BioMicroCenter:Advanced analytical Fragment analyzer

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

BIOMICRO CENTER

THE CORE BIO-FABRICATION AND BIO-INFORMATION RESOURCE AT MIT.

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Purchased in July of 2012, the Advanced analytical Fragment analyzer is a highly efficient and accurate fluorescence-based electrophoresis instrument used to size and quantify high sensitivity DNA and both nano(conc. >5ng/ul) and pico RNA (conc. 50 pg/ul-5ng/ul). It is faster and more cost effective than the BioAnalyzer2100, and can handle unsupervised runs of up to 96 samples. With a failure rate of less than one percent, the machine's efficiency allows the BMC to analyze most samples within 24 hours of submission. A run of 12 samples takes 60 minutes and 2 µL of sample with a cost of $8 per sample.

High Sensitivity DNA

The Advanced analytical analyzes DNA using capillary electrophoresis. A tiny amount of sample is injected through a capillary with gel, and across a fluorescence detection window using a voltage gradient. DNA intercalating dye within the gel makes the DNA detectable by a camera lens, which is able to read the fluorescence levels of the fragments through the window, and accurately give the size and concentrations of the sample. For a more in-depth description see the link below:

Fragment Analyzer - Parallel Capillary Electrophoresis *(Advanced Analytical)*

The Advanced analytical processes DNA fragments of 50-5000bp at a wide range of concentrations:

5pg/µL-1000pg/µL (Fragments)

50pg/µL-5000pg/µL (Smear)

Nano and Pico RNA

The Advanced analytical analyzes RNA also using capillary electrophoresis. A tiny amount of sample is injected through a capillary with gel, and across a fluorescence detection window using a voltage gradient. RNA intercalating dye within the gel makes the RNA detectable by a camera lens, which is able to read the fluorescence levels of the fragments through the window, and accurately give the size and concentrations of the sample. It is capable of analyzing both pico and nano RNA.

The Advanced analytical provides an RNA quality number (RQN) from 1-10 on samples of nano or pico RNA. It is capable of analyzing samples at concentrations of 50pg/ul-5ng/ul for pico RNA or 5ng/ul-500ng/ul for Nano RNA.

Problem Identification

The Advanced Analytical is capable of identifying problems such as hyperamplification and "primer-dimer".

Platform Comparison with BioAnalyzer 2100

	Advanced Analytical	BioAnalyzer
Volume per sample	2 µL	1 µL
Time per run	60' for 12 samples (up to 96 samples)	45' for 10 samples
Prep/Loading Time	<5' for 12 samples	>40' for 10 samples
Failure Rate	<1%	15-30%
Minimum Conc.	~.06nM (DNA)	~.02nM (DNA)
Cost Per Sample	$8	$15
Assays	High Sens. DNA, Nano RNA, Pico RNA	Many

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