

Metrology for the determination of contaminants and development Of BNDs/CRMs of water & food matrices: CSIR-NPL efforts for dissemination of quality product to the end user for safe consumption

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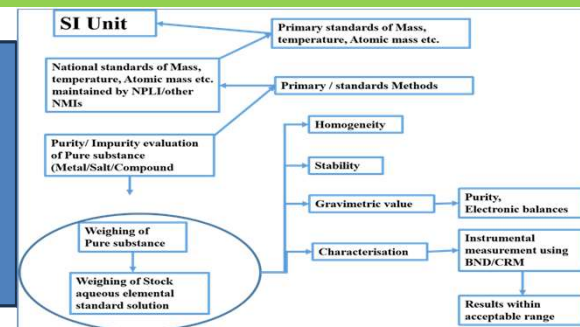
Traceability linkage for the source metal/salt/compound for aqueous elemental BNDs

Preambles

The contamination of water and food is a serious concern as the contaminant easily enters the human body through the food chain. Heavy metal contaminants exceeding the permissible limit in water & food commodities are seen in various regions of India which is of great concern to the Local Water Supply Bodies and Food Authorities. Adulteration of food materials is also found in spices, honey, turmeric etc. and dyes are being used as adulterants in spices. Continuous research is carried out in CSIR-NPL to find out the contamination region, and concentration level of contaminants. Accurate & precise determination of contaminants is needed for both the toxicological and economic point of view to cater the needs of the country and to overcome the barrier in trade. Under the Metrology in Chemistry Activity of CSIR-NPL, India, effort has been taken continuously in the last four decades to make available of Indigenous CRM which trade name is Bharatiya Nirdeshak Dravyas (BNDs). Technical support has been given to the Reference Material Producers (RMPs), conducting Proficiency Testing programme time to time, strengthening of quality infrastructure of the Pollution Control Board Laboratories involved in the rejuvenation of clean Ganga under National Mission along with PTB, Germany. Technical support is given as faculty, members of various committees, and assessors to the statutory Body like Bureau of Indian Standard and national Accredited Bodies. To overcome the demand of the testing laboratories, continuously BNDs/CRMs of chemical parameters in Water & Food matrices are disseminated so as to provide quality product to the end users for safe consumption.

Objective

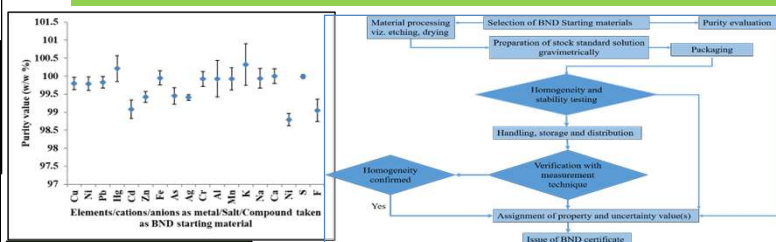
- Research and Development as per the need of Nation
- Development of Measurement Techniques, Methods
- Development of Standards, BNDs/CRMs as per the demand
- Capacity Building and Public Awareness
- Supporting to the RMP to establish traceability
- Supporting Water Monitoring and Testing Laboratories-BNDs
- Establishing International Cooperation – Participating in International Comparison



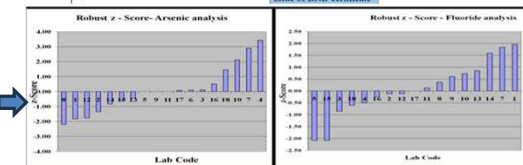
Indigenous Heavy metal induced Rice powder BND/CRM development at NPLI through cultivation -BND® 3001



Percent purity of the starting materials of aqueous elemental solution BNDs with their associated uncertainties and certification process



Proficiency Testing Programme - To Assess the competency of eighteen water testing laboratories for Arsenic & Fluoride analytes.



Conclusion Metrology in Chemistry activity of CSIR-NPL is focused on the development/production of CRMs/BNDs of chemical parameters to cater the need of the country and thus to establish the quality infrastructure of the Testing Laboratories, and helps as important substitution and export promotion. Utilising the measurement capability, BNDs of micro plastic, millets and various matrices will be developed as per the need of the country for the dissemination of quality products to the end user for safe consumption of water and food.

Cater the need of Ministry of Water by disseminating traceability for water parameter tested by Laboratories to ensure safe drinking water to the end users



Urgent Future Need: There is an urgent need for the microplastic identification in Water and Food matrices, as no such RM/CRM is available. Thus, effort will be taken in future to develop method for its quantification and produce RMs of some common microplastic which will certainly help the Regulatory Body.

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References: 1. ISO/IEC 17025:2017 - General requirements for the competence of testing and calibration laboratories; 2. ISO 17034:2016 - General Requirements for the competence of Reference Material Producers; 3. ISO Guide 35:2017 - Reference Materials - General and statistical principles for certifications; 4. ISO Guide 31:2015 - Reference Materials - Contents of certificate, labels and accompanying documentation

Contamination of heavy metals in paddy crops of Moga, Punjab region of India

A detailed study has been done on the paddy crops contamination and its source. Determination of lead, mercury, arsenic, cadmium, chromium was carried out in the water used for irrigation, soil, root, shoot, rice bran and grain. Below figure shows the arsenic contamination found mostly in the soil and root of paddy crops, however, the grain is not affected and under the permissible limit.

