

Biological Agent Detection and Identification – A Short Primer

The detection and identification of biological agents in the field (as opposed to the laboratory) is in its infancy, compared to chemical agents. Three basic technologies are currently available: immunoassay, polymerase chain reaction (“PCR”), and mass spectrometry. In addition, there are numerous airborne particle sensor devices that are either non-specific to particle composition or which have limited selectivity for biological material. These devices are used primarily as “triggers” to turn on biological agent sensors when a particle cloud or bioaerosol is detected.

Immunoassay is based upon selective interactions of an antibody with components such as proteins on the surfaces of bioagents, and linked color-developing reactions to provide a detectable signal. PCR also utilizes a colorimetric reaction, but the recognition is based upon the amplification of a sequence of DNA specific to a particular biological agent. Mass spectrometry technologies generally rely upon pyrolysis techniques to generate ions which can classify or even identify biological agents. The Block II Chemical Biological Mass Spectrometer, which is in preproduction evaluation on two military reconnaissance systems, advances the state of fieldable mass spectrometry by detecting and identifying bacterial biomarkers and protein products that provide biological agent identification. It was developed in a program for the US Army Soldier and Biological Chemical Command led by the Oak Ridge National Laboratory.

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