Exploring the role of 4-thiazolidinone derivatives as potential COX-2 inhibitors and free radical scavenging agents

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Background: Cyclooxygenase-2 (COX-2) and free radicals has become an important target in the management of various pathological conditions including cancer and inflammation. The pyridine or thiazolidinone has become an emerging scaffold in the drug design and development of COX-2 inhibitors and free radical scavenging agents. 4-Thiazolidinone clubbed pyridine may potentiate each other activity and can emerge as a promising scaffold in the treatment of inflammation/cancer.

Methods: The present work reports synthesis and screening of 4-thiazolidinone-pyridine hybrids with substituted arylidene containing electron-donating group at 5th position. The compounds were screened for their *in-vivo* anti-inflammatory activity using carrageenan-induced rat paw edema. The antioxidant activity of the compounds was determined by the DPPH method. The compounds were also screened for their ADMET properties. Furthermore, the compounds were docked against COX-2 (PDB ID: 3LN1) using AutoDockTools version 4.2.2.

Results: The results showed that compounds bearing 2,5 dimethoxy group are found to be active and possessed the highest docking score with value of -8.0. However, the compound-bearing nitro group was found to be carcinogenic while the former ones showed good ADMET properties. The antioxidant of the compounds bearing 2,5 dimethoxy was found to be excellent than other analogues.

Conclusions: The 4-thiazolidinone-pyridine hybrids bearing 2,5 dimethoxy group showed good pharmacological and ADMET profile and can emerged as promising COX-2 inhibitor.

Keywords : COX-2 inhibitors, inflammation, 4-thiazolidinone pyridine.