

## Plant genotyping

# Customized master mixes for plant genotyping using real-time PCR

Save time and produce resilient crops

## Plant genotyping solutions using customized master mixes

Plant samples are known to contain inhibitors (such as proteins, polysaccharides, polyphenolic components, and humic acid) that affect polymerase performance and real-time PCR (qPCR) efficiency. This poses a challenge, with growing demand to screen plant tissues and seeds for single-nucleotide polymorphisms (SNPs), copy number variations (CNVs), and seedborne pathogens in the following applications:

- Testing the genetic purity of commercial seed
- Monitoring plant pathogens in leaf and seed samples
- Programs to improve the yield and quality of multiple crops
- Genotypic screening of seed before germination in crop plants
- Plant diversity analysis, molecular breeding, and genetic engineering
- Detection of genetically modified organisms (GMOs)

## All-in-one master mixes resistant to plant inhibitors

Performing qPCR for selected markers can reduce the time needed for routine analysis from multiple days to just 50 minutes. Therefore, we have broadened our selection of all-in-one master mixes for qPCR analysis by developing custom products exhibiting high resistance to plant-derived PCR inhibitors (Table 1).

These products are manufactured in an ISO 13485–certified facility with stringent production and process controls to help ensure excellent manufacturing consistency. Applied Biosystems™ TaqMan™ SureAmp™, TaqMan™ THF-B, and TaqMan™ Eco master mixes can successfully identify SNPs with 1–20 ng genomic DNA per well, sufficient not only for SNP, but also for CNV and

pathogen identification. The TaqMan SureAmp master mixes are suitable for targets with high GC content and can be run in both fast and standard cycling modes using Applied Biosystems™ TaqMan™ SNP Genotyping Assays, TaqMan™ Copy Number Assays, or TaqMan™ Gene Expression Assays.

**Table 1. Comparison of master mix offerings.**

	Stock master mixes		Specialty master mixes					
Product description	TaqMan GTXpress Master Mix	TaqPath ProAmp Multiplex Master Mix	Custom TaqMan ProAmp Master Mix with ROX and Tracking Dye	Custom TaqMan ProAmp Master Mix with ROX	TaqMan SureAmp Master Mix, ROX	TaqMan SureAmp MP Master Mix, MP	TaqMan THF-B Master Mix with ROX	TaqMan Eco Master Mix without ROX
<b>Concentration</b>	2X	2X	2X	4X	2X	2X	2X	2X
<b>Passive reference dye</b>	ROX	Mustang Purple	ROX	ROX	ROX	Mustang Purple	ROX	None
<b>Inhibitor tolerance</b>	+	+++	+++	+++	++	++	+++	++
<b>Carryover contamination control</b>	-	UNG and dUTP	UNG and dUTP	UNG and dUTP	UNG and dUTP	UNG and dUTP	-	-
<b>dNTP mix</b>	Optimized for genotyping	Optimized for contamination control (dUTP) and genotyping	Optimized for contamination control (dUTP) and genotyping	Optimized for contamination control (dUTP) and genotyping	Optimized for contamination control (dUTP) and genotyping	Optimized for contamination control (dUTP) and genotyping	Standard	Standard
<b>Multiplexing</b>	++	++++	+++	+++	+++	++++	+++	+++
<b>Specific features</b>	Fast genotyping on sample lysate	Accurate determination of copy number in samples with up to four copies	Tracking dye adds benefit for automatic handling of reaction setup	2X more concentrated than regular master mixes for instances where more room for sample is needed	Suitable for targets with high GC content	Suitable for targets with high GC content	Works well with plant leaf samples; has ability to amplify large amplicons (e.g., >500 bp)	Works well with fungus, plant, and soil samples; performance is independent of primer T <sub>m</sub> (compatible with assays with oligo primer/probe T <sub>m</sub> of 45–55°C or lower)
<b>Application</b>	SNP genotyping	SNP genotyping, CNV analysis, or pathogen detection using TaqMan Gene Expression Assays						
<b>Cat. No.*</b>	4471970C (250 mL)	A46643C (125 mL) A35058C (250 mL)	A46642C (250 mL)	A47526C (50 mL) A45346C (250 mL)	A28021 (100 mL)	A27668 (250 mL)	A51672C (125 mL)	A41141 (5 mL) C1230C001 (100 mL)

\* Please contact [custom.solutions@thermofisher.com](mailto:custom.solutions@thermofisher.com) regarding the possibility of setting up a custom Cat. No. containing your preferred vial size and/or custom label. Please note that a minimum order quantity applies to such an order.

## Ordering information

For a sample, quote, or a customized solution, please reach out to [custom.solutions@thermofisher.com](mailto:custom.solutions@thermofisher.com)

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[OEM and Commercial Supply solutions](#)

## We offer a solution for each step of your plant genotyping workflow

From sample purification kits to high-throughput screening of numerous targets, we are ready to offer a solution for every step of your plant genotyping workflow.

### Broad range of DNA or RNA purification kits for your plant samples

You can be confident in high yields of DNA or RNA from plant samples by selecting a kit for your needs offered by Thermo Fisher Scientific. For example, the [Applied Biosystems™ DNA Extract All Reagents Kit](#) reduces the DNA preparation step to as little as 5 minutes.

For other solutions, please visit [thermofisher.com/us/en/home/life-science/agricultural-biotechnology/agrigenomics/plants](https://thermofisher.com/us/en/home/life-science/agricultural-biotechnology/agrigenomics/plants)

### A platform for each step of your plant genotyping research

Thermo Fisher offers microarray (e.g., Applied Biosystems™ GeneChip™ and Axiom™ arrays) and next-generation sequencing (NGS) instruments to perform initial screening of plant genomes for your targets of interest.

Once the markers are selected, the time for routine analysis of samples can be reduced from several days to 50 minutes when performed using qPCR.

Depending on the qPCR platform and block type used, the screening capacity of selected targets can comprise 96-well or 384-well plates, prespotted with TaqMan Assays.

### Confidence in your results with our proprietary assay design

The design of your primers and probes is optimized when using predesigned and custom TaqMan Assays. Predesigned TaqMan Assays are enhanced to target a specific gene sequence or polymorphism, and many are stocked and ready for purchase. They require no further design, optimization, or lengthy melt-curve analyses. Just add your sample and reagent, then run your experiment.

If predesigned assays are not available for your target, leverage the Applied Biosystems™ Custom TaqMan™ Assay Design Tool for a secure assay design pipeline:

[Custom TaqMan Assay Design Tool for Custom SNP Genotyping and Gene Expression Assays](#)

[Custom TaqMan Copy Number Assays](#)

Learn more at [thermofisher.com/custompcrformulations](https://thermofisher.com/custompcrformulations)

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