

Wilawan Amatapitaksakul 2012: Indolenine and Benzothiazole Cyanine Dyes with an Indole Nucleus as Fluorescent Dyes for DNA Detection: Microwave-assisted Solvent-free Synthesis, Spectral Properties and Theoretical Studies. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Mr. Surachai Thachepan, Ph.D. 65 pages.

Indolenine and benzothiazole cyanine dyes were synthesized by condensation of 2,3,3-trimethylindolenine or 2-methyl benzothiazole with carboxaldehyde in the presence of triethylamine under solvent-free microwave irradiation. Characterization by FTIR, UV-Vis and 1H -NMR spectroscopy confirmed that the synthesized products were indolenine and benzothiazole cyanine dyes. The products were obtained with high yield, suggesting that solvent-free synthesis of indolenine and benzothiazole cyanine dyes was a fast and efficient route. The absorption and fluorescence properties of the dyes were investigated both experimentally and theoretically. The calculations performed using a combination of time-dependent density functional theory (TD-DFT) and polarizable continuum model (PCM) helped us to interpret the behavior of electronic transition of indolenine and benzothiazole cyanine dyes and the calculated results were in good agreement with experimental values.

Student's signature

Thesis Advisor's signature