सीएसआईआर-केंद्रीय खाद्य प्रौद्योगिक अनुसंधान संस्थान
CSIR- CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE
मैसूरु / MYSURU-570 020, भारत / INDIA
(Constituent Laboratory of CSIR, New Delhi (Ministry of Science & Technology)
An ISO 9001:2008, ISO 14001:2004 & ISO 17025:2005, NABL Accredited Laboratory

Corrigendum: Tender for Inductively Coupled Plasma Mass Spectrophotometer (ICP-MS)

Corrigendum Title: Revised Technical Specification based on PBC

Tender Ref: CFTRI/52334/2023 Date: 07-06- 2023

Tender ID: 2023_CSIR_156589_1

The revised final specification based on the discussion in Pre Bid Conference held on 14-06-2023 @ 11.00A.M is uploaded herewith.

All the prospective bidders are requested to take cognizance of the revised specification and submit their bids accordingly on or before 02.00 p.m. on 13/July/2023.

All other tender terms and conditions of tender remain unaltered.

Controller of Stores &Purchase

CSIR-CFTRI, Mysore

Revised Technical Specifications for ICP-MS with HPLC based on pre bid conference held on 14.06.2023 with prospective bidders.

Sl. No.	ICP-MS with HPLC Specification
1	
	Nebulizer: Concentric Micro mist Nebulizer with low sample flow rate
	Spray Chamber: Software controlled Peltier cooled spray chamber with range – 5 °C to + 20 °C or more.
	Peristaltic pump: Low pulsation high precision peristaltic pump with minimum of three separate channels and 10 or more roller, which can be controlled through the software.
2	
	RF Power range: 600 W to 1600 W Radio Frequency Generator (Solid State): ≥ 27 MHz Impedance Matching: Auto-tuning to get maximum coupling efficiency.
	Torch: Easy mountable single piece quartz torch with shield/or suitable mechanism. Torch movement should allow for complete computer-control and auto tunable in x-y-z directions with independent movements in the three directions. Provision for Auto-alignment of the torch after routine maintenance with a reproducibility better than 0.1 mm in x-y-z directions
	Plasma Gas Control: Should have at least 3 Mass Flow Controllers (AMFC) or equivalent PC Controller for control plasma, auxiliary makeup, carrier gases. Gases used should be controlled with mass flow controller and Fully computer controlled. Argon gas dilutor or equivalent technology must be quoted along with the main instrument.
3	**Ion Extraction Interface**
	The system should have standard sample and skimmer cones with suitable orifice diameters to suit all application and to prevent clogging and minimize signal drift. It should be easily mountable and dismountable. Scope of supply of standard (Nickel) and optional (Platinum) cones should be clearly specified (for any alternate material, bidder would need to prove sensitivity) Lens/ extraction cones or equivalent should be easy to maintain.
4	**Ion Focusing System**
	Ion focusing system with efficient mechanism for removing all neutrals and photons from the Ion path.
	Cell offering three modes of operation: Standard Mode, Collision Cell Mode and Reaction Cell Mode
	Switching of reaction and collision gases will be through software and automated. Unit will have

	the flexibility of applying both (collision, and reaction) gases using single method for removal of interferences. Mass Cut off (low and high) facility or equivalent technology should be there to remove unwanted polyatomic interferences formed due to free atoms.
	The unit should have two separate gas channels one for Collision mode and one for Reaction mode.
	A reaction cell should be provided for polyatomic interference removal with Collision mode using Helium and reaction mode using Oxygen/ Hydrogen/ other suitable gases. Separate AMFCs controllers for the precise control of variable gas flow rate for Reaction cell gases.
	Vendor should attach application notes for Arsenic analysis as per FSSR/ any other Food National or International regulation, demonstration successful analysis As by either collision mode or mass shift reaction mode to remove ArCl interference.
	Reaction cell assembly and quadrupole/octopole/hexapole assembly (if requires cleaning any time in lifetime) should be quoted.
5	**Quadrupole Assembly**
	Quadrupole Mass Analyzer: A quadrupole mass analyzer to provide effective ion transmission, superior resolution and abundance sensitivity.
	Mass range: 2-260 amu or above
	RF Frequency : Fully Digital RF generator with frequency 2-3 MHz
	Abundance sensitivity: Low Mass Side: ≤ 5 x 10^{-6} High Mass side: ≤ 1 x 10^{-7} or 0.5 ppm
	Scan Speed: ≥ 3000 amu/s Mass stability: ≤ ± 0.05 amu over 8 hours of continuous operation.
	Resolution: Variable from 0.3 u to 1.0 u or better, user definable
6	**Ion Detector Assembly**
	Solid State dual stage dynode discrete over ≥ 9 orders of magnitude of linear dynamic range.
	Should be unique log amplifier circuit, features a high-speed analog mode for transient signals and a true nine orders dynamic range.
	Minimum dwell time / integration time of 100 µs (in both pulse count and analog modes.
	Dual-stage detector assembly should come as a standard with the system.
7	**Vacuum System**
	Efficient Vacuum system with turbo molecular pump and single external rotary pump for fast pump down and simple maintenance.
	In the event of vacuum failure, the entire vacuum system is to be automatically back-filled by inert gas to preserve the cleanliness of the system or an alternate system.
8	**Performance Specifications**
	Should be able to analyze Sn, Ni, Cu, Zn, Ba, Sb, Ni, B, Ag, Mg, Ca, Na, As, Cd, Cr, Hg, Pb, Se, Fe

	(but not limited to these elements) at a concentration of 0.05 ppb with RSD of < 5% at standard conditions.
	Oxide ratio (%) CeO/Ce < 3 %
	Double charged ratio < 3 %
	Isotope-ratio Precision: 1%RSD
	Sensitivity: Li (7) /Be (9): ≥ 6 Mcps/ ppm In (115) /Y (89): ≥ 90 Mcps/ ppm U (238) /Tl (205): ≥ 70 Mcps/ ppm
9	**Water Chiller**
	The system should have a suitable re-circulating chiller.
10	**Auto Sampler**
	Highly effective auto sampler compatible with operation along with ICP-MS without user intervention.
	Auto sampler with minimum 200 vials holding capacity with 500 nos. of 15 ml capacity tubes (as consumable) to be provided.
	Programmable complete with inert PTFE coated probe with PTFE inner tubing for auto sampler to be supplied.
	All accessories, racks, bottles, tubing assembly, waste container, dust cover etc.
11	**System Controller and Operating System**
	Software control for automatic data acquisition and processing.
	Mass spectrometer tuning and calibration auto and manual
	Data Validation (IQ/OQ/PQ for Software)
	Self-diagnostics
	Multi element analysis capability Isotope ratio and dilution
	Cold Plasma or other facility to eliminate polyatomic interferences.
	Remote diagnostics
	Software should control plasma, MS and other accessories like auto sampler
	The system software should support the following calibration curve fit modes for Quantitative analysis: i). Linear least squares. ii). Weighted linear least Squares iii). Linear forced-through-zero least squares. iv). Quantitative analysis including external calibration, additions calibrations, method of standard additions, isotope ratios and isotope dilution's and semi quantitative analysis. v). On-line help with quick steps to reference entire instrument user manual. **Licensed software compatible to windows 10 OS or latest advanced to be provided with additional licenses with lifetime validity. As and when, there is a change in software upgradation it has to be provided without any additional charges.**
12	**Speciation Studies & Methyl Mercury Unit**
	The system /unit model should have the provision to attach HPLC to perform Speciation studies.
	The speciation kit should have all necessary accessories to connect HPLC along with the

	software to operate.
	A Complete kit to analyze Arsenic, Chromium, Methyl Mercury should be included.
	Necessary accessories for the analysis of Arsenic, Chromium, Methyl Mercury should be included.
12 a	**HPLC Pump Module**
	Bio Inert HPLC Pump with Binary pump with completely inert and metal-free fluid path for lower detection limits and better accuracy.
	Suitable mechanism has to be present to avoid salt build-up behind the pump seal, increasing seal lifetimes and reducing pump maintenance.
	Pump should have suitable mechanism to ensure that pulsations are kept to a minimum and that quiet baselines can be achieved. Built-in backpressure compensation should be there.
	Flow rate range: 0.01 to 5.0 mL/min or more
	Pressure Range: 0 to 5,000 psi or more for entire flow rate range
	Flow precision 0.5% RSD or better
	Flow accuracy ± 2.0% or better
	➢ **Column Oven:**
	Operating temperature range ambient to 80°C or better with 1°C increment.
	Temperature accuracy ≤ 0.5°C
	Temperature stability < 0.1°C
	➢ **Auto sampler**
	Fluid path should be composed of entirely inert and metal-free components. Wetted Materials in Flow Path: PEEK, PTFE, and inert, coated needle.
	Injection volume pressure limit: Up to 8000 psi or better.
	Sample Capacity: 1.5-2 mL vials or equivalent.
	Sample tray capacity: more than 90 vials
	Standard injection volume programmable from 0 ul to 99.99 ul or more in 1 ul increment.
	Syringe size 100ul or more standard.
	Valve Switching Time: minimum.
	Loop volume: 2uL to 100uL or more.
	Injection precision with full loop :< 0.5% RSD.
	Sample carry over with standard wash: ≤ 0.1 %
	Safety and EMC Compatibility : CE, CSA (UL), RoHS, ISO 9001
	➢ **Switching valve**

	Switching valve should be there to allow the mobile phase to be diverted away from the ICP-MS, enabling you to tune the mass spectrometer at the same time as equilibrating your column.
	➢ **Software**
	Suitable software compatible with windows 10 OS or latest advanced to control all modules of HPLC.
	Separate analytical columns with suitable guard columns (4 no's each) to be supplied for As, Hg and Cr speciation.
13	**Computer**
	Latest compatible PC with minimum configuration of Intel ® Core ™ 12th generation i7 – 4570 Quad Core Processor (3.2 GHz),16 GB (2 x 8 GB) 3200MHz DDR4 Non-ECC RAM , 1 TB SATA (7.200 Rpm) Hard Drive, 16X Half Height DVD ± R/W Drive , Full height 2nd Serial Port card , Display Port to DV Adaptor ,On board 10/100/1000 PCIe network card , Full height additional network card ,USB Optical Mouse, Keyboard : US/European USB Keyboard, Windows 10 professional (64 Bit Windows 10 or better License, Media) English , Windows 10 or Later (64 Bit) English Resource DVD
	Microsoft Office Home & Business 2023, 23" TFT LED Monitor **or better** Specifications.
	Reputed Branded Laser jet printer and automatic back-to-back print should be provided.
	Standard Warranty of minimum 12 months (for Computer and printer) starting from date of satisfactory, installation and acceptance.
14	**Multi vessel Microwave digestion system**
	Magnetron .Power:- Microwave heating system must have a measured delivered output power of 1500 watts or more with dual magnetron system. There should be provision of protection of magnetron from reflected microwave energy.
	Control: System must have a built in operating system with touch screen controller fluorescent and facility for connecting external mouse and external alphanumeric keypad for entry of operating parameters and sample Identification. System must operate stand alone and must not require the use of any external computer for operation. System software must automatically adjust the power delivery based upon number of vessels, type of vessels and type of samples in a single touch operation.
	System must be capable of processing up to 16 vessels or more simultaneously (40 bar or above and 50ml or more volume size).
	➢ **Vessels:**
	Microwave digestion vessels must be ventable preferably without any metal discs
	No of vessels: 16 or more
	Volume: 50 ml or more
	Temperature: Min 230 °C or more

	Pressure: 40 bar or more
	MOC of vessels: TFM
	Temp Control: Temperature controlling should be with volume independent flour mounted contactless temperature sensor for temperature monitoring, vessel counting and automatic vessel detection prior to start/calculate heating reactions in precise manner.
	Cavity : Cavity should be made up of SS with impact resistant polymer shell for durability & should be coated with multilayer Teflon coating cavity size of min 40 liters or above.
	Door safety: System should have at least 5 safety switches out of which 3 safety interlocks should be for door safety & two thermal switches.
	System must be able to control temperature in all vessels suitable software should be offered.
	Capable of digesting the samples from 0.2 g to 2 g per vessel in the same run.
15	**Water unit (Type – 1 Water Purification System) with 50 L tank capacity.**
	System must be supplied along the external Pre-treatment and External RO to handle the silica free applications.
	System should be standalone single stage system-produce Endotoxin and bacteria free ultrapure water Type 1 and Type 2 directly from potable water supply.
	System should be capable of providing ASTM Type I (18.2 Mega ohm resistivity) Water and have the UF cartridge to cater Biological applications.
	System should be capable of providing ASTM Type II (1-10 Mega ohm resistivity) Water from potable tap water
	System has feed water acceptance level of Conductivity up to 1500 µS/cm or more, Fouling Index (SDI) > 3 and Total Chlorine less than 0.1 ppm or more.
	System should have a pretreatment kit with 1µm filter, Harness Stabilizer and Carbon.
	System should have RO Flow rate 5 Ltr/hour or more.
	Type 1 water flow rate should be equal or more than 1 Ltr/Minute.
	Reverse Osmosis module is made up of thin film composite polyamide RO membrane with rejection rate of 94 - 99%.
	System should have feed water specific purification pack before UV lamp consisting of mixed bed ion exchange resin/ micro filter / activated carbon to ensure better purification and longer life of the cartridges.
	System should have dual wavelength 185/254 nm for UV-oxidation for reducing the content of microorganisms and their metabolites to ensure the quality of Type 1 water.
	System should have inbuilt reservoir 5 Ltr or more in volume. Water is recirculated through High Purity Cartridge to maintain purity.
	System should have to be fed with imported Pre-treatment water as as to take the excessive care.
	System be compatible for onsite IQ/OQ(Onsite Validation).

	Production rate of Purified Water @ 5 ltrs/hr or more.
	System should be quoted with One set of Consumables including RO.
	Ultra-Pure (Type I) water: Resistivity...18.2 Mega Ohms.cm @ 25 Degree C. TOC ..... < 5 ppb Bacteria ... < 0.01 cfu /ml or better Particulates (.22 micron)... < 1 /ml RNAse.....< 0.003 ng/ml or better DNAse.....< 0.4 pg/ml or better Endotoxin....0.001 EU/ml or better Flow rate.....≥ 1 Ltr/Minute.
	Ultra-Pure (Type II) water: Resistivity... > 1 Mega Ohms.cm @ 25 Degree C. TOC ..... < 30 ppb
16	**Exhaust unit**
	Exhaust unit for the ICP-MS has to be supplied along with the System
17	**Standards with minimum expiry time of two years**
	Specially pure Analytical NIST traceable single element standard solutions (minimum of 100ml each) for Sn, Ni, Cu, Zn, Ba, Sb, Ni, B, Ag, K, Mg, Ca, Na, As, Cd, Cr, Hg, Pb, Se, Fe, Co, Mo, Al, Ti, V, P, Se, Bi, Sr, U should be supplied. Multi element Calibration NIST traceable standards for ICP-MS - one set. Suitable mixed internal standards. The above standards shall have certificate of analysis.
18	**Power Supply**
	The system should have online UPS with pure sine wave 3 phase in, single phase out (minimum 20 KVA) of suitable rating with voltage regulation, spike protection and minimum 60 minutes back up under full load condition, with inbuilt isolation transformer for the supplied equipment of reputed make (**APC/ Emerson/ ABB**).
19	**Essential Accessories**
	Peristaltic pump tubing-sample intake – 100 No's
	Peristaltic pump tubing-Drain – 100 No's
	Tubing – Auto Sampler to Peristaltic Pump – 25 No's
	Micro mist nebulizer – 5 No's
	Plasma Torch – 5 No's
	Ni Sampling Cone – 4 No's

	Pt Sampling Cone – 2 No's
	Ni Skimmer Cone – 4 No's
	Pt Skimmer Cone – 2 No's
	Hyper skimmer cones/extraction system for HF digested sample
	A HF resistant kit to handle HF digested samples should be supplied
	Vacuum Pump oils – as per the requirement of the pump.
	Argon Gas Cylinders-6 No's (>99.999 % pure as per system requirement)
	Gas cylinder for Collision cell gases – Helium-2 No's (>99.9999 % pure as per system requirement)
	Gas cylinder for Reaction cell gases –2 No's (>99.999 % pure as per system requirement), whichever is applicable for individual system for elimination of interference species along with 2 stage SS Gas pressure regulators (certified manufactures) for each cylinder. All supplied cylinders should have all test certificates.
	Gas purification panel for Argon, Oxygen, Helium & reaction gas with appropriate plumbing.
	Required vibration free table for the instrument and revolving chair for analyst.
	Optional: Any other accessory as felt required for the proper functioning of the equipment.
20	**Consumables**
	Consumables for Five years operation of the system for main ICP unit, spare torches, nebulizer, tunings, and moisture trap to be supplied.
	Bidders should quote a start up package for 100 samples. In addition, the bidders should give a list of recommended consumables along with their source and budgetary prices.
	Operation kit comprising all required items pump tubings, transfer tubings, work coils etc. for startup/regular operation of instrument.
	Firm should also quote for all essential pre-installation requirements and utility requirement for ICP-MS.
	Give the Detection limits (DL) chart for Sn, Ni, Cu, Zn, Ba, Sb, Ni, B, Ag, Mg, Ca, Na, As, Cd, Cr, Hg, Pb, Se, Fe (but not limited to these elements. Provide for as many elements as vendor can) and give the conditionsat which the DLs are measured
	Essential consumables for HPLC (like suitable tubings, end fittings, vials (100 no's) etc,.
	Operation and maintenance manual for each unit in both hard copy and soft copy.
	Service manual with set of required tools for each system/unit.
	The system should have future upgradability for Server connectivity and should be capable of 21 CFR Part 11 and food safety compliance if required in future. The necessary validations will have to be carried out by the equipment suppliers.
	Methods library for all food matrixes, related software's and user manuals to be provided.
21	**Operation and maintenance & Training Component**
	The supplier will have to carry out successful installation at our laboratory premises (wherever the system has to be installed) and to provide onsite comprehensive training for minimum of 20 working days for scientific personnel operating the system or until customer satisfaction.
22	**IQ/OQ/PQ**
	IQ/OQ/PQ of the system is required
23	**Warranty**

	Standard Warranty of minimum 12 months (for ICPMS, HPLC, Microwave digester, water purification unit, UPS) starting from date of satisfactory, installation and acceptance of the equipment. SMF batteries should have minimum 2 years warranty from date of satisfactory commissioning of the system for 60 minutes backup at full load conditions.
	Annual Maintenance Contract Service for 60 months after expiry of standard Guarantee/Warranty should be quoted separately on yearly basis.
	Annual calibration of the equipment shall be a part of the AMC. It shall also be mandatory to perform calibration after every major repair/breakdown
	The vendor should guarantee the availability of spares for minimum 10 years from the date of commissioning of the instrument.
	Current user's / performance list with contact details (Customer name, phone email id etc.) and date of installation to be provided (Minimum 2 installations of the model quoted)
	Number and details of the service engineers has to be provided near to CFTRI, Mysuru.
	Onsite technical performance evaluation of the quoted model of the equipment will be carried out for those who qualify in the technical bid
24	**Pre installation requirements**
	List out all pre-installation requirements (which are to be provided by the Lab)