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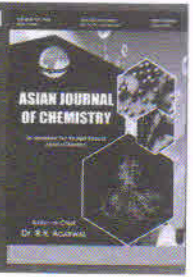

Regioselective NBS-Mediated Synthesis of Indolyl–1,2,3-triazole Hybrids as Potent Anti-breast Cancer Agents with Reduced Nephrotoxicity

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The growing demand for targeted cancer therapeutics with minimal systemic toxicity has directed the exploration of heterocyclic scaffolds with multifunctional potential. In this study, we designed and synthesised a series of indolyl-1,2,3-triazole compounds (**IIIA1-IIII4**) *via* a regioselective NBS-mediated coupling protocol, combining key pharmacological features of the indole and triazole moieties. All the fourteen derivatives were structurally validated using spectral and elemental analysis. Their antiproliferative activity was assessed against MCF-7 breast cancer cells, revealing that some derivatives surpassed adriamycin in efficacy. Compounds featuring chloro or fluoro substituents at the 5- or 6-positions on the indole core and methyl groups on the triazole ring, demonstrated potent cytotoxicity, with **IIIA6**, **IIIA7** and **IIIA14** showing IC_{50} values between 3.7 and 10.9 μM. Further safety evaluation of **IIIA14** using HEK 293T kidney cells confirmed limited cytotoxicity at effective doses. These findings highlight the promise of indolyl-triazole hybrids, particularly **IIIA14**, as selective anti-breast cancer agents with an improved safety profile suitable for future therapeutic development.

Keywords: Cytotoxicity, Indolyl-1,2,3-triazole, MTT assay, Nephrotoxicity, Regioselective coupling, Sulforhodamine B assay.