
The Thermo Scientific NanoDrop 8000 Spectrophotometer from Thermo Fisher Scientific offers quick measurement time for efficient PCR



# In the middle of a (polymerase) chain reaction

Polymerase chain reaction (PCR) is a thermal cycling technique used to amplify and replicate regions of DNA, generating millions of copies of a chosen DNA sequence. Reverse transcription polymerase chain reaction (RT-PCR) also exists, in which an RNA strand is first reverse transcribed into its DNA complement before standard PCR amplification is performed. Applications of both include disease diagnosis, genetic engineering and forensic analysis. Recent advances in PCR have seen faster and more efficient DNA amplification performed with minimal sample preparation and significant cost reductions. The PCR process has been quickened further by real-time polymerase chain reaction (qPCR), an advanced technique based on PCR, which is now used to amplify and simultaneously quantify a targeted DNA module as the reaction progresses, speeding up the PCR process.

## Polymerase Chain Reaction

Two new kits launched by **Finnzymes** for Direct PCR applications: **Phire® Plant Direct PCR Kit** and **Phire® Animal Tissue Direct PCR Kit** speed up the PCR process by enabling DNA amplification without prior DNA purification from materials such as blood, animal tissues, plants and FFPE sample tissue. Finnzymes has developed these two optimized kits for various sample materials. Phire® Plant Direct PCR Kit is designed to amplify DNA directly from plant samples and has been tested with leaves and seeds from a wide variety of plant species. Phire® Animal Tissue Direct PCR Kit is optimized for animal tissue samples, allowing direct DNA amplification from numerous species including mice, fish and insects. Both kits are based on Finnzymes' Phire® Hot Start DNA Polymerase, a highly engineered enzyme with a unique DNA binding domain. This PCR enzyme is extremely robust and tolerant of many PCR inhibitors present in plant and animal tissues. By removing the need for time consuming DNA extraction from plant and animal samples, the new kits make the PCR process faster and more efficient.

**Lab901** and **Biofortuna** have collaborated on the launch of an automated PCR Dx system for the rapid detection of certain HLA-related diseases such as Coeliac disease. Lab901 will be optimizing its automated **ScreenTape® PCR diagnostics platform** for use with Biofortuna's range of **multiplex PCR diagnostics kits** for the detection of Coeliac disease and other HLA- related diseases such as reactive arthritis, diabetes and drug hypersensitivity. Lab901's automated ScreenTape PCR diagnostics platform includes an instrument, pre-packed consumables and analysis software that automatically interprets results, simplifying and speeding up gel electrophoresis.

The **EconoTaq® PLUS GREEN 2X Master Mix** from **Lucigen Corporation** is used to amplify GC-rich templates from human genomic DNA. This master mix is formulated with high purity Taq DNA Polymerase, a PCR enhancer, dNTPs and tracking dyes in a high density PCR buffer for direct gel loading. This solution offers rapid performance, convenience and reliability at a low price for routine PCR and genotyping. The PCR enhancer in EconoTaq PLUS GREEN 2X Master Mix ensures reliable amplification of templates up to 5 kb and withstands cycling temperatures up to 98°C, enabling amplification of challenging GC-rich


Agilent Technologies' AffinityScript One-Step RT-PCR Kit for high-throughput RT-PCR in a single reaction

The iScript™ RT-qPCR Sample Preparation Reagent by Bio-Rad Laboratories

templates. EconoTaq PLUS 2X Master Mix offers the same low cost and high performance without the need for tracking dyes for use with absorbance or fluorescence detection systems.

**Thermo Fisher Scientific** offers a range of products to ensure fast, easy and reliable routine PCR and post-PCR analysis. Thermo Scientific PCR reagents include thermostable and hot-start **Taq DNA polymerases** and **Master Mixes**. The PCR Master Mixes contain all the components required for PCR. This saves time, reduces the number of reagent handling steps, minimizes errors and improves reproducibility. Many Thermo Scientific PCR Master Mixes are also available in **ReddyMix** format where a red loading dye and precipitant allows direct loading of PCR products onto agarose gels for electrophoresis. This significantly reduces time needed for post-PCR analysis. Thermo Scientific PCR Master Mixes can be ordered pre-aliquoted in thin-walled PCR plastic consumables which can be stored at 4°C. This removes the need for freezing and saves time as individual components do not need to be thawed. Thermo Fisher Scientific also offers PCR plates, tubes and tube strips for consistent reproducible results.

The **Thermo Scientific NanoDrop 8000 Spectrophotometer** from Thermo Fisher Scientific is commonly used by scientists working in high-throughput environments for amplification by PCR due to its quick measurement time and minimal loss of material. This microvolume instrument allows investigators to perform absorbance spectroscopy with eight 1ul samples simultaneously, greatly reducing the time required to measure 96-well plates of samples and speeding up the PCR process. The NanoDrop™ 8000 Spectrophotometer uses an eight channel pipette to quickly dispense the samples onto the optical surfaces. This instrument allows researchers to work with larger numbers of samples while providing the overall capabilities and ease-of-use of the **NanoDrop 1000**.

## Reverse Transcription Polymerase Chain Reaction

**Agilent Technologies** has launched a One-Step Setup RT-PCR Kit for cloning, gene expression and quantification by reverse transcription polymerase chain reaction. The **AffinityScript One-Step RT-PCR Kit** is a high performance system for convenient, high-throughput RT-PCR in a one step reaction. The kit is ideal for rapid, easy one step set-up for RT-PCR, and the simple format eliminates the potential for contamination when preparing multiple or high-throughput reactions. The kit targets researchers performing end-point RT-PCR reactions and is the only RT-PCR kit on the market with fusion enzyme-based technology, enabling faster extension times, substantially reduced time-to-results and increased sample throughput without compromising amplicon yields and template input sensitivity.

## Real-time Polymerase Chain Reaction

**Bio-Rad Laboratories, Inc**. announces the availability of its **iScript™ RT-qPCR Sample Preparation Reagent** for rapid isolation of total RNA, enabling reverse transcription and real-time PCR to be performed directly from cell lysates. Scientists can use the protocol to efficiently remove genomic DNA and stabilize RNA in as little as five minutes. Conventional RNA purification methods, such as organic extraction or column-based methods that include salting out or the use of magnetic particles, require numerous steps to purify RNA without contaminating genomic DNA and can take at least 30 minutes to complete. iScript RT-qPCR Sample Preparation Reagent employs selective lysis of the cell membrane while leaving the nuclear membrane intact to achieve DNA-free RNA within five to 10 minutes. The cost of RNA sample preparation has remained high, relative to the cost of performing reverse transcription and quantitative PCR. This reagent provides a more affordable option for researchers looking to complete sensitive, rapid gene expression analysis.

The new **Masterclear™ Cap Strips** and real-time PCR **Tube Strips** from **Eppendorf** signal improved sensitivity and reproducibility in real-time PCR experiments, which may enable the number of replicates to be reduced. These technologies optimize light transmission and bring all the benefits of white reflective wells to the PCR tube format. The new products will benefit all real-time PCR applications, with particular advantages in three areas: detection of low copy genes; when using reagents with weak fluorescence signals; and in low volume real-time PCR assays. By reducing the vapor volume inside PCR tubes and plates, Masterclear Cap Strips enable reaction volumes to be reduced to as low as 2.5 µl in standard PCR tubes, therefore saving on reagent costs. Eppendorf real-time PCR Tube Strips feature an extremely thin wall for optimal heat transfer, making them ideal for fast real-time PCR protocols.

**Companies mentioned in this Product Focus:**
**Agilent Technolgies** – www.agilent.com
**Biofortuna** – www.biofortuna.com
**Bio-Rad Laboratories, Inc.** – www.bio-rad.com
**Eppendorf** – www.eppendorf.com
**Finnzymes** – www.finnzymes.com
**Lab901** – www.lab901.com
**Lucigen Corporation** – www.lucigen.com
**Thermo Fisher Scientific** – www.thermo.com