



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: Investigating the intrinsic photophysical properties and potential anticancer activity of compound DHF from *Alpinia nigra*

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SHORT ABSTRACT

The plant *Alpinia nigra*, known for its medicinal value, yields 3,5-dihydroxy-7,4'-dimethoxyflavone (DHF), a non-polar compound poorly soluble in water. However, DHF's limited solubility in water necessitated investigations into enhancing its aqueous solubility. Through UV-visible studies, DHF's solubility across various pH levels was explored, revealing highest solubility at pH 13, accompanied by a notable red shift in absorption peak. Furthermore, interactions between DHF and Hen Egg White Lysozyme (HEWL) aggregates at different pH conditions were examined, highlighting DHF's ability to inhibit fibril formation, particularly in acidic (pH 2) environments. However, it is noteworthy that DHF's inhibitory influence is not extended to amorphous aggregates at pH 5. Conversely, under the distinctly alkaline conditions at pH 12.2, DHF's inhibitory impact on HEWL aggregates is of a milder nature. In the context of cancer research, DHF demonstrated significant inhibition of colon cancer cell migration and proliferation, without cytotoxic effects on normal cells. DHF's non-cytotoxicity in normal HaCaT cells distinguishes it, highlighting its potential as an anticancer agent. In cancer cells SW480 and HCT116, DHF exhibits significant inhibition of proliferation and migration, upregulating E-cadherin and downregulating N-cadherin and CXCR4 expressions. Comparative analysis with kaempferol, a structurally related compound known for its anticancer properties, underscored DHF's efficacy in inhibiting cell proliferation. These findings advocate for further exploration of flavonoids, like DHF, as promising candidates in cancer therapy, emphasizing the importance of harnessing natural compounds for combating cancer. Overall, this multifaceted investigation sheds light on DHF's diverse pharmacological potentials, from enhancing solubility to impeding amyloid aggregation and inhibiting cancer cell proliferation, thus opening new avenues for therapeutic interventions.