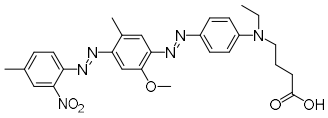
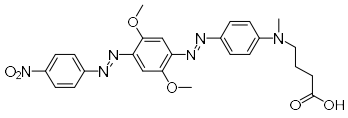
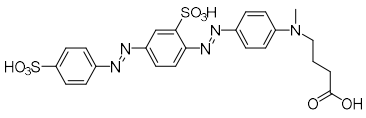
Spectral Properties and Quenching Range of Black Hole Quencher BHQ-1™, BHQ-2™ & BHQ-10™

Black Hole Quenchers™ (BHQs™) are the gold standard among quenchers in molecular biology, especially for quantitative PCR (qPCR) and other fluorescence-based assays. Unlike traditional quenchers, BHQs™ are true dark quenchers without native emission, which reduces background noise and increases detection sensitivity.

Jena Bioscience now offers BHQ-1™-, BHQ-2™- and BHQ-10™- labeled nucleotides to quench fluorescence across different spectral ranges:
BHQ-1 has an absorption maximum at 534 nm and a quenching range between 480 - 580 nm, making it suitable for quenching commonly used green and yellow fluorophores like Cy3, Fluorescein and Rhodamine. BHQ-2, with an absorption maximum at 579 nm, is used to quench in the range 560 – 670 nm and is most effective in quenching orange and red dyes such as Cy5, AF594 and Texas Red.
BHQ-10 is a water-soluble quencher with an absorption maximum at 615 and a quenching range of 480-550 nm. This makes BHQ-10 suitable for quenching blue and green fluorophores like AF488, Fluorescein and Rhodamine (Table 1).

Table 1: Spectral properties and quenching range of Black Hole Quencher BHQ-1™, BHQ-2™ & BHQ-10™.

Please note: It is important that the emission peak of the fluorescent dye and the absorption peak of the quencher have a large overlap range that ensures efficient resonant energy transfer and thus efficient quenching.

Dye	Quencher		
	BHQ-1™	BHQ-2™	BHQ-10™
	λ_{exc} 534 nm ε 34.0 L mmol^{-1} cm^{-1}	λ_{exc} 579 nm ε 38.0 L mmol^{-1} cm^{-1}	λ_{exc} 516 nm ε 28.7 L mmol^{-1} cm^{-1}
			
IR750	-	-	-
ATTO 680	-	-	-
IR680LT	-	-	-
ATTO 655	-	-	-
AF647	-	-	-
Cy5	-	x	-
ATTO 647N	-	x	-
ATTO 643	-	x	-
STAR RED	-	x	-

Jena Bioscience GmbH | Loebstedter Str. 71 | 07749 Jena, Germany
Phone +49-3641-6285 000 | Fax +49-3641-6285 100
www.jenabioscience.com

IFTA AG
Certified QMS and EMS according to
DIN EN ISO 9001 and DIN EN ISO 14001
Reg.-No.: ICV03597 534 and ICV03597 034 14

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Jena Bioscience
Building Blocks of Life

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ATTO 594	-	x	-
AF594	-	x	-
Texas Red	-	x	-
STAR 580	-	x	-
AF555	x	x	-
ATTO 550	x	x	-
Cy3	x	x	-
ATTO 532	x	-	-
5/6-Rhodamine	x	-	x
ATTO 488	x	-	x
5/6-Fluorescein	x	-	x
AF488	x	-	x
ATTO 425	x	-	x
DEAC	x	-	x
AMCA	-	-	-
AF405	-	-	-

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