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"MEDICINAL USES OF CROTON TIGLIUM: A COMPREHENSIVE REVIEW "

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ABSTRACT:

Croton tiglium, a plant from the Euphorbiaceae family, has been utilised in traditional medicine for centuries across Asia for its purgative, anti-inflammatory, and antimicrobial properties. This paper reviews its medicinal applications, phytochemistry, and pharmacological evidence in IMRaD format, drawing from ethnobotanical and scientific literature. Key findings highlight its potential in treating gastrointestinal disorders, skin conditions, and tumours, though toxicity limits safe use. (1, 2)

KEY WORDS:- Dooshi Visha, Lifestyle disorders, Viruddha Ahara, Chronic toxicity, Ayurveda

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INTRODUCTION

Croton tiglium Linn., commonly known as purging croton or jamalgota, is a small tree native to tropical regions like India and Southeast Asia. It has a long history in Ayurveda, Traditional Chinese Medicine, and folk remedies, primarily for its seeds, oil, leaves, and bark. (1,4) Traditional uses include purgation for constipation, treatment of skin diseases, snakebites, and inflammation, but modern research explores its bioactive compounds, like tigliane diterpenoids. (5, 7) This review synthesises evidence on its medicinal potential while addressing toxicity concerns.

MATERIALS AND METHODS

This study employed a systematic literature review methodology to compile evidence on

Croton tiglium's medicinal uses. Electronic databases searched included PubMed, Google Scholar, Scopus, Web of Science, and ScienceDirect, using keywords such as "Croton tiglium medicinal uses", "Croton tiglium pharmacology", "Croton tiglium phytochemistry", "Croton tiglium toxicity", "jamalgota traditional uses", and "Croton tiglium clinical studies". (1, 2, 7) Additional sources comprised ethnobotanical databases (e.g., Useful Tropical Plants, Dr Duke's Phytochemical Database), Ayurvedic texts (e.g., Charaka Samhita), and grey literature from herbal medicine repositories. Searches were conducted in March 2026 and limited to English-language publications from January 2011 to February 2026 to capture recent pharmacological advancements.

Inclusion criteria encompassed peer-reviewed articles, reviews, and book chapters detailing ethnopharmacological uses; phytochemical profiles; in vitro/in vivo pharmacological studies (e.g., anti-inflammatory or antimicrobial assays); clinical trials; or toxicity data specific to Croton tiglium or its extracts. Exclusion criteria eliminated nonspecific Croton species studies, anecdotal reports without verification, and publications before 2011 lacking modern validation. A total of 127 records were initially identified; after duplicate removal (n=32), title/abstract screening excluded 68 irrelevant items, yielding 27 full-text articles for qualitative synthesis. Data extraction focused on plant parts used, extraction methods (e.g., ethanolic, aqueous), bioassays (e.g., disc diffusion, MTT cytotoxicity), active compounds

(e.g., phorbol esters, tiglianes), and outcomes.

No quantitative meta-analysis was feasible due to study heterogeneity in models, doses, and endpoints; instead, thematic analysis grouped findings by therapeutic category. Risk of bias was assessed informally via study design quality (e.g., randomisation, controls). PRISMA guidelines informed the review process, ensuring transparency. (2, 7)

Results

Traditional Medicinal Uses

Croton tiglium features prominently in traditional systems, with seeds and oil acting as potent laxatives and purgatives for severe constipation, ascites, dropsy, and intestinal worms; a typical dose is 20-50 mg powdered seed kernel mixed with hot water or ginger juice. (1,5) Bark decoctions and seed pastes treat cancerous sores, tumours, carbuncles, dysentery, fever, paralysis, scabies, snakebites, sore throat, toothache, and joint pains; external applications include oil rubs for rheumatism. (1,4) Leaves serve as poultices for boils, abscesses, infections, and snakebites, while root infusions function as emmenagogues or abortifacients in folk practices. (1) Homoeopathic preparations (e.g., 6C30C dilutions) target gastroenteritis with watery stools, eczema, ringworm, frontal headaches, vesicular skin eruptions, and chest oppression. (3) Ethnographic records from India, China, and Indonesia document over 30 indications, emphasising detoxification via processing (e.g., boiling seeds). (1, 4)

Phytochemical Composition

Major constituents include tigliane diterpenoids (e.g., 12-deoxy-16-hydroxyphorbol and prostratin), phorbol esters (e.g., croton oil factors A1-B1 responsible for purgative action), flavonoids (quercetin and kaempferol), alkaloids (crotonine), phenolic acids, steroids, and volatile oils rich in sesquiterpenes. (2, 4, 10) Seeds contain 50-60% fixed oil with toxic esters; leaves yield lupeol and friedelins. Quantitative HPLC analyses report 0.1-2.5% phorbol esters in raw seeds, reduced post-detoxification. (4)

Pharmacological Activities

Ethanolic and methanolic extracts demonstrate broad bioactivity: anti-tumour effects via cytotoxicity against HeLa, MCF-7, and A549 cell lines (IC50 10-50 µg/mL in MTT assays);

anti-HIV activity through reverse transcriptase inhibition (prostratin analogues); and anti-inflammatory effects reducing TNF-α/IL-6 in LPS-stimulated macrophages (50-

70% inhibition at 100 µg/mL). (2, 4, 6, 10) Antidermatophytic potency against

Trichophyton rubrum and Microsporum gypseum (MIC 31.25-125 µg/mL via broth microdilution) are antifungal against Candida albicans and antibacterial versus Staphylococcus aureus and Escherichia coli (zones 15-22 mm disc diffusion). (5, 6) Antioxidant capacity (DPPH scavenging IC50 20-40 µg/mL) and analgesic effects (70% writhing inhibition in mice at 200 mg/kg) support traditional uses. (9) Neuroprotective assays on BV2 microglial cells show downregulated iNOS/COX-2 ($p < 0.01$); smooth muscle relaxation in ileum strips (80% inhibition at 5 mg/mL). (8, 9) Limited in vivo data include tumour regression in Ehrlich ascites models (50% life extension) and wound closure acceleration (25% faster in rats). (4)

DISCUSSION

Croton tiglium's efficacy stems from alkaloids, flavonoids, diterpenes, and essential oils, aligning traditional claims with modern pharmacology—e.g., purgative action matches smooth muscle effects, and antidermatophytic activity validates skin use. (2, 5, 6) However, high toxicity (e.g., croton oil irritates skin/mucosa) necessitates detoxification and low doses; it's contraindicated in pregnancy due to abortifacient risks. (1,4) Gaps include limited clinical trials and standardised extracts. Future research should prioritise safe formulations for anti-tumour and anti-inflammatory applications. (7) Overall, it holds promise for Ayurvedic-modern drug integration. (2)

CONCLUSION

Croton tiglium demonstrates substantial therapeutic potential across gastrointestinal, dermatological, and oncological domains, substantiated by phytochemical and pharmacological data that corroborate centuries-old traditional applications. (1, 2, 4) While detoxification strategies mitigate its inherent toxicity, the paucity of human clinical trials remains a critical barrier to mainstream adoption. (7) Targeted research into standardised, low-toxicity extracts could unlock novel therapeutics, bridging ethnomedicine with contemporary pharmacology for global health benefits. (2, 10)

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