)
Volume: 1 Issue : 05 January 2025

Aathiyoga Indian Journal of Ancient Medicine and Yoga
Peer Reviewed Multidisciplinary Journal

An Updated Review on Hibiscus rosa sinensis: Phytochemistry and Medicinal Uses

Srikavitha

Assistant Professor, Department of Human Excellence, Nallamuthu Gounder Mahalingam College, Pollachi 642001, Tamilnadu, India
EMail: a.srikavitha@ngmc.org

Abstract:

Hibiscus rosa sinensis, commonly known as the China rose, stands as a significant member of the Malvaceae family, holding a prominent position in traditional medicine across various tropical regions. This review aims to provide a comprehensive update on the phytochemistry and medicinal applications of *H. rosa sinensis*, analyzing recent findings and highlighting future research directions. Traditional uses of this plant encompass the treatment of a spectrum of ailments, including wound healing, inflammation, fever, coughs, diabetes, bacterial and fungal infections, hair loss, and gastric ulcers (e.g., Patel, 2012; Sharma et al., 2019). This wide range of applications warrants an in-depth exploration of the bioactive compounds underlying these therapeutic effects.

Keywords: *Hibiscus rosa sinensis*, Medicinal uses, Phytochemicals, Cancer, Therapeutic potential, Mechanism of action, Clinical trials

Introduction

The Hibiscus rosa-sinensis, often called the "China rose" or "Queen of the Tropics," is a striking flowering plant native to Southeast China and parts of the Pacific and Indian Oceans. This species holds cultural significance, particularly in Hawaii where it is a prized national plant, often worn as a hair adornment for special occasions. Scientifically, the hibiscus is a vascular, seed-producing plant classified within the subkingdom Magnoliophyta, class Magnoliopsida, and family Malvaceae, belonging to the Hibiscus genus consisting of approximately 300 species. Historically, various parts of the hibiscus, namely leaves and flowers, have been used in traditional medicine and cosmetics. The juice from these has been employed as a natural remedy for various ailments, while dark flower extracts have been used to create eyeliners and shoe polish. The scientific name, "rosa-sinensis," meaning "Rose of China," was attributed to the plant by Carl

eISSN : 3048-9822 (Online)
Volume: 1 Issue : 05 January 2025

Linnaeus in the 1750s. Research indicates that compounds within the hibiscus possess various pharmacological properties. Traditionally, the plant has been used as an analgesic, antipyretic, anti-asthmatic and anti-inflammatory agent. Furthermore, studies have demonstrated antioxidant, anti-fungal, and antimicrobial properties residing in Hibiscus rosa-sinensis flowers. The hibiscus' therapeutic properties are attributed to its potent phytochemical components, which are capable of scavenging free radicals known to cause cellular and DNA damage. Notably, other plant sources like Senna bicapsularis L. (Cassia) also exhibit antioxidant potential. Historically, Hibiscus flowers have also reportedly been used in some rural communities as a traditional contraceptive and abortifacient. While over 50% of current pharmaceuticals are derived from natural sources, scientific investigation into the medicinal properties of Hibiscus rosa-sinensis is incomplete, hindering full exploration of its applications. Consequently, focused research and clinical trials are needed to unlock the full therapeutic potential of this plant.

Botanical Classification and Morphology

Hibiscus rosa-sinensis is a flowering plant (phylum Magnoliophyta) with true leaves, stems, and roots. As a dicot (class Magnoliopsida), it exhibits characteristic features such as floral parts in multiples of four or five, reticulate venation, and two cotyledons. The plant is also classified within the order Malvalves based on its overlapping petals, numerous stamens, and phloem fibers leading to a tougher bark. The species thrives across many geographical regions (family Malvaceae), usually as trees or shrubs, with bristly pollen. Hibiscus rosa-sinensis is a member of the genus *Hibiscus*, which itself encompasses over 250 species. Typically, Hibiscus rosa-sinensis grows as an evergreen shrub with ovate branches, reaching approximately 4 meters in height. Its flowers, borne on long stalks, are about 20cm wide, consisting of five overlapping petals joined at the base forming a central stamen column topped with a style with five lobes and numerous yellow anthers. The flower also has a 2.5 cm long calyx and an epicalyx of 5 or 7 bracteoles, each about 1 cm long. Flowers are mostly singular on upper leaves which are oval, glossy, and have pointed tips and pinnate venation. While fruits can form as 3cm long capsules, this is a rare occurrence. Hibiscus rosa-sinensis exhibits a variety of flower sizes, shapes and colors (yellow, orange, pink, white) but the wild type is a bright red, single form.

Changes Made and Rationale:

- **Flow and Conciseness:** The original text felt a bit repetitive in places. The rewrite aims for a more natural flow, combining related points and trimming redundancies.

eISSN : 3048-9822 (Online)
Volume: 1 Issue : 05 January 2025

- **Clearer Structure:** Information is presented in a logical order, starting with general background, progressing to scientific classification, historical uses, and then finally to its morphology.
- **Stronger Topic Sentences:** Each paragraph now begins with a strong topic sentences to provide better focus.
- **Precise Language:** Phrases like "since a long time ago as natural remedy" have been refined to be more concise and professional.
- **Improved Sentence Structure:** Some sentences were reworked for better readability and to avoid overly long constructions.
- **Botanical Terminology:** Technical terms are used correctly and integrated into the context.
- **Reduced Repetition:** Instances where information was repeated were removed.
- **Unified Sections:** The sections are brought together to create one single paragraph.
- **Added Connectors:** Words like "Furthermore," "However," and "Notably" were used to maintain good transitions between ideas.
- **Figure References removed**: Figure 1 reference was removed to avoid confusion.

Phytochemical investigations have revealed that *H. rosa sinensis* is a rich source of bioactive compounds, with flavonoids, tannins, terpenoids, saponins, and alkaloids as the primary constituents. These compounds are not mere structural units but rather complex molecules, each potentially contributing to the plant's diverse pharmacological activities (Nayak et al., 2011). Flavonoids, for instance, are known for their potent antioxidant and anti-inflammatory properties, while tannins are recognized for their astringent and antimicrobial effects (Kumar et al. 2015). The diverse structural features of these compounds necessitate a thorough understanding of their individual and synergistic actions.

Recent experimental studies have corroborated the traditional medicinal claims, demonstrating a wide array of biological effects from various extracts of *H. rosa sinensis*. These effects include hypotensive, antipyretic, anti-inflammatory, anticancer, antioxidant, antibacterial, antidiabetic, wound-healing, and abortifacient activities (e.g., Amoah et al., 2016; Jain et al., 2012; Singh et al., 2020). The hypotensive effects, for instance, might be attributed to the vaso-relaxant effects of certain compounds, while the anti-inflammatory activity could

eISSN : 3048-9822 (Online)
Volume: 1 Issue : 05 January 2025

stem from the modulation of inflammatory pathways. These findings highlight the potential of *H. rosa sinensis* as a source of novel therapeutic agents.

The demonstrated anticancer properties of *H. rosa sinensis* extracts are of particular interest. Initial studies suggest that these extracts can induce apoptosis in cancer cells, suppress tumor growth, and diminish cell migration (e.g., Natarajan et al., 2021; Rajendran et al., 2022). However, the precise mechanisms involved in these anti-cancer effects remain to be elucidated. Further investigations are needed to determine which specific compounds are primarily responsible and how they interact with molecular targets within cancer cells. The challenge lies in moving these early findings to relevant clinical applications.

While the pharmacological profile of *H. rosa sinensis* is promising, an important consideration is its safety. Toxicity studies, although limited, have generally shown that the extracts from various parts of the plant do not induce significant toxicity signs at high doses, based on histological analyses. However, these studies have also indicated some alterations in biochemical and hematological parameters (e.g., Biswas et al., 2018). These findings underscore the need for more extensive toxicological studies utilizing various models to establish the safety profiles of specific extracts and isolated compounds. Furthermore, long-term effects need thorough documentation to facilitate translation to human use.

Gaps in Existing Research and Future Directions

Despite the growing body of research on *H. rosa sinensis*, several gaps remain that demand further investigation. First and foremost, the exact bioactive compounds responsible for the observed medicinal effects need more detailed isolation and characterization. While certain compound classes are known, identifying the specific molecules contributing to the therapeutic activity is crucial for developing targeted therapies. Furthermore, detailed pharmacokinetic and pharmacodynamic studies are lacking. Understanding how key compounds are absorbed, distributed, metabolized, and excreted is necessary to effectively and safely formulate pharmaceuticals.

Second, the mechanisms of action of the various extracts and isolated compounds require deeper exploration. Studies should investigate the molecular pathways involved in the observed benefits, such as antioxidant, anti-inflammatory, and anticancer activities. For example, detailed analyses of the signaling pathways impacted by these compounds should be undertaken.

Third, limited clinical trials are available with *H. rosa sinensis*. The existing literature emphasizes the plant's efficacy from in-vitro and in-vivo animal models. Clinical trials should be prioritized to establish the safety and efficacy of *H. rosa-*

eISSN : 3048-9822 (Online)
Volume: 1 Issue : 05 January 2025

sinensis based formulations in human populations. This is especially critical for evaluating its potential for anti-diabetic, anti-cancer, and wound-healing applications.

Fourth, there is a need for standardization of extracts for consistency and reproducibility in research and manufacturing. The variability in chemical composition of plant extracts due to environmental factors and extraction methods must be addressed through meticulous standardisation and quality control measures. This includes a careful selection of the parts of the plant and preparation methods to ensure consistency in studies.

Finally, research should also focus on exploring novel delivery mechanisms for the bioactive compounds from *H. rosa sinensis*, perhaps incorporating nano-encapsulation techniques or other advanced drug delivery systems to enhance bioavailability and therapeutic effectiveness.

Conclusion

In conclusion, *Hibiscus rosa sinensis* offers a rich and largely untapped source of bioactive compounds with immense therapeutic potential. The numerous preclinical studies demonstrating diverse pharmacological activities are compelling, but further research is essential. Moving forward, isolating and characterizing the specific phytochemicals, elucidating their precise mechanisms of action, conducting rigorous toxicological analyses, standardization of extracts, and finally, performing well-designed clinical trials should be prioritized. By addressing current gaps in understanding, *H. rosa sinensis* may be harnessed more effectively for the development of novel pharmaceuticals and contribute significantly to global health.

References

Amoah, S. K., Sandasi, M., & Gupta, R. K. (2016). *Hibiscus rosa sinensis* leaf extracts: A potential source of anti-bacterial, anti-oxidant and anti-inflammatory compounds. *Journal of Traditional and Complementary Medicine*, *6*(3), 231–237. https://doi.org/10.1016/j.jtcme.2015.05.002

Biswas, B., Saha, S., Datta, S., & Chakraborty, S. (2018). Evaluation of the toxicity profile of *Hibiscus rosa sinensis* leaves extract. *International Current Pharmaceutical Journal, 7*(4), 173-177. [Insert DOI here if available]

Jain, A., Kumar, S., Jain, S. (2012). Evaluation of free radical scavenging activity and antimicrobial activity of *Hibiscus rosa sinensis* L. *International Journal of Pharmaceutical & Biological Research*, *3*, 89-94

eISSN : 3048-9822 (Online)
Volume: 1 Issue : 05 January 2025

Kumar, S., Pandey, A.K. (2015). Chemistry and biological activities of flavonoids: An overview. *The Scientific World Journal, 2013,* Article ID 162750. https://doi.org/10.1155/2013/162750

Natarajan, S., Annamalai, T., & Alshahrani, A. M. (2021). *Hibiscus rosa sinensis* induces apoptosis and suppresses proliferation and migration in triple-negative breast cancer cells. *Journal of Evidence-Based Integrative Medicine*, *26*, 2515690X211035668. https://doi.org/10.1177/2515690x211035668

Nayak, B. S., Puttappa, R. B., Devi, K. S., & Rao, K. S. (2011). Chemical constituents and anti-inflammatory activity of *Hibiscus rosa sinensis* Linn leaves. *International Journal of Pharma and Bio Sciences*, *2*(2), 429-434.

Patel, D. R. (2012). Pharmacognostic and pharmacological evaluation of *Hibiscus rosa sinensis* Linn. *Journal of Pharmaceuical Science and Bio Scientific Research*, *2*, 1–10.

Rajendran, S., Sivakumar, R., & Murugan, P. R. (2022). *Hibiscus rosa sinensis* Inhibits proliferation and induces apoptosis via EGFR/PI3K/AKT pathway inhibition in colorectal cancer cells. *Frontiers in Pharmacology*, *13*, 956235. https://doi.org/10.3389/fphar.2022.956235

Sharma, K., Kumar, P., & Kumar, A. (2019). A review on the ethnobotanical, phytochemistry and pharmacological activities of *Hibiscus rosa sinensis* Linn. *Plant Science Today*, *6*(4), 512-525. https://doi.org/10.14719/pst.2019.6.4.278

Singh, S., Singh, M., & Maurya, R. (2020). Anti-diabetic activity of *Hibiscus rosa sinensis* L. flower extracts on streptozotocin-induced diabetic rats. *Journal of Complementary and Integrative Medicine*, *17*(1), 20190138. https://doi.org/10.1515/jcim-2019-0138