

A STUDY ON AUTOMATED ANALYSIS OF PROTEINS USING A MICROFLUIDICS SYSTEM

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Abstract

Although SDS-PAGE is the traditional method for protein analysis, data can be variable and results are qualitative. Parts of the gel process can be automated, but a significant amount of manual interaction is still required. Microfluidic assays are proven methods for protein analysis in laboratories requiring more information in an expedient manner. The LabChip system performs automatic sampling from a microtiterplate followed by electrophoresis, data analysis, and reporting. Because sample loading, injection, and separation can be precisely controlled on the microfluidic chip, analytical data is highly reproducible. The Protein Express assay generates quantitative sizing, concentration, and purity data as each sample is processed. Sensitivity is comparable to mid-range colloidal coomassie stain, with a large dynamic range. The assay encompasses a wide variety of comparable gel concentrations, which allows a broader resolution range to be achieved. The assay is a microfluidic version of SDS-PAGE, where each step of the slab gel process - sample loading, electrophoresis, staining, destaining, and detection - is integrated into a microfluidic device. Quantitative sizing, relative concentration, and purity results are reported for each sample. Sample analysis takes approximately 35 seconds, and a full 96-well plate can be analyzed in just over an hour. Results can be viewed in three formats: a gel-like display, an electropherogram, and a tabulated results table. Detailed sample information can be imported into the software for tracking purposes. Protein data can also be exported for presentations, data archiving, or database submission.