

Portable kit to check Chromium contamination

8. SHRI K.R. ARJUNAN: Will the PRIME MINISTER be pleased to state:

(a) whether it is a fact that the Bhabha Atomic Research Centre (BARC) has developed a portable kit to check chromium contamination in water and that too within five minutes;

(b) if so, the details thereof;

(c) whether it is also a fact that BARC's kit is simple, user friendly, quick and cost effective for on the site determination of contamination; and

(d) if so, whether the Department of Atomic Energy has any plan to market this product in public interest?

THE MINISTER OF STATE IN THE DEPARTMENT OF ATOMIC ENERGY (DR. JITENDRA SINGH): (a) Yes, Sir. National Centre for Compositional Characterisation of Materials (NCCCM), Chemistry Group, BARC, located at Hyderabad has developed a portable visual detection kit for detection of hexavalent chromium [Cr(VI)] between 5 to 500 ng/ml (ppb) range in water within 5 minutes.

Chromium exists in the environment primarily in two valence states, trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Cr (III) is biologically important element and needed for glucose and lipid metabolism. Cr (VI) however is considered toxic and IARC (International Agency for Research in Cancer, WHO) has classified it as a group 1 agent, defined as carcinogenic to humans.

(b) According to the method developed, three reagents kept inside different bottles are to be added to the clear water sample. Reagent 1 and Reagent 2 are added and mixed for two minutes. The third reagent is then added and mixed thoroughly (shaken for 1-2 minutes). Within 5 minutes, a pink colour develops in the top layer and the intensity of this is compared by visual inspection to obtain the Cr(VI) range in water.

By this method Cr(VI) can be detected in drinking water sources such as ground water, lake water, river water, etc. According to Indian standard IS10500, maximum permissible limit for Cr(VI) in drinking water is 50 ng/mL and as per United States Environmental Protection Agency (USEPA) it is 10 ng/mL and the kit meets the requirements of both the standards.

(c) Yes, Sir.

(d) Yes Sir, the technology of this kit has been transferred to M/s. L Tek Systems, Nagpur for commercialisation of the product for societal benefit.

Research papers and patents

9. DR. VIKAS MAHATME: Will the PRIME MINISTER be pleased to state:

(a) the number of research papers published in indexed journals and the patents obtained by the Department of Atomic Energy during the last five years; and

(b) where do we stand as compared to research and patents in comparison with / similar departments from USA, UK and China?

THE MINISTER OF STATE IN THE DEPARTMENT OF ATOMIC ENERGY (DR. JITENDRA SINGH): (a) Department of Atomic Energy (DAE) is a broad-based multidisciplinary organisation incorporating basic research, applied research, technology development and its translation into industrial applications. During the five year period 2012-2016, different DAE institutions published a total of 14498 papers. The Department obtained 43 patents during this period. Following are the country-wise break-up:-

Sl. No.	Countries	Applications Filed	Patents Granted
1.	Australia	4	1
2.	Canada	2	4
3.	China	1	1
4.	Europe	6	7
5.	India	40	9
6.	Japan	3	5
7.	Russia	—	1
8.	South Africa	1	2
9.	South Korea	—	1
10.	USA	18	12
TOTAL		75	43

(b) It is not possible to exactly identify what a "similar department" in USA, UK and China is. The Department has identified a set of institutions (Tables 2-4) in each of these countries pursuing research in similar areas to those of the DAE institutions,