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An Insight to Killer Arsenic

Abstract* : *Arsenic, the king of poisons, is a host of anthropogenic activities. Due to very toxic nature of arsenic, it has emerged a global concern among scientific communities. Arsenic has emerged disaster in developing countries such as India, Bangladesh, China and Mongolia, illustrated by mass poisoning. South American countries like Argentina and Chile have also been affected. Exposure of living beings to arsenic resulted a variety of diverse health effects, dysfunction of critical enzymes, and cell damage. Living organisms have evolved dynamic mechanisms for facing the toxicity of arsenic in the environment. In this sense, it is worthwhile to note that As-metabolism of living organisms is often associated with arsenic speciation and mobility that further participates in the biogeochemical cycle of the element. The amazing capability of various biological systems to environmental As species just sketched in this short review.

Arsenic (As) the king of poisons is known as silent killer in life and fiction. Arsenical species present threats to all organisms, therefore, among the general public, the word "arsenic" has become almost synonymous with the word "poison"[1]. This scary reputation was apparently gained via 1900 poisonings incidents[2]. The scale of the problem is illustrated by the frequently used term "mass poisoning". The period from 1850 to 1950 is regarded as the **"century of arsenic"** contamination. This was the time when human beings were affected by As in medicine, food, air, water and at work. The deadly career of arsenic started many centuries BC. One of the well-known victims poisoned with arsenic was Napoleon Bonaparte, but speculation on the cause of his death is still ongoing. Furthermore in 19th century, green dye colored wallpaper containing copper arsenate was discovered in living rooms, causing deaths, mainly among children[3,4]. Arsenic has a dual-edged infamous past. It has a beneficial as well as detrimental aspect. Arsenic compounds were described and used in antiquity, especially as poisons. Arsenic minerals such as realgar (AsS) and orpiment were used in pigment formation, wall paintings and as depilatories in the leather industry[5]. Several arsenical compounds such as sodium arsenite ($NaAsO_2$), calcium arsenate ($CaAsO_4$), and lead arsenate ($PbAsO_4$) were used in the manufacturing of pesticides, herbicides, wood preservatives, cotton desiccants, dyes and ceramics. It was also used for the treatment of leukaemia, psoriasis and dermatitis herpetiformis ailments[6]. From early 1900s to 1955, sodium arsenite was used to treat ticks in livestock throughout the world[7, 8].

***Arsenic Menace in World* :** A case study by 2007 found that over 137 million people in more than 70 countries are probably affected by arsenic poisoning of drinking water[9]. It is estimated that 37 to 100 million people are at risk of drinking arsenic-contaminated drinking water[10]. The World Health Organization(WHO) reported that long-term exposure to arsenic in groundwater, at concentrations over 500 μgL^{-1}, causes death of 1 in 10 adults[11]. Affected countries include Bangladesh (>30 million

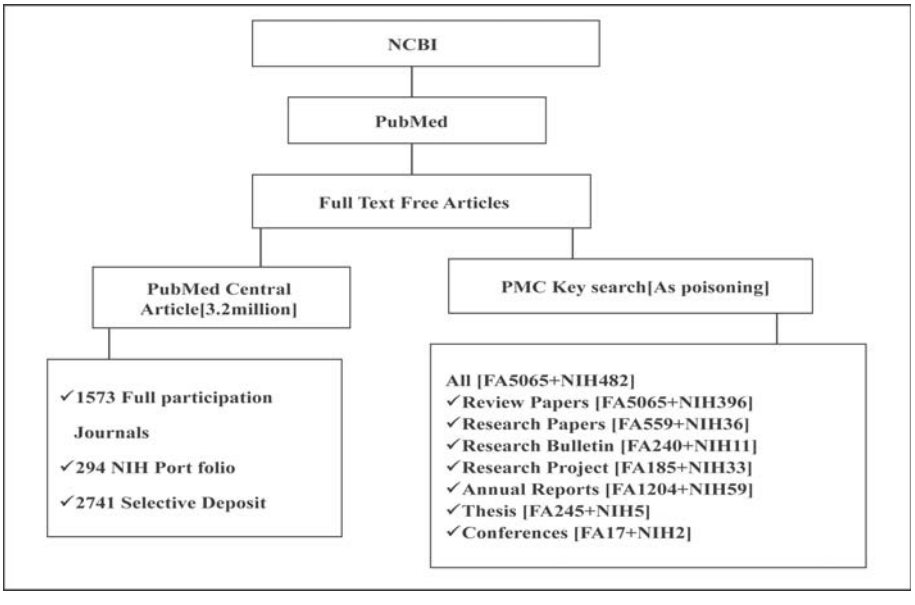

Fig. 1. Criteria for the selection of articles, **Legend:** FA: indicates full article, NIH: indicates National Institute of Health grant.