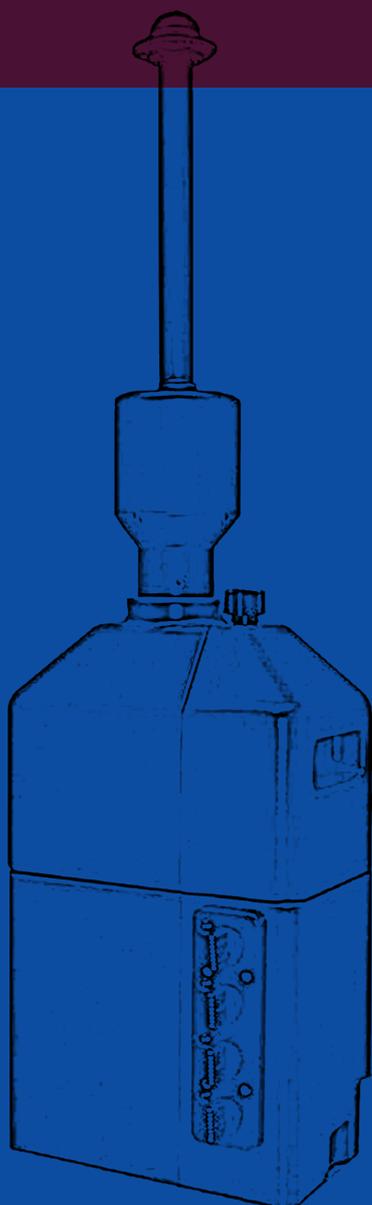


Biodetectors in Defence

Equipment & Accessories

(A Guide Book)



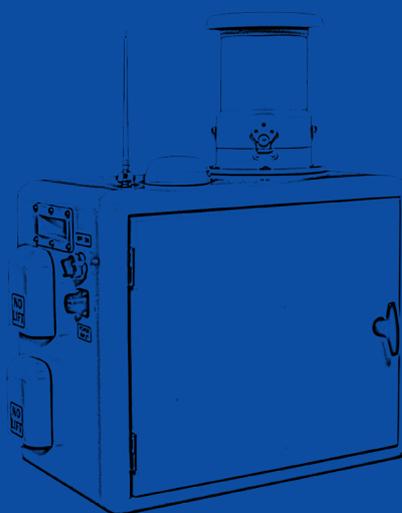
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Executive Summary

Hundreds of companies are dedicated to providing solutions for the military defence against chemical, biological, nuclear, radiological, and high-yield explosive (CBRNE) weapons of mass destruction (WMD). Domestic preparedness against current and emerging threats of WMDs meets the requirements of the International Treaties for detection of Biological Warfare Agents (BWAs), Chemical Warfare Agents (CWAs), Toxic Industrial Chemicals (TICs), or in the monitoring of food, air, soil, and water.

Biological agents are covered under the Biological and Toxins Weapons Convention (BTWC) and are of major concern as many of them can be manufactured, transported, and dispensed with ease; and symptoms appear much later based on incubation time as many people could become sick or die if a biological attack were to occur in a major metropolitan area. Biological Warfare Agents (BWAs) include bacterial agents, viral agents, rickettsiae and biological toxins. Rapid detection thus enables faster, efficient and tailored response as it uses new approaches to differentiate between biological infections and natural contaminants.

Chemical warfare agents are considered as the Weapons of Mass Destruction because of the destructive effects of these chemicals, which are toxic enough to be used as chemical weapons or they may be used to manufacture such chemicals. Any toxic chemical, regardless of its origin, is considered a chemical weapon unless it is used for purposes that are not prohibited: it may include use of nonliving toxic products from living organisms such as botulinum toxin, ricin, and saxitoxin and are considered as chemical warfare agents under the Chemical Weapons Convention (CWC) and provisions.

When investigating a suspicious incidence in the environment, detection of biological and chemical agents for the early responders requires identifying threat agents for planning and implementing the response systems. A number of companies are developing advanced and portable detectors using advanced technologies, instrumentation and diagnostic system, that play an important role in the early detection and identification of the biological threat agent's release offering the possibility of rapid, accurate, and sensitive biodetectors for use in battlefield or urban settings. Advanced detection systems provide early warning, identify populations at risk and contaminated areas and facilitate prompt treatment that integrates technology, operations, and policy and provides a framework for coordinated local, state, and federal emergency response to minimize mortality and morbidity.

The effective detection of biological agents in the environment requires (a) early alert of presence of bioagents about the potential danger (b) concentration of the bio-agents in liquefied, (c) detection, (d) identification of the bioagent using immunological techniques to determine the right countermeasures. In cases of aerosolized incidence, early warning (alerts), detection and identification of bioagents becomes necessary. For investigation into powder incident, a wide variety of sample collection products, field-deployable assays and detection systems are in use to determine if the substance contains biological material and warrants further investigation.

Fully automated biodetectors have been devised for real-time sample collection, detection, and identification in the field while taking care to maintain the highest level of sensitivity. Biodetectors are available designed for fixed and 24/7 surveillance, outdoor and indoor, which use different principles and technologies for identification and quantification of the bioagents.

The present guide reports information on compatible instruments, consumables, and computer-based laboratory systems available either exclusively for detection of biological warfare agents or has the dual application capabilities of detecting both the biological warfare agents and chemical warfare agents for applications in life science and analytical chemistry. Information is also provided to the source of these technologies and similar technologies and systems. We have not picked radiological and nuclear technologies or systems for the report.

Efforts have been made to summarize commercially available technologies that can be used by first responders, military, homeland security agencies and others to investigate an unusual event that has happened or is in progress in the environment by collecting, screening and identifying the biological materials from the field.

All efforts have been made to provide accurate information of technical specifications primarily based on vendor-provided information; however, where possible the summaries have been supplemented with additional information obtained from reports and websites. Efforts are also made to provide minimum information on the performance metrics in terms of quantity or concentration of organism detected. As far possible, reference to certification by International Organization for Standardization (ISO) has also been avoided so as to minimize the biased decisions.

The aim of the report is only to provide useful information about available technologies to help end-users make informed decisions about biodetection technology procurement and use. The focus of this report is on available equipment and technologies for environmental alerts, sampling and detection, and safety of food and water from biological contaminants including information on decontaminants and protective equipment for first responders.

The purpose of this report is to provide information on types of detection technologies and not to compare the available technologies. The list is neither exhaustive and nor an endorsement of any technology described herein and similar technologies may be available from other companies. Reviewers may verify the authenticity of the details on websites.

The guide is meant for reference purposes for educating the general public, defence industry, homeland security agencies, local, state and national governments on biological and chemical defence matters regarding available equipment and technologies to combat WMDs, terrorism, and homeland security for safety of citizens and critical infrastructure and respond to incidents of CBRNe. The guide lists range of gadgets, instruments, devices and technologies available from leading global providers of instrumentation and technologies providing options best suited to these agencies to meet their requirements.