Test with confidence

Solutions for GMO screening and quantification
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On-going public demand for more information about food safety, authenticity and origins continues to drive tighter regulations around the use, supply and labelling of specific foods and ingredients. In many countries food manufacturers must provide clear labelling when specific ingredients are present including certain allergenic materials and genetically modified organisms (GMO). The need for reliable and affordable tests to enable accurate analysis and provision of information has never been greater.

Find GMO real-time PCR testing solutions for your complete workflow with Applied Biosystems™ TaqMan™ GMO Detection and Quantification Kits, supplied in partnership with Imegen™. Choose from nucleic acid extraction, GMO screening and quantification solutions that can detect the presence of GMO-specific DNA events in soy, corn, and downstream processed products. We also offer a universal assay that detects and quantifies all approved GMOs in Europe and the vast majority of GMOs approved in other countries.

Like all of our real-time PCR food safety and authenticity tests, TaqMan GMO Detection and Quantification Kits are designed to run on our world-class real-time PCR instrument, the Applied Biosystems™ 7500 Fast, enabling you to expand your testing capability across a single platform.
GMO Extraction Kit

GMO Extraction Kit provides a fast and easy silica-based DNA purification method to obtain DNA from a wide variety of food samples, such as raw materials, processed food and feed.

High sample input: Test up to 20 g of sample for increased sensitivity

Fast total assay time: Two hour turnaround time enables faster reporting

Safe: No toxic reagents for safer handling

Reliable: Removal of inhibitors, isolation of high purity DNA

Easy to use: Minimal handling steps for a simple workflow

Choice of protocols: Low and high throughput options to fit your needs

Manual sample preparation for lower throughput (throughput dependent on centrifuge capacity), semi-automated sample preparation processing with Applied Biosystems™ BeadRetriever™ Instrument (suitable for processing 15 samples per run) and Thermo Scientific™ KingFisher™ Flex Instrument (suitable for processing up to 96 samples per run).

Table 1: Products tested using GMO Extraction Kit all giving high purity DNA (A260/A280 > 1.8).
The TaqMan GMO Screening Kit simultaneously detects regions P35S & CaMV, TNOS & A. tumefaciens and P34S & FMV using the three GMO event master mixes, supplied in kit for highly accurate determination of the presence of genetically modified material and the natural presence of these organisms/viruses used for initial modification. In addition, the kit contains master mixes for the multiplex amplification of an Endogenous Vegetal Control (EVC) and Internal Positive Control (IPC). Results are obtained in under three hours.

**Easy to use:** Real-Time PCR, no post run electrophoresis required

**Reliable:** IPC allows verification of the PCR process in the presence of inhibitors

**Unique specificity:** Excludes presence of CaMV, A. tumefaciens and FMV

**High sensitivity:** Detects down to levels of three DNA copies (equivalent to 0.01 %) for screening and down to 20 DNA copies for quantification

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<table>
<thead>
<tr>
<th>Description</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>P35S Master Mix</td>
<td>Detection of P35S and CaMV virus promoters</td>
</tr>
<tr>
<td>TN0S Master Mix</td>
<td>Detection of TN0S and A. tumefaciens terminators</td>
</tr>
<tr>
<td>P34S Master Mix</td>
<td>Detection of P34S and FMV virus promoter</td>
</tr>
<tr>
<td>Vegetal Master Mix</td>
<td>Endogenous Positive Control and Inhibition Control</td>
</tr>
<tr>
<td>General Master Mix</td>
<td>Amplification reagents</td>
</tr>
<tr>
<td>Positive Control</td>
<td>Positive Control for the assay</td>
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</table>

Table 2: Components of the TaqMan GMO Screening Kit.
Table 3: Varieties used during the specificity assay for the TaqMan GMO Screening Kit.

<table>
<thead>
<tr>
<th>Standard transgenic varieties</th>
<th>Maize</th>
<th>Soy</th>
<th>Oilseed Rape</th>
<th>Cotton</th>
<th>Sugarbeet</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA21</td>
<td>RR</td>
<td>T45</td>
<td></td>
<td>MON1445</td>
<td>H7-1</td>
</tr>
<tr>
<td>MON810</td>
<td>A2704-12</td>
<td>GT63</td>
<td></td>
<td>MON531</td>
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<td>MON863</td>
<td></td>
<td></td>
<td></td>
<td>MON15985</td>
<td></td>
</tr>
<tr>
<td>BT176</td>
<td></td>
<td></td>
<td></td>
<td>LLCotton25</td>
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</tr>
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<td>BT11</td>
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<td></td>
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<td>MON88913</td>
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<td>NK603</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TC1507</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Results of the TaqMan GMO Screening Kit corresponding to the amplification performed to determine the PCR limit.

<table>
<thead>
<tr>
<th>Results for PCR limit</th>
<th>100 copies / reaction</th>
<th>10 copies / reaction</th>
<th>5 copies / reaction</th>
<th>1 copy / reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>P35S / CaMV</td>
<td>100% (6/6)</td>
<td>100% (12/12)</td>
<td>100% (12/12)</td>
<td>33% (4/6)</td>
</tr>
<tr>
<td>TNOS / A. tumefaciens</td>
<td>100% (6/6)</td>
<td>100% (12/12)</td>
<td>&gt; 90% (11/12)</td>
<td>33% (4/6)</td>
</tr>
<tr>
<td>P34S / FMV</td>
<td>100% (6/6)</td>
<td>100% (12/12)</td>
<td>&gt; 90% (11/12)</td>
<td>17% (2/6)</td>
</tr>
<tr>
<td>Plant / IPC</td>
<td>100% (6/6)</td>
<td>100% (12/12)</td>
<td>&gt; 90% (11/12)</td>
<td>33% (4/6)</td>
</tr>
</tbody>
</table>

Figure 1: Amplification plots for cross species reaction CaMV, A. tumefaciens and FMV.
TaqMan Roundup Ready Soya Quantification Kit

Uses real-time PCR to detect and quantify the percentage of Roundup Ready (RR) soya (event: MØN-Ø4Ø32-6; GTS 40 – 3 – 2) compared to the total soya in any food or animal feed sample.

The kit quantification standard consists of a plasmid containing both an endogenous gene (gene present soybean) and a transgenic sequence (one copy of the specific soybean Roundup Ready fragment).

**Flexible:** Adapted to processed DNA using small TaqMan Minor Groove Binder (MGB™) probes

**Sensitive:** Quantification limit of 20 DNA copies. Detection limit of three DNA copies

**Reliable:** Plasmid based quantification standard with broad dynamic range (200,000 copies–20 DNA copies) equivalent to 0.01%

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean Master Mix</td>
<td>Soybean quantification</td>
</tr>
<tr>
<td>RR Soybean Master Mix</td>
<td>RR Soybean quantification</td>
</tr>
<tr>
<td>General Master Mix</td>
<td>Amplification reagents</td>
</tr>
<tr>
<td>RR Soya Standard</td>
<td>Determination of quantification (comparison of standard and sample amplification)</td>
</tr>
</tbody>
</table>

**Table 5:** Components of the TaqMan Roundup Ready Soya Quantification Kit.

<table>
<thead>
<tr>
<th>Reagents</th>
<th>5 copies</th>
<th>2.5 copies</th>
<th>1 copy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soy</td>
<td>100% (21/21)</td>
<td>&gt; 95% (20/21)</td>
<td>&gt; 85% (18/21)</td>
</tr>
<tr>
<td>Roundup Ready Soy</td>
<td>100% (21/21)</td>
<td>100% (21/21)</td>
<td>&gt; 76% (16/21)</td>
</tr>
</tbody>
</table>

**Table 6:** Results for the TaqMan Roundup Ready Soya Quantification kit limit of detection (21 replicates of samples containing different DNA copy numbers).
TaqMan GMO Maize Quantification Kit

The TaqMan GMO Maize Quantification Kit uses Real-Time PCR to detect and quantify the percentage of P35S compared to the total maize in any food sample or feed sample.

The Kit quantification standard consists of one plasmid containing both an endogenous gene (gene present maize) and a transgenic sequence (one copy of the specific maize fragment).

**Flexible:** Adapted to processed DNAs using small TaqMan MGB probes

**Sensitive:** Quantification limit of 20 DNA copies. Detection limit of three DNA copies

**Reliable:** Plasmid based quantification standard with broad dynamic range (200,000 copies–20 copies)

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize Master Mix</td>
<td>Maize quantification</td>
</tr>
<tr>
<td>P35S Maize Master Mix</td>
<td>P35S Maize quantification</td>
</tr>
<tr>
<td>General Master Mix</td>
<td>Amplification reagents</td>
</tr>
<tr>
<td>P35S Maize Standard</td>
<td>Determination of quantification (comparison of standard and sample amplification)</td>
</tr>
</tbody>
</table>

*Table 7: Components of the TaqMan GMO Maize Quantification Kit.*
**GMO Products Overview**

<table>
<thead>
<tr>
<th>Description</th>
<th>Pack Size</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample preparation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GMO Extraction Kit (for manual DNA extraction)</td>
<td>48 extractions</td>
<td>4466336</td>
</tr>
<tr>
<td>KingFisher Flex Purification System (96 Deep Well Processor)</td>
<td>Instrument</td>
<td>A32681</td>
</tr>
<tr>
<td>Thermo Scientific BeadRetreiver System</td>
<td>Instrument</td>
<td>15950</td>
</tr>
<tr>
<td>Applied Biosystems™ PrepSEQ™ Nucleic Acid Extraction Kit</td>
<td>100 extractions</td>
<td>4480466</td>
</tr>
<tr>
<td>(for use with KingFisher Flex Purification and BeadRetreiver Systems)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PrepSEQ Nucleic Acid Extraction Kit (for use with KingFisher Flex Purification and BeadRetreiver Systems)</td>
<td>300 extractions</td>
<td>4428176</td>
</tr>
<tr>
<td><strong>Detection &amp; Quantification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TaqMan GMO Screening Kit</td>
<td>4x48 reactions</td>
<td>4466334</td>
</tr>
<tr>
<td>TaqMan Roundup Ready Soya Quantification Kit</td>
<td>2x48 reactions</td>
<td>4466335</td>
</tr>
<tr>
<td>TaqMan GMO Maize Quantification Kit</td>
<td>2x48 reactions</td>
<td>4481972</td>
</tr>
<tr>
<td>Applied Biosystems 7500 Fast Instrument Package, Laptop*</td>
<td>see below</td>
<td>A30299</td>
</tr>
<tr>
<td>Applied Biosystems 7500 Fast Instrument Package, Desktop*</td>
<td>see below</td>
<td>A30304</td>
</tr>
<tr>
<td>RapidFinder Express v2.0 and SDS 1.4.2 Software for 7500 Fast Instrument</td>
<td>CD pack</td>
<td>A28811</td>
</tr>
<tr>
<td><strong>Service and Support packages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact your local supplier for information on instrument service and support including OQ/IPV services and extended warranty packages</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Includes: Applied Biosystems 7500 Fast Instrument, Computer, RapidFinder Express v2.0 and SDS 1.4.2 Software, Calibration kits, Capping tool, Precision plate holder and Block balance tubes

To learn more about our solutions for GMO screening and quantification, go to: [thermofisher.com/gmo-testing](http://thermofisher.com/gmo-testing)