

# The best tools for DNA and RNA quantification

## What is nucleic acid quantification (NAQ)?



NAQ determines the concentration of DNA or RNA in a sample, enabling the calculation of the correct amount of nucleic acid required for downstream applications.

## Why perform NAQ?

Using the correct amount of nucleic acid saves time and money, preventing downstream experimental failures.

Downstream applications include:  
Cloning, NGS, qPCR, Ligation, PCR, Transfection, Microarrays, Sanger sequencing

### In PCR techniques:

- Too little NA can result in failure to amplify the target
- Too much NA used can lead to non-specific amplification

Note: MIQE guidelines require input NA quality and purity to be reported in publication.

MIQE - [Minimum information for publication of quantitative real-time PCR experiment](#)

### In NGS:

- Accurate quantification of NA prior to library prep helps obtain high-quality reading data
- Insufficient NA will result in low sequencing efficiency
- NA overabundance will result in poor quality data

## Things to consider when selecting a tool

### Sensitivity



What quantity ranges do you expect?

### Throughput



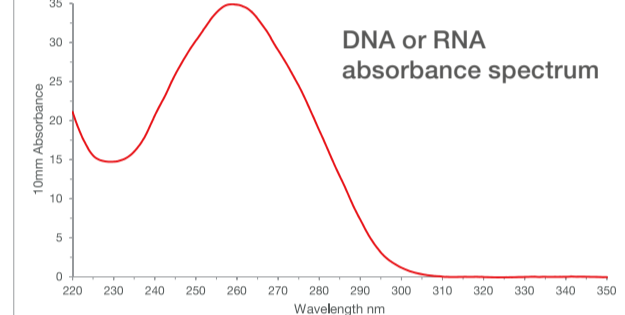
How many samples do you process per week?  
How many samples do you quantify at a time?

## Technologies used in NAQ



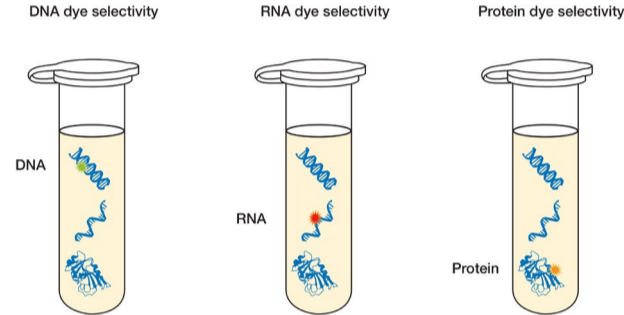
### Absorbance – UV-Vis

Provides concentration of nucleic acid and protein by measuring the **amount of light** that it absorbs.



### Fluorescence

In a fluorometric assay, **dyes bind** selectively to DNA, RNA, or protein of interest.



## How to select the most suitable technology

### Absorbance

Benefits	Limitations
Simple	Limited selectivity
Purity	Limited sensitivity
Contaminant information	

### Fluorescence

Benefits	Limitations
Specific	Requires reagents and standards
Sensitive	No purity identification
Accurate	



### Did you know?

If **absorbance - blank ≤ 9X instrument precision** (see instrument specifications), you cannot rely on the measurement.

In this case switching to fluorescence will improve your result.

## How solutions from Thermo Fisher Scientific could help you

### Absorbance – UV-Vis



Thermo Scientific™ NanoDrop™ One & One<sup>®</sup> Spectrophotometers

Thermo Scientific™ NanoDrop™ Eight Spectrophotometer

Thermo Scientific™ Multiskan™ Sky-High Microplate Spectrophotometer

Thermo Scientific™ Varioskan™ LUX Multimode Microplate Reader

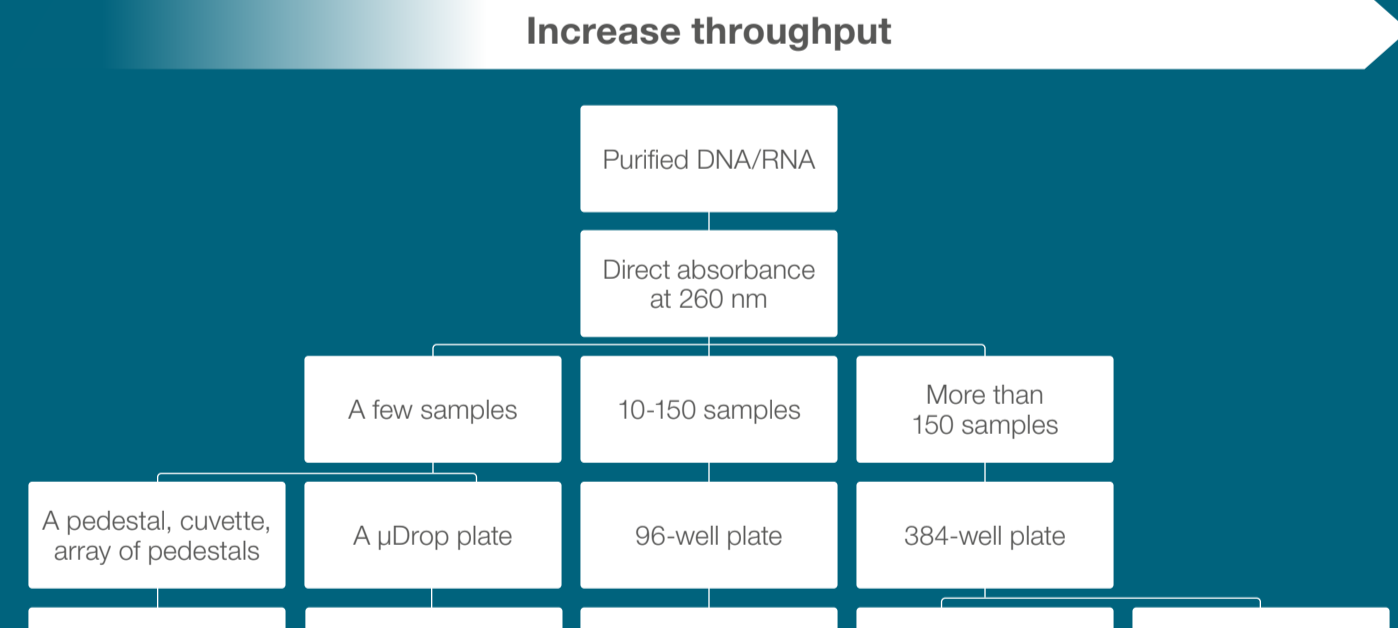
Only 1-2µ sample needed for accurate quantification of one sample at a time

Quantifies 8 samples at a time for improved productivity

Offers high throughput and sample flexibility using 96-384-well plates, cuvettes, or the Thermo Scientific™ µDrop™ Plate

Versatile for both photometric and fluorescence quantification and offers increased flexibility addressing diverse research needs in laboratories

### Increase throughput



### Fluorescence\*



Invitrogen™ Qubit™ 4 Fluorometer

Invitrogen™ Qubit™ Flex Fluorometer

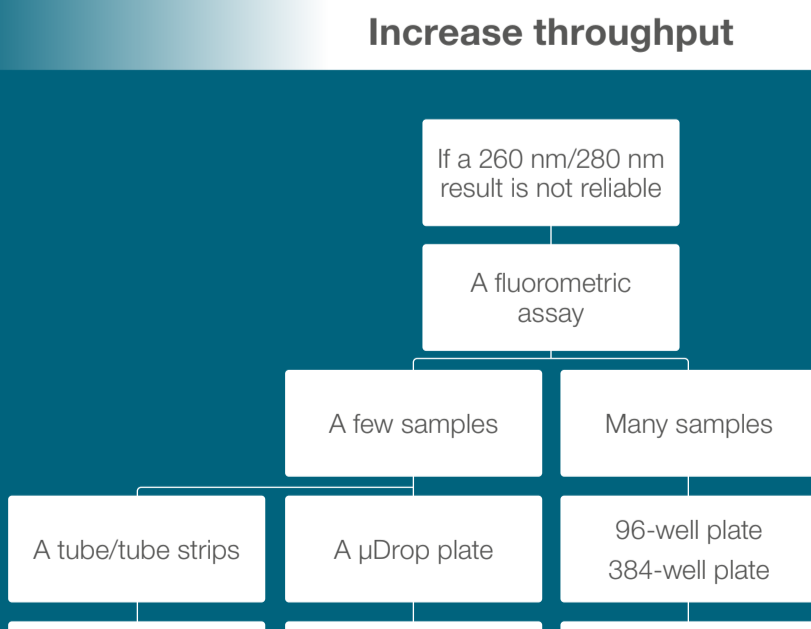
Thermo Scientific™ Varioskan™ LUX Multimode Microplate Reader

Sensitivity and specificity one sample at a time

Quantifies 8 samples with high sensitivity, accuracy and precision

Versatile for both photometric and fluorescence quantification and offers increased flexibility addressing diverse research needs in laboratories

### Increase throughput



\*For fluorescent NA quantification, the Qubit reagents are available for Qubit instruments, and the Invitrogen™ Quant-iT™ reagents for Varioskan LUX microplate readers.