Q-LINEA

DETECTION OF AEROSOLIZED SPORES

The Q-linea platform employs padlock or proximity ligation probes directed towards specific nucleic acid sequence motifs or surface epitopes for detection, identification and quantification of pathogens.

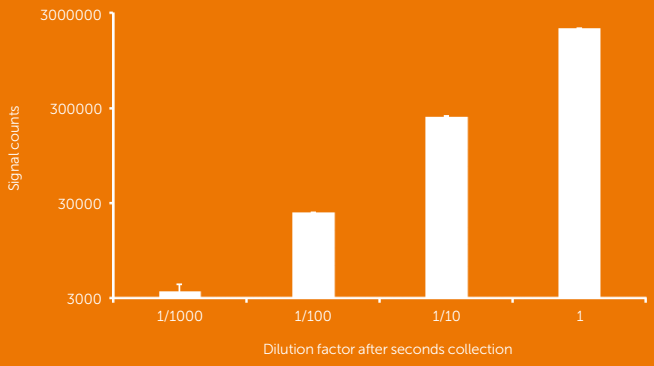
This approach ensures high analytical sensitivity and selectivity in combination with flexibility in probe design. Reacted padlock probes are detected using Q-linea's amplified single molecule detection approach. This involves converting individual target recognition events to fluorescent micrometer-sized DNA molecules which are amenable to optical detection and enumeration in Q-linea's Aquila instrumentation.

Detection of Bacillus atrophaeus Spores after Aerosol Dissemination

A dry preparation of B. atrophaeus spores was dissolved in NaCl buffer to a concentration of 108 spores/ml. The preparation was aerosol disseminated in a summer season forest environment to mimic field conditions and was carried out in collaboration with CBRN Defence and Security at the Swedish Defence Research Agency. An Auto Sampler for Airborne Particulates (ASAP) was placed on the dissemination site and biothreat agent spraying was carried out with a flow of 1 ml/min. Every sampling occasion consisted of 15 min air sampling at a rate of 200 liters of air/min. B. atrophaeus spores were disseminated for 3 sec of this period and the majority of sprayed aerosol was collected in the ASAP filter. The collected material was extracted from the filter with 500 µl PBS buffer and the resulting solution was diluted in steps of ten. The samples were interrogated by proximity probes which subsequently were subjected to amplified single molecule detection.

The Q-linea platform proved to be suitable for analyzing realistic environmental samples containing the full complexity of biomaterials present in the air of a Swedish forest during summer season. Samples collected for 3 seconds could still be detected when diluted by a factor of 1000.

The proximity ligation assay in combination with amplified single-molecule detection, results in an analytical sensitivity significantly higher than standard sandwich immunoassays, and similar to the best PCR based approaches. In contrast to PCR protocols the Q-linea approach demands no sample preparation, is less sensitive to many known inhibitors in environmental sample matrices, has a high through-put, offers multiplexing capability and combines nucleic acid and protein analysis on the same platform.



Characteristics of the Q-linea technology platform:

- Molecular probing mechanisms, with outstanding specificity.
- One platform for nucleic acid and protein analytes, enabling a wide-range assay menu (bacteria, spores, viruses, toxins, etc).
- Detection of minute analyte amounts, down to single-digit numbers.
- Rapid sample processing, down to 30 minutes depending on analyte type.
- Multiplex assay formats for detection and classification of analyte panels.
- Digital quantification offers simple data analysis and classification.
- Compatible with random access or batch processing of samples.

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