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Suzuki-Miyaura Coupling Mediated Synthesis and Spectral Characterization of Novel Chalcones Derived from Substituted Phenothiazines

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A new series of chalcone-functionalized 10*H*-phenothiazine derivatives (**3a-h** and **4a-h**) was synthesized and characterized to explore their potential in medicinal chemistry. The compounds **3a-h** and **4a-h** were synthesized through Suzuki–Miyaura cross-coupling, subsequently acylated with appropriate cinnamic acid derivatives to afford the desired products. Spectral characterization using FTIR, ^{1}H NMR, mass spectrometry and HPLC confirmed the successful synthesis of all the derivatives. FTIR revealed the characteristic C=O and C=C stretches, while ^{1}H NMR indicated *trans*-olefinic protons (J = 15.6 Hz), confirming the *E*-configuration of the chalcone moiety. HRMS data aligned with theoretical molecular weights and HPLC showed excellent purity ranging from 94.2% to 99.3%. Notably, electron-withdrawing substituents such as Cl and CF_3 influenced melting points and yields, suggesting significant structural impact on physico-chemical properties. These findings not only validate the synthetic strategy but also offer a structurally diverse framework for future bioactivity studies, particularly in anticancer or CNS-related drug development.

Keywords: Chalcone derivatives, Phenothiazine, Suzuki–Miyaura coupling, HPLC purity.