

Quantum Dots Assay Linearity, Reproducibility and Sensitivity

Introduction

Quantum dots are a unique class of fluorescent semiconductor nanoparticles that allow scientists in such diverse fields as life science, electronics, and optical engineering to label molecules of interest. Simply modifying the size of the quantum dot particle produces fluorescent labels that can be tuned to specific absorption and emission specifications. The Thermo Scientific NanoDrop 3300 Fluorospectrometer can measure as little as 1 µl of sample, thereby significantly scaling-down the reaction volumes commonly needed for conventional cuvette-based fluorometers. This micro-volume capability of the NanoDrop™ 3300 allows the researcher to run quality control checks for a variety of reagents labeled with quantum dots. In addition, the versatility of the white LED allows for the simultaneous measurement of multiple fluorophores.

Method

Maple Red Evitags serially diluted in DI water were measured on the NanoDrop 3300 using a 470 nm excitation source with the emission wavelength monitored at 615 nm. Fresh 2 µl aliquots were used for each measurement.

Maple Red Evitag Linearity
NanoDrop 3300

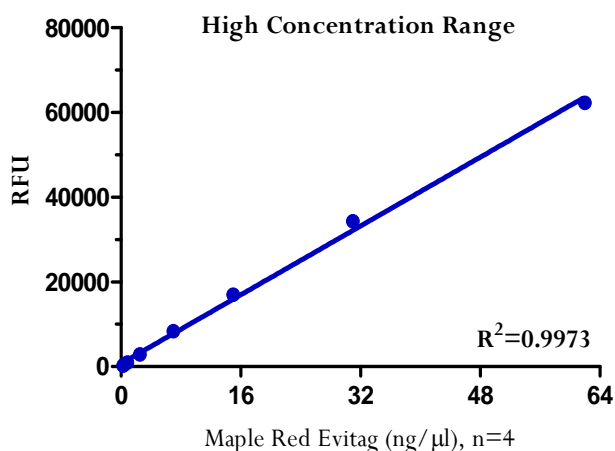


Figure 1: RFU values for 0.25 ng/µl to 62 ng/µl Maple Red evitags.

Results

Quantum Dots per assay (µg)	Quantum Dot (µg/µl)	Ave RFU (n=4)	Stdev	%CV
0.5	0.25	238	5.9	2.5
0.9	0.45	493	6.6	1.3
1.7	0.85	953	22.4	2.4
5	2.5	2913	79.2	2.7
14	7	8353	61.1	0.73
30	15	16941	223.0	1.32
62	31	34309	478.1	1.39
124	62	62245	126.7	0.20

Linearity was shown between 0.25 ng/µl and 62 ng/µl.

Maple Red Evitag Linearity
NanoDrop 3300

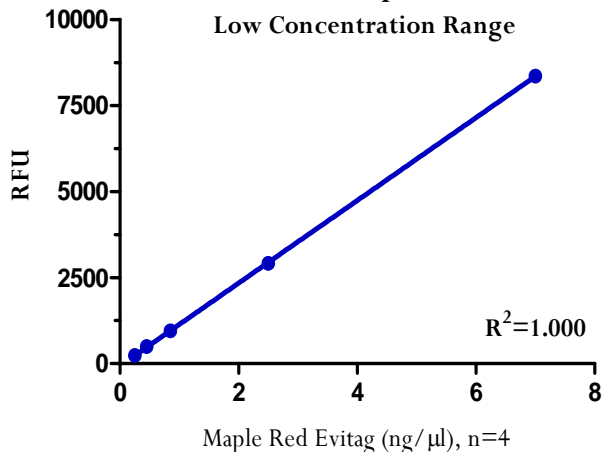


Figure 2: RFU values for 0.25 ng/µl to 7.5 ng/µl Maple Red evitags.