Visions to Products

GeneSlice for Rotor-Gene Q
Multi-Parameter Nucleic Acid Testing

Decision making in **clinical** settings, in **food** testing, or in **forensics** frequently requires **nucleic acid testing** (NAT). Real-time **polymerase chain reaction** (PCR) may serve as method of choice to detect low NA concentrations in samples.

To reduce labor-intensive, error-prone hands-on time, we developed the **centrifugal microfluidic platform** *GeneSlice*: All *GeneSlices* comprise **pre-stored reagents**, reduce manual interaction to **one pipetting step**, and can be operated in a **standard thermocycler** (Rotor-Gene, QIAGEN). *GeneSlices* can be **scaled to customers'** needs by integrating e.g. nested PCR and melt curve analysis.

Multiple successful **proof of concepts** were demonstrated:

(A) **Octaplex** *GeneSlice* for **clinical** settings: 8-fold geometric multiplexing of sample (*C. glutamicum* + *E. coli* gDNA) to reaction cavities with alternatingly pre-stored PCR Master Mixes. Four samples per run can be processed.

(B) **Tetraplex** *GeneSlice* for **food** testing: 4-fold geometric multiplexing of multiple sample matrices (four common food-pathogens). Six samples per run can be processed.

(C) **Nested PCR** *GeneSlice* for **forensics**: Universal pre-amplification. 14-fold geometric multiplexing for specific main-amplification. Final melt curve analysis. Multiple controls included (no template, internal positive, extraction).

Fig. 1: One pipetting step for sample insertion. Here, four *GeneSlices* can be processed per run. Proof-of-concepts showed cross-contamination free amplification in a standard Rotor-Gene Q.

Assay implementation

- Real-time PCR testing of 4 to 6 independent samples with 4 to 14-fold geometric multiplexing per run.
- Pre-storage of required PCR reagents.
- Easy assay design and adaption: Geometric multiplexing replaces laborious multiplex assay design / adaption.

Device + Disposable

- Standard real-time thermocycler Rotor-Gene Q.
- Automated processing by simple thermal protocol.
- Microfluidic foil *GeneSlice* inspired by low-cost blister packaging.
- No active components required.

All results showed **correct** and **cross-contamination free** amplification and detection of the targets in the respective reaction cavities.

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