Dabcyl-3 is classified as a dark quencher (a non-fluorescent chromophore), and is typically used to label a Fluorescence Resonance Energy Transfer (FRET) DNA oligonucleotide probe with a quencher moiety at the 3'-end. Such probes are primarily used in nucleic acid assays, but also find a place in nucleic acid structural studies (1). Examples include TaqMan probes (2), Scorpion primers (3), and Molecular Beacons (4).

Dabcyl-3 has an absorbance maximum of 479 nm, and an effective absorbance range of 346-489 nm. It is the preferred quencher for pairing with fluorescent dyes that emit in the blue to green part of the visible range (442-506 nm). The emission spectra of this set of dyes sufficiently overlaps the absorbance spectrum of Dabcyl to allow the latter to quench the fluorescence of the former with a high degree of efficiency.

The advantages of using a dark quencher in a FRET probe are (a) low background fluorescence (and thus better signal-to-noise ratio), (b) higher dynamic range, (c) amenability to multiplex assays (due to a dark quencher having no secondary fluorescence), and (d) ease of synthesis of FRET probes with a dark quencher (due to dark quenchers being resistant to degradation during the oligo deprotection step) (5).

Quencher Spectral Data

Absorption Max, nm

Quenching Range, nm Dabcyl 453 380-530 BHQ1 534 480-580 BHQ2 579 550-650 BHQ3 672 620-730 BBQ-650 650 550-750 Click here for complete list of quenchers **Black Hole Quencher License Agreement

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References