



Sizing and characterization of proteins and nucleic acids samples with the Bioanalyzer. STAN 2110

Description

The Bioanalyzer allows for the assessment of concentration, integrity and purity of proteins and nucleic acids using a 'lab-on-a-chip' technology. This system allows for the performance of an agarose gel-like miniaturized electrophoresis.

A chip is prepared by adding the separation support in situ —the miniaturized gel—. The samples are loaded into the chip. These samples are previously diluted to fit the dynamic range. Then, a fluorescence dye is added to those samples.

This chip is then placed in the 2100 Bioanalyzer device which enables the automatic running and creates a report that includes an electropherogram, concentration and integrity data of each sample and a digital gel-like image.

Equipment:

2100 Bioanalyzer (Agilent Technologies) – Year: 2011

Uses:

It is required for all cases in which the integrity of the nucleic acids extracted from eukaryotic cells is essential for downstream processes, such as the sequencing of nucleic acids.

It is most commonly used to assess the quality of the RNA before performing gene expression analysis including RNA sequencing (RNAseq), and DNA microarray.

The advantage of this technology when it is used for gene expression analysis, is that it calculates the RNA integrity number (RIN) based on the intensity of the ribosomal RNA bands and its ratio to noise. This technology is also highly required by the companies that offer RNA sequencing services, since it is considered a quality standard.

Advantages

Unlike conventional methods that use agarose gels for the assessment of samples, the main advantage of the Bioanalyzer is its high sensitivity. Such sensitivity allows for the use of little sample of DNA or RNA, which is important when the source of such DNA or RNA is limiting (such as human biopsy samples).

In addition, its high reproducibility is greater than the reproducibility of the agarose gels, and it allows for the comparative assessment of samples which have been analyzed at different times. With regard to the RNA integrity, the Bioanalyzer (as well as its more recent alternatives, such as Tape Station) is the only device that calculates the RIN number; a variable that is globally considered the most important RNA quality criterion.