Review Article

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Profiling of the Herbal Drug *Neolamarckia cadamba*: A Review on the Pharmacological Role of Its Phytoconstituents

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Abstract

Neolamarckia cadamba (Roxb.) Bosser, commonly known as the Kadamba tree, is a traditional medicinal plant widely used in ethnomedicine. It is rich in diverse phytoconstituents such as alkaloids, flavonoids, terpenoids, and glycosides, which contribute to its therapeutic potential. This review highlights the pharmacological activities of its constituents, emphasizing antioxidant, hepatoprotective, anti-inflammatory, antimicrobial, antidiabetic, and neuroprotective effects. The purpose of this article is to provide a comprehensive profiling of N. cadamba with a focus on its bioactive compounds and their pharmacodynamic actions, aiming to support its further development in evidence-based herbal therapy.

Keywords: Neolamarckia Cadamba, Pharmacological Activity, Phytoconstituents, Antioxidant, Neuroprotection

1. Introduction

Herbal medicine has long been a cornerstone of traditional healthcare systems across the globe. Among the various botanical species, Neolamarckia cadamba (family: Rubiaceae) holds an important place in Indian and Southeast Asian ethnopharmacology. The plant is valued for treating ailments ranging from fever and diabetes to inflammation and liver disorders.

Various parts of the plant, especially the bark and leaves, have shown rich content of phytoconstituents like cadambine, chlorogenic acid, isovallinic acid, and quinovic acid glycosides, each contributing to a spectrum of biological activities [1,2].

2. Botanical Profile

Feature	Description
Botanical name	*Neolamarckia cadamba* (Roxb.) Bosser
Family	Rubiaceae
Common name	Kadamba
Parts used	Bark, leaves, fruit, flowers
Native region	South and Southeast Asia

3. Phytochemical Constituents

Phytochemical investigations have identified a wide range of secondary metabolites, including:

- **Alkaloids:** Cadambine, isocadambine
- **Flavonoids:** Quercetin, rutin, kaempferol
- **Triterpenoids:** Lupeol, betulinic acid
- **Phenolic acids:** Chlorogenic acid
- **Steroids:** β-sitosterol
- **Glycosides:** Saponins and quinovic acid derivatives

These bioactive molecules are responsible for the pharmacological versatility of the plant [3,4].

4. Pharmacological Activities of Key Phytoconstituents

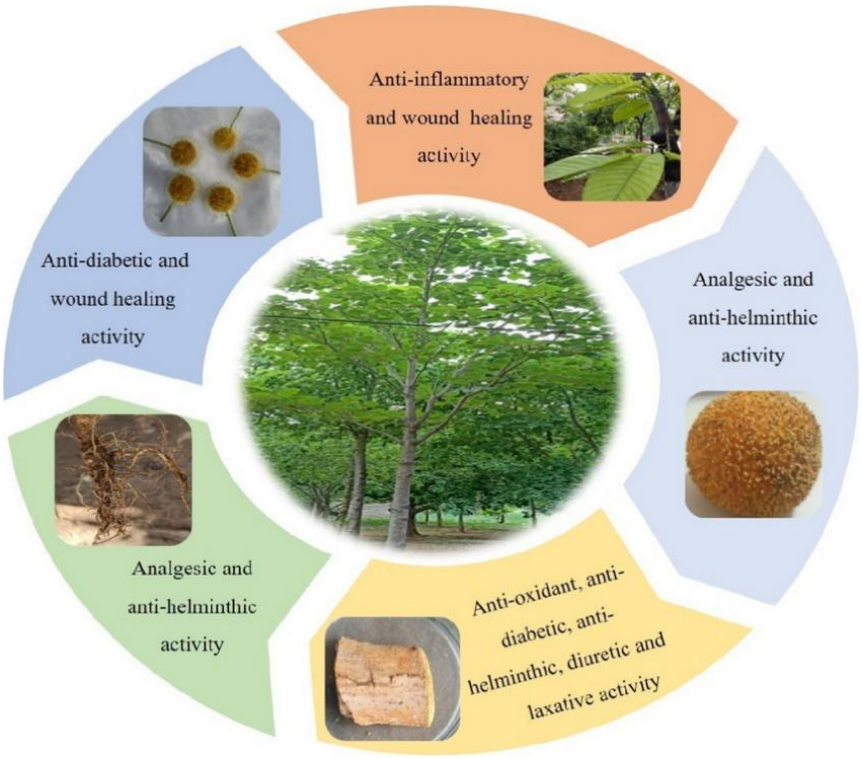

Figure 1: Pharmacological Activities of Key Phytoconstituents of Neolamarckia Cadamba

4.1. Antioxidant Activity

Compounds like chlorogenic acid, quercetin, and rutin exert potent antioxidant effects by scavenging free radicals, reducing lipid peroxidation, and enhancing endogenous antioxidant enzymes such as SOD and catalase [5].

4.2. Hepatoprotective Activity

Ethanolic extracts of *N. cadamba* bark showed significant protection against carbon tetrachloride-induced liver damage in rats. The hepatoprotective effect is attributed to triterpenoids and flavonoids that stabilize liver membrane integrity [6].

4.3. Antimicrobial Activity

Methanolic extracts of the plant bark and leaves demonstrated broad-spectrum antibacterial activity against *E. coli*, *S. aureus*, and *P. aeruginosa*. This effect is mainly due to quinovic acid glycosides and triterpenes [7].

4.4. Anti-inflammatory Activity

The anti-inflammatory potential of *N. cadamba* leaf extract was observed in carrageenan-induced paw edema models, with significant inhibition attributed to flavonoids and phenolic acids [8].

4.5. Antidiabetic Activity

Cadambine and saponins from the bark exhibit antihyperglycemic activity by increasing insulin secretion and enhancing glucose uptake, as shown in streptozotocin-induced diabetic rats [9].

4.6. Neuroprotective Activity

Recent studies reveal the neuroprotective role of *N. cadamba* extract in 6-hydroxydopamine (6-OHDA) and haloperidol-induced Parkinsonian rat models. The mechanism involves suppression of oxidative stress and modulation of dopaminergic pathways by compounds like chlorogenic acid and quercetin [10].

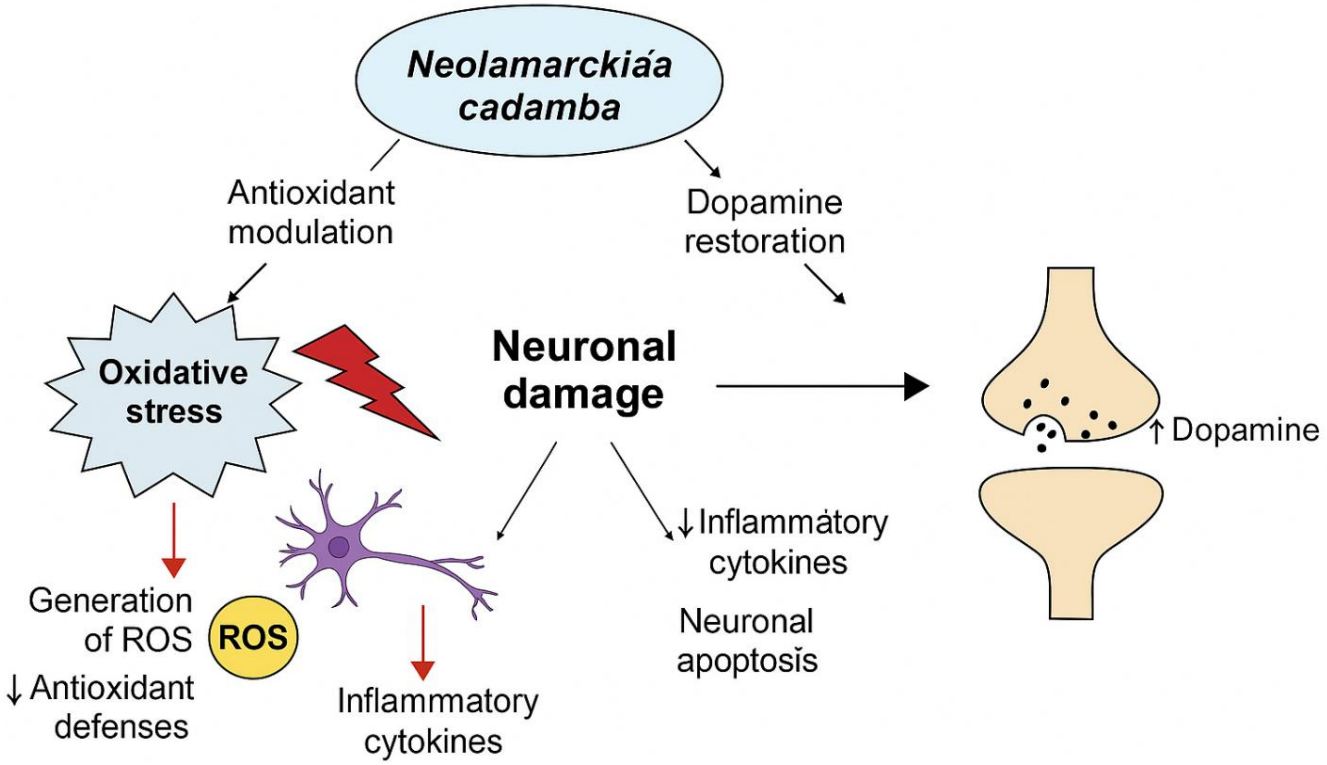

Figure 2: Schematic Representation of Neuroprotective Mechanism of N. cadamba via Antioxidant Modulation and Dopamine Restoration

5. Mechanism of Action

Activity	Proposed Mechanism	Key Constituents
Antioxidant	ROS scavenging, SOD activation	Quercetin, chlorogenic acid
Hepatoprotective	Membrane stabilization, liver enzyme modulation	Triterpenoids, flavonoids
Neuroprotective	Dopaminergic pathway support, ROS inhibition	Quercetin, chlorogenic acid

6. Toxicity and Safety

Acute and sub-chronic toxicity studies in rodents have demonstrated that *N. cadamba* extracts are safe at therapeutic doses up to 2000 mg/kg with no significant adverse effects [11].

7. Conclusion

Neolamarckia cadamba stands out as a promising medicinal plant with rich pharmacological potential. Its diverse phytoconstituents, especially flavonoids and alkaloids, exhibit significant therapeutic actions including antioxidant, hepatoprotective, antimicrobial, and neuroprotective effects. The current evidence strongly supports further investigation and standardization of this plant for its integration into modern phytotherapeutics.

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9. References

1. Saha S, Verma, R. J. (2018). Evaluation of antioxidant activity of Neolamarckia adamba bark extract. *Pharmacogn J. 10*(1):130-5.
2. Patil, SM., Karandikar, P. S. (2017). Phytochemical and pharmacognostic evaluation of Neolamarckia cadamba. *Int J Pharm Sci Res. 8*(9):3745-50.
3. Chandel, V., Singh, R. (2020). LC-MS analysis of bioactive compounds in N. cadamba. *J Ayurveda Integr Med. 11*(4):580-6.
4. Sharma, R., et al. (2019). Phytochemical profiling and in-vitro antioxidant activity. *J Ethnopharmacol.* 235:93-101.
5. Kumar, D., et al. (2016). Comparative antioxidant evaluation of various parts of N. cadamba. *Phytother Res. 30*(12):2021–8.
6. Jadhav, V. M., et al. (2010). Hepatoprotective activity of N. *cadamba Pharmacogn Res. 2*(1):41-5.
7. Hossain, M. A., et al. (2011). Antimicrobial potential of Neolamarckia cadamba. *Asian Pac J Trop Biomed.* 1(6):441-

6.
8. Bora, K. S., Sharma, A. (2013). Anti-inflammatory properties of kadamba bark. *J Herb Med*. 3(1):42–6.
9. Rathi, A., et al. (2014). Evaluation of antidiabetic effect of N. cadamba stem bark. *Ind J Exp Biol*. 52(6):579-85.
10. Patel, V., et al. (2023). Neuroprotective effects of Neolamarckia cadamba in Parkinson's models. *Biomed Pharmacother*. 158:114143.
11. Gupta, M., et al. (2012). Toxicity assessment of kadamba extracts in animal models. *Toxicol Int.* 19(1):30–5.