



## Technical Note 176

# Methods of Protein Quantification

## Introduction

DeNovix DS-11 Series Spectrophotometer / Fluorometer instruments enable the precise absorbance and fluorescence quantification of proteins across a wide dynamic range. The DS-11 FX+ includes three measurement modes in one instrument: microvolume absorbance, cuvette absorbance and fluorescence. Each of the three modes enables quantification of different types of protein samples including but not limited to purified protein, cell or tissue extracts and low concentration samples.

The purpose of this technical document is to describe and compare the methods to quantify proteins using a DS-11 Series instrument.

## Protein A280

The Protein A280 app enables the rapid and direct quantification of purified protein samples. This app uses the absorbance at 280 nm and Beer's Law to calculate the concentration of protein in the sample. The app is flexible and includes settings for BSA, IgG, E1%, 1A = 1 mg/mL and MW & Extinction coefficient. Protein A280 can be used in microvolume or cuvette mode, depending on the concentration of the sample. Microvolume mode enables the quantification of BSA from 0.04 to 1125 mg/mL. Cuvette mode (1 cm) measures BSA concentration as low as 0.002 mg/mL.

Many buffers commonly used with protein samples exhibit significant absorbance around 280 nm. Protein samples suspended in buffers such as RIPA buffers are not appropriate for measuring via Protein A280. If a protein is in an inappropriate buffer, either resuspend the protein in PBS or consider a colorimetric method.

## Labeled Proteins

The Labeled Protein app is used to quantify protein samples based upon absorbance values at 280 nm, as well as dyes and fluorophores at specific analysis wavelengths.

## Peptides

The Peptide app is used for low concentration samples that do not have aromatic residues, such as Trp, Tyr, or Cys-Cys disulphide bonds. The Protein A280 app is recommended when the sample does contain aromatic rings.

## Colorimetrics

Colorimetrics assays are recommended to quantify protein from cell or tissue extracts, unpurified protein, or protein which is suspended in a buffer that absorbs in the UV region. The Colorimetrics app is fully optimized and preprogrammed with the Bradford, BCA, Lowry and Pierce 660 Colorimetrics Assays and can be used in either microvolume or cuvette absorbance mode. Other colorimetric assays can be added using the Standard Curve Methods app. Please refer to the assay manufacturers' instructions for concentration ranges and buffer compatibility.

## Fluoro Protein and Fluoro Standard Assays

The Fluoro Protein app enables sensitive fluorescence quantification of protein, including unpurified protein. The app includes a selection of excitation sources and compatible protein assays, such as the Thermo Fisher Qubit™ 1X dsDNA BR assay. The Fluoro Standard Assays app also enables user-entered assays to measure protein. Fluorescently labeled proteins, such as green fluorescent protein (GFP), can be measured directly in fluorescence mode by selecting the desired excitation and emission channels. Refer to [Tech Note 170 – GFP Quantification Performance Data](#) for more information about measuring GFP concentration.

## Summary

The DeNovix DS-11 Series Spectrophotometer / Fluorometer instruments enable the flexible and accurate quantification of different types of protein samples. DeNovix EasyApps™ software is intuitive and easy to use, and the Protein A280, Labeled Proteins, Peptides, Colorimetrics and Fluoro Protein apps are optimized for measuring protein.

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