# Synthesis of Quinoline-Based Schiff Bases as Multifunctional Fluorescent and Antioxidant Agents

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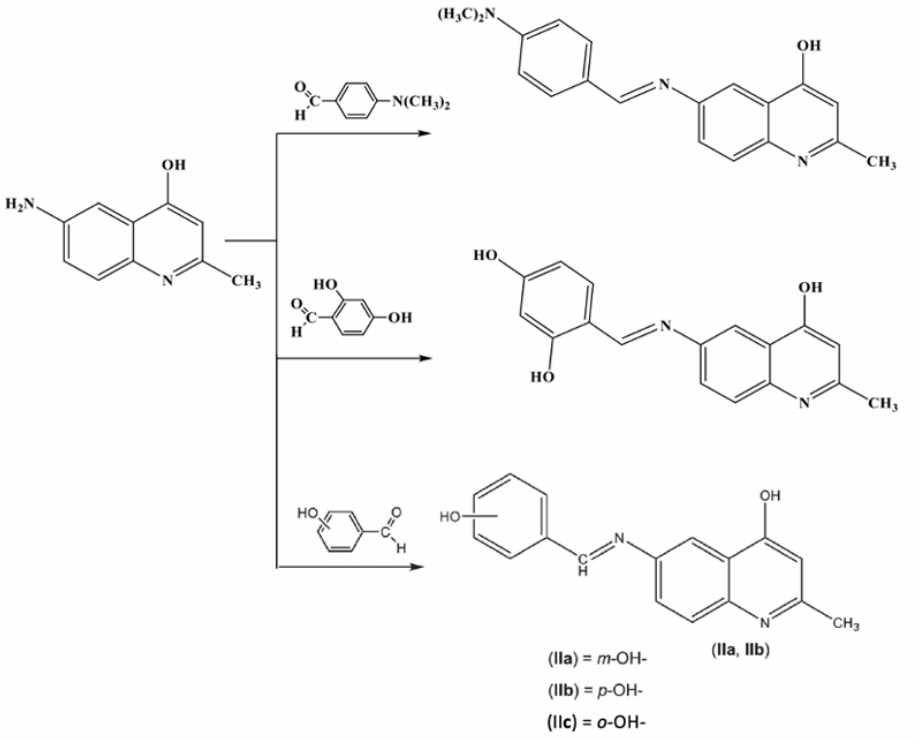
## Abstract

Quinoline derivatives remain essential in medicinal chemistry due to their rich structural diversity and multifunctional properties. Among them, Schiff bases containing quinoline rings have gained special interest over the past decade because of their modular design, ease of synthesis, and wide range of biological activities [1]. These compounds are known for their anticancer, antibacterial, and antifungal effects, which often become even more potent upon forming complexes with metal ions. Their unique structure centered around an imine (>C=N) group gives them remarkable chemical and physical behavior [2], making them attractive candidates in areas such as catalysis, analytical science, and biomedical research. Quinoline based Schiff bases also exhibit fluorescent properties, allowing them to serve as sensitive sensors for metal ions like $Zn^{2+}$ or $Al^{3+}$. These properties are often governed by photoinduced electron transfer (PET) and intramolecular charge transfer (ICT) mechanisms [3-6]. When hydroxy or amino groups are located close to the imine group, these molecules can undergo excited-state intramolecular proton transfer (ESIPT), which further enhances their light-responsive features [7-9].

In this study, Schiff bases were synthesized using 4-hydroxy-2-methyl-6- aminoquinoline and various hydroxybenzaldehydes via a building-block strategy in methanol [10]. Their antioxidant activity, evaluated via the PNDMA assay, showed higher efficiency than vitamin C [11]. Quinoline-based Schiff bases exhibit aggregation-induced emission (AIE), emitting blue-green fluorescence. Their D–π–A structure makes them promising candidates for fluorescent probes in bioimaging, diagnostics, optoelectronics, and chemical sensing applications [12].




**Scheme 1.** Synthesis of Schiff bases based on 6- amino-4-hydroxy-2-methylquinolne