

GUEST EDITORIAL

## Looming Threat of Chemical and Biological Warfare Agents

A.K. Goel

*Division of Biotechnology, Defence Research and Development Establishment, Gwalior-474 002, India  
E-mail: akgael73@yahoo.co.uk*

In the recent past, a dramatic shift has been observed in the strategies of warfare from conventional to non-conventional. Now-a-days, traditional power is of less importance than it used to be earlier. Weapons of mass destruction, which comprise of nuclear weapons, and chemical and biological warfare agents, are posing a great peril to the world due to their devastating potential. Though, there are several bilateral as well as multilateral treaties to control the use and proliferation of these weapons, yet the risk of use of such agents by non-state actors cannot be overlooked. Chances of use of chemical and biological agents are more likely than the nuclear weapons. A comparison of nuclear, chemical and biological weapons in terms of technology, cost, signature, effectiveness on protected and un-protected troops shows that chemical and biological weapon programmes require much lower level of technology and cost than the nuclear weapon programme. Further, there is no or least distinctive and readily observable signature in biological weapon programme in comparison to nuclear and chemical weapon facilities. There can be two possibilities of use of these agents in terrorist attacks. First, there is a risk of transfer of material or know-how of these weapons to terrorists for using against the adversaries and second, the risk of these agents being pilfered due to poor security, thereby sabotaging the national security. The International Committee of Red Cross in February 1918 reckoned these agents as 'barbarous inventions' that can 'only be called criminal'.

The world has witnessed the use of chemical warfare agents even before Christ. World War I witnessed the open use of chemical warfare agents and since then these agents have been used in several internal civil conflicts. Likewise, there is very long history of use of biological agents as weapons as well; even much before the discovery of bacteria or pathogens. In fact, microbes have been ancient enemies of humanity and

it has been observed that disease outbreaks have accounted for more deaths and loss than the war itself in the history. However, scientific research on development and production of biological weapons began during second world war in the first half of 20<sup>th</sup> century when several countries included bio weapons in their military programmes. These agents may be more deadly than the chemical weapons and can cover more area than any other weapon system. Further, recent advancements in life sciences, especially in biotechnology and molecular biology have made it much easier to develop such weapons. These agents can cause large number of casualties; perpetrators can escape easily well before the onset of casualties and there can be several mode of their dispersal in water, soil or air.

Keeping in mind the threat potential of chemical and biological weapons, it is important to create awareness about these agents. Therefore, a special issue of *Defence Science Journal* (DSJ) has been dedicated to the Chemical and Biological Warfare Agents. Detection, protection, decontamination, and medical management are the key issues for any chem-bio defence programme. In this issue, research papers in the area of molecular and immunological detection of biological and chemical warfare agents, auto-injectors for biodefence, micro-cantilever platform for chemical and bio-sensing applications, and a review article on detection and monitoring techniques for biological warfare agents are covered.

It is an honour for me to serve as the Guest Editor of this special issue of *Defence Science Journal*. I sincerely acknowledge all the authors for their outstanding and overwhelming contributions. I am grateful to the Editor-in-Chief, the Editorial Board, and the Editorial team of DSJ for their support in realising the special issue well on time. Lastly, I entreat all our valuable readers to submit their valuable work for publication in DSJ.

### GUEST EDITOR

**Dr Ajay Kumar Goel** received his PhD (Microbiology) from CCS Haryana Agricultural University, Hisar, in 1999. Currently working as a Scientist 'F' at Division of Biotechnology, Defence Research and Development Establishment, Gwalior. He has more than 80 research papers, 4 patents, radio talks, and several overseas presentations to his credit. His current interests include : Development of detection and protection systems for potential biothreat agents.

