

Two Effective Approaches in the Determination of DNA Concentration: Flexible Consumable-free and Disposable Higher Accuracy Systems

Introduction

ScanDrop² is a very flexible spectrophotometer for fast UV/Vis measurements of small sample volumes down to 0.3 µL. Depending on the application, the users can choose out of different setup combinations in one simple and user-friendly system. Different path length and the usage of a consumable or a re-usable sample adapter makes the system absolute unique, allowing both flexibility during method development and consistency during workflow or routine measurements. Pre-installed analysis tools provide a highly simplified device handling, as well as smooth user experience. Reliable results and an excellent reproducibility round off the overall package.

Your Benefits

- High reproducibility in DNA measurements using smallest sample volumes
- Flexible application with or without consumables
- The variable path length allows a wide concentration range without dilution

Application

Using the innuPREP Plant DNA kit, DNA was isolated from different samples for final genetically modified organism (GMO) testing. Each purified DNA was measured in a 4-fold determination both utilizing the consumables-free Butterfly Cuvette and using the disposable CHIPCUVETTE. In the results, only the average value and the corresponding standard deviation (in each separate case) are displayed.

Results

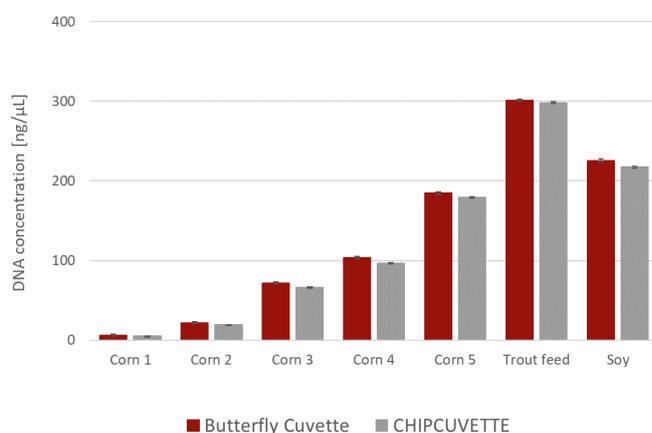


Figure 1: Average DNA concentration

The average DNA concentration of each isolated sample in comparison: Butterfly Cuvette (red) and CHIPCUVETTE (gray).

Table 1: Overview of measured DNA concentrations

Sample	Butterfly Cuvette		CHICUVETTE	
	Average DNA conc.	Standard deviation	Average DNA conc.	Standard deviation
Corn 1	6.0 ng/μL	1.3 ng/μL	4.8 ng/μL	0.3 ng/μL
Corn 2	21.4 ng/μL	1.3 ng/μL	19.1 ng/μL	0.2 ng/μL
Corn 3	71.8 ng/μL	1.3 ng/μL	65.9 ng/μL	0.6 ng/μL
Corn 4	103.8 ng/μL	1.3 ng/μL	96.4 ng/μL	0.5 ng/μL
Corn 5	184.4 ng/μL	2.2 ng/μL	179.5 ng/μL	0.5 ng/μL
Trout feed	301.0 ng/μL	1.5 ng/μL	298.3 ng/μL	1.6 ng/μL
Soy 1	225.3 ng/μL	2.5 ng/μL	217.4 ng/μL	0.7 ng/μL

Overall, the corresponding result pair of the DNA measurements using both the Butterfly Cuvette and the CHIPCUVETTE are in reasonable agreement (see figure 1 and table 1). A more accurate path length and thus higher photometric accuracy is warranted through the fixed path of the CHIPCUVETTE, especially in the case of very low sample amounts. On the other hand, the usability and a reduced consumables cost factor are the clear advantages of the Butterfly Cuvette. This is a fully reusable optical system and easy to clean. It is amenable for an incorporation within decontamination routines.

The deviation in absorption between the two cuvette systems relies on the distinct geometry of the optical pathways. In general, shorter sample pathlengths (e. g. 0.1 mm) lead to a higher fluctuation in the measured volume and thus potentially to deviation on the recorded absorption. Despite these challenges, deployment of microvolume UV/Vis measurements bring key advantages regarding less dilution, preparation steps and overall reduction of sample volume of costly samples.

Here the ScanDrop² spectrophotometer leverages an excellent performance independent of the application and utilizing reusable or disposable micro-cuvette systems.

Reference: TechNote_ScanDrop²_en_0001_DNA-DRAFT.docx

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