



IROHA Indigo

The Extraordinary Power of Japanese Indigo

Pharmacological Insights on Tryptanthrin

The Antineoplastic Component of Japanese Indigo

The cancer-fighting properties of Japanese Indigo (*Persicaria tinctoria*) stem from its indole alkaloid active compound, **tryptanthrin**.

Chemical Structure and Traditional Context

Tryptanthrin is an indole alkaloid derived from the core structure of Indigo. It functions as a key bioactive marker in traditional Chinese medicines, including **Da Qing Ye** (Indigo leaf) and **Ban Lan Gen** (Indigo root), validating centuries of therapeutic use.

How Tryptanthrin Works: Selective Cancer Cell Targeting

Laboratory Evidence (*In Vitro*):

Studies demonstrate **potent inhibition of cancer cell proliferation**, with low IC₅₀ values across multiple human cancer cell lines—including HL-60 leukemia and HGC gastric cancer cells. Critically, tryptanthrin shows minimal toxicity to normal cells, indicating a **high degree of selectivity** for malignant tissue.

Animal Studies (*In Vivo*):

Research using induced cancer mouse models confirms that oral tryptanthrin administration **significantly reduces the incidence** of small intestinal adenomas and colorectal cancer. These findings point to a powerful **chemopreventive effect** within the gastrointestinal tract, suggesting potential for cancer prevention strategies.

Additional Therapeutic Properties

Beyond its antineoplastic effects, tryptanthrin demonstrates notable **antibacterial and antifungal activities**. This scientifically validates the traditional application of Indigo in treating various skin conditions and infectious diseases, bridging ancient medicinal wisdom with modern pharmacological understanding.

Clinical Significance: Tryptanthrin's dual capacity for selective cancer cell targeting and broad antimicrobial action positions it as a promising candidate for both preventive and therapeutic interventions.

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