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Phytochemical and pharmacological potential of medicinal plants used by the Kani tribe of the Southern Western Ghats: An integrative review

V. P. Hariramana*, R. Ravi*◆, K. Baranidharan*, P. Hemalatha*, and B. Rajagopal**

**Department of Forest Products and Wildlife, Forest College and Research Institute, Mettupalayam-641 301, Coimbatore, Tamil Nadu, India*

*** Department of Plant Biotechnology, Tamil Nadu Agricultural University, Coimbatore-641 003, Tamil Nadu, India*

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Abstract

The Kani tribe, an indigenous particularly vulnerable tribal group of the Southern Western Ghats of India, possesses a century old ethnomedicinal tradition centered on forest plant resources with significant pharmacological importance. This integrative review examines the phytochemical composition and pharmacological activities of six widely used Kani medicinal species *Triochopus zeylanicus* Gaertn., the primary adaptogenic species, along with *Azadirachta indica* A. Juss., *Ocimum tenuiflorum* L., *Terminalia chebula* Retz., *Centella asiatica* (L.) Urb., and *Syzygium cumini* (L.) Skeels. The major phytochemical groups include alkaloids, flavonoids, phenolic acids, terpenoids, saponins and glycolipids, all of which are associated with key pharmacological properties such as antioxidant, anti-inflammatory, antidiabetic, antimicrobial, hepatoprotective, and adaptogenic effects, supported by both *in vitro* and *in vivo* studies. The glycolipid fractions of *T. zeylanicus* are structurally unique and contribute to adaptogenic activity by modulating the hypothalamic pituitary adrenal axis and enhancing natural killer cell function. Advanced analytical techniques, including gas chromatography-mass spectrometry (GC-MS) and high performance liquid chromatography (HPLC), have enabled the identification of bioactive compounds. However, significant limitations persist, including reliance on crude extracts, lack of phytochemical standardization, insufficient mechanistic validation, and absence of clinical trials. Toxicological data are also limited. Addressing these gaps through bioactivity guided isolation, metabolomics, and clinical validation is essential for translating this traditional knowledge into scientifically validated phytopharmaceutical applications.

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