

World Congress on
Drug Delivery, Formulation and Analytical Techniques
July 02-03, 2018 New Orleans, USA

Discovery of a synthetic method to form 2, 2'-bis(naphthoquinone) compounds

Jayalakshmi Sridhar

Xavier University of Louisiana, USA

Quinones are key structural components in many natural products and therapeutic drugs impacting many disease conditions, viz antimicrobial, antiparasitic, anti-tumor, inhibition of PGE2 biosynthesis and anti-cardiovascular disease. As part of our efforts in the design and development of kinase inhibitors as potential therapeutics for cancer and Alzheimer's disease, the synthesis of monohydroxy naphthoquinones using Diels-Alder reaction was pursued. This led to the discovery of a novel method for the synthesis of 2, 2'-bis(naphthoquinones) using conjugated ketene silyl acetals with benzoquinone. The analysis of the reaction conditions and the product structures using NMR and X-ray led to the elucidation of a credible mechanism of dimer formation. The control of reactant stoichiometry to yield either the monomer or the dimer product is explored.

Biography

Jayalakshmi Sridhar has her expertise in organic synthesis of complex molecules and computational molecular modeling. Her research work group focuses on the development of modulators for three classes of proteins: (1) Protein kinases that regulate many of the key signaling pathways in the cell, (2) the cytochrome P450 enzymes that metabolize exogenous and endogenous substances in the body and (3) Liver X Receptor β that is a key mediator in many of the cellular processes. The development of new synthetic methods for the target molecule is part of his research focus.

jsridhar@xula.edu

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