



Document 2022/101/25335 - GENERAL (modified version of 2022/25326/101) - File No. 2022/101/4424
Approved by Registrar on 11/11/2022 14:30:19

http://www.kufos.ac.in/
cxXYD-pGE-ocjFH-SsmrN



KUFOS HQRS, Panangad, Ernakulam



KERALA UNIVERSITY OF FISHERIES & OCEAN STUDIES
കേരള ഫിഷറീസ്-സമുദ്രപഠന സർവ്വകലാശാല
PANANGAD P.O., KOCHI 682 506, KERALA, INDIA
Phone:0484- 2703782, 2700598; Fax: 91-484-2700337; e-mail: utypanangad@kufos.ac.in



GA7/4424/2022

Panangad dated, .11.2022

E- TENDER NOTICE

E- tenders are invited for the Supply of “**Inductively Coupled Plasma-Mass Spectrometry (ICP MS) for PMMSY Aquatic Referral Lab for Quality Testing and Disease Diagnosis, KUFOS, Panangad**” with specification as per attached documents.

The Tender should be submitted as e- tender in the e- procurement portal of Kerala Government with detailed specification, Tender fee of Rs.15,500/- and EMD of Rs.1,00,000/-, by means of e- Payment. The GST amount of the tender fee @18% should be remitted to the GST department directly by the bidder. More details will be available in the Office of Dr. Devika Pillai, PI & Director of Research , KUFOS Panangad, on all working days with the permission of undersigned. As per DSIR registration, necessary exemption can be availed for customs & excise duties for the purchase. Our GST Regn. No. is: 32AAAGK0031QIZL.

All the terms and conditions applicable to University/Government quotations/Tenders are applicable to this Tender also. Right to accept the Tender in full or in part or to reject without assigning any reason is reserved to the undersigned.

REGISTRAR

To : Firms/Programmer to Publish on the Website
Copy to : Dean FFS/ Dr. Devika Pillai, PI, PMMSY Project through Dean FFS/ SF

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

Panangad P.O. 682 506, Kochi, Kerala, India. Phone : 91 484 2700964; Fax : 91 484 2700337

Email :- utypanangad@kufos.ac.in



(Note: It is mandatory for the bidders to provide the compliance statement (comply/not comply) for the below points with document proof as required)

Bench top ICP-MS should be capable of doing Trace and ultra-trace elemental analysis (% , ppm, ppb and ppt) in a single aspiration without sample dilution and in a single method in various types of environmental samples. Component wise specification is as following:

1. Sample Introduction:

1.1. System should be offered with Argon gas dilution accessory like Ultra High Matrix Introduction

(UHMI)/ All Matrix Solution (AMS)/ Argon Gas Dilution (AGD) /etc., to handle the sample with

> 25% TDS or more without dilution.

1.2. The system should be a space saving, compact bench top model that can fit into allocated lab space with all the sub-systems and accessories.

1.3. Open architecture design for sample introduction system of ease of operation in switching between GC/LC/IC, etc. for speciation analysis. Interface should be provided for integration with LC/IC.

1.4. System should have appropriate Glass concentric nebulizer with port to connect to O₂ gas line (for Organic solvent aspiration) or Argon for Argon dilution accessory.

1.5. System should have high precision peristaltic pump with at least 4 channels and 10 rollers.

1.6. Sample introduction system assembly should be easily accessible for maintenance.

1.7. Sample Introduction system should have very low dead volume with low uptake rate.

1.8. System should be equipped with MFC/Electronic flow controllers for precise control of variable gas flow rate.

1.9. Peltier cooled spray chamber with temperature range -5 to 20°C or better (in case of organic application).

2. Ion Source and Plasma

2.1. It should have computer controlled RF generator operating between 27 MHz/35 or equivalent, operating from 0.75 to 1.6 kW or Wider range, for automatic control and torch ignition, shutdown and system warm up.

2.2. Vendor should ensure for RF coil life time for at least 10 years without fail, else required spare of RF coil should be offered in the standard offer.

2.3. For better operating experience and enhanced lifetime, RF coil with chemical oxidation resistant metal, self/water -cooling technique with higher surface area is preferred.

2.4. Plasma gas control should have at least 4 active mass flow controllers for control plasma, auxiliary, makeup & carrier gases. Gases used for collision cell & Reaction cell should be



controlled
should be
automatic

with separate mass flow controller. (All the gas controls like plasma, auxiliary, nebulizer computer/software controlled and gases for collision and reaction cell also should be controlled by computer/software.)

2.5. System should have digitally driven and programmable plasma generator, with auto tuning features.

System should have capability of Automatic shutdown of the plasma by the system after completion of analysis.

2.6. Torch alignment: User should be able to control the horizontal, vertical and sampling depth position using PC.

2.7. Vendor should offer enough consumables to last for 3 years of trouble-free operation. Including Cone, bonnet, cone mounting plate.

2.8. Duct and blower for venting/exhaust must be included.

2.9. Suitable chiller or equivalent must be included

2.10. Plasma view window should be provided to observe plasma status

2.11. To protect operator and instrument, safety features for plasma unit must be included such as automatic door lock during running of plasma

2.12. It should be equipped with suitable features to save expensive argon during sample analysis and when system is in standby with plasma on

3. Torch

3.1. Easy mountable wide bore torch injector system with fixed torch cassette or equivalent is preferred.

Torch movement should be completely computer controlled and auto tunable in x-y-z directions with independent movements in the three directions, system should not be manually aligned.

Provision for auto-alignment of the torch after routine maintenance with reproducibility better than 0.1 mm in x-y-z directions.

Torch should have the capability for variable sampling depth equal to or better than 25 mm to handle high TDS samples efficiently. Manual override should be available for torch alignment.

3.2. One piece-quartz torch for efficient matrix decomposition and sample ionization, and wide bore quartz injector.

4. Ion extraction Interface and Ion focusing System



4.1. Interface: Sampler, skimmer cones/extraction system should be easily mountable and demountable.

The cones should be accessible without breaking vacuum for easy maintenance. Systems which can access the ion lenses without breaking vacuum will be preferred as it will reduce the instrument down time after routine maintenance or services. Cones should have larger orifice (> 1mm) to minimize clogging. Sample, skimmer cones/extraction system should be easily mountable/dismountable without venting out the system.

4.2. Suitable water-cooled interface under vacuum and with standard high performance Ni and Pt sampling and skimming cones. Lens/Cones system outside the vacuum system is preferred to reduce down time.

4.3. The placement of the Sampler cone, Skimmer cone should be such that, no unwanted plasma matrix should enter into the system and maintain the stability of the instrument.

4.4. Ion focusing system should be capable of removing all neutrals and photons from the ion path without causing any damage to the optics. The system should be capable of minimizing interface background.

4.5. Capable of removing all neutrals and photons from the ion path without causing any damage to the optics.

4.6. Cone removal must be handy required for its removal from system to facilitate easy cleaning whenever required.

5. Quadrupole System

5.1. Quadrupole system should be capable of removing all interference

5.2. Quadrupole material: made of molybdenum or stainless-steel rods or Gold with RF pre- filters.

5.3. Capable of Mass shift mode in reaction cell technology. The mass range should be from 5-260 amu or better.

5.4. Quadrupole scan speed should not be less than 3000 amu/sec over the entire mass range during the data acquisition at every mass.

5.5. Dwell/integration time should be minimum of 0.1 ms or better with zero settling time

5.6. Background equivalent concentration should be less than 2 cps.

6. Detector

6.1. Discrete dynode electron multiplier type detectors or equivalent or better detectors that can operate in simultaneous dual-mode (analogue and digital mode) over 10 orders or more magnitude of



linear

dynamic range. Should be able to operate in dual mode.

6.2. The detector should be capable of analyzing all ICP-MS measurable elements from percentage to ppt level in a single run.

6.3. Detector should have unique log amplifier circuit features a high-speed analog mode for transient signals, and a true 10 orders dynamic range. Minimum dwell time should be minimum of 3ms microseconds with zero settling time (pulse count and analogue mode) or less and integration time should be minimum of 100 microseconds or less.

6.4. System should have fastest data acquisition of at least 70,000 data points /sec.

7. Dynamic range

7.1. System should have dynamic range 10 orders of magnitude or more to address varied concentrations (from % to ppt level) in single aspiration and detector should provide 10 orders of magnitude in a single continuous scan.

8. Vacuum system

8.1. Four stage vacuum system (split flow turbo molecular pump, turbo pump, external rotary pump, turbo pump backing) or equivalent is preferred. The pumps should have capacity of producing 1×10^{-5} torr or less pressure in analyzer.

8.2. System should consist of two rotary and ceramic-bearing/equivalent turbo molecular pumps for efficient pumping with pneumatic vacuum isolation between first and second stage of vacuum.

8.3. The pumps should be a fume and acoustic free system.

9. Collision/Reaction Cell technology

9.1. System should have all the three modes of operation: Standard, collision (using inert gases such as helium) and reaction mode using 100% reactive gases like oxygen and hydrogen and methane using separate gas lines.

9.2. It should have the capability to eliminate interfering species, isobaric species and polyatomic interfering species through chemical gas reaction and collision gas reaction technology.

9.3. System should have a dedicated and separate gas line for collision and reaction while analyzing difficult matrix samples.

9.4. System also should be able to use 100% pure reactive gases like CH_4 , C_2H_2 , CH_3F , C_2H_6 etc. as well as mixture of gases like H_2/He .



9.5. The gas switching time & stabilization time of the collision and reaction cell from no gas to inert and/ or reaction gas is to be specified and to be demonstrated during installation.

10. Performance

10.1. Detection limit:

9Be: 1 ppt or better

115In: 0.5 ppt or better or suitable element

238U: 0.5 ppt or better

10.2. Oxide ratio (CeO/Ce): <3% or suitable element.

10.3. Doubly charged ratio: Ce^{2+}/Ce (%): $\leq 3\%$ or suitable element

10.4. Short term stability: <3% (over 10 minutes) and long-time stability of <4% (over 4 hours) should be demonstrated.

10.5. Isotope ratio precision: Ag107/Ag109 <0.1% RSD or suitable element.

10.6. Auto tune facility to optimize plasma conditions, lens and cell voltage, etc. for best ionization and sensitivity.

10.7. The system should have the capability to eliminate polyatomic and isobaric interferences, and acid matrices effectively and analyze the sample precisely.

10.8. System should have least maintenance components. Vendors have to give a maintenance chart for all the components that require frequent maintenance or replacement as consumables.

10.9. The system should be easy to use and vendor should be ready to give at least 10 Years technical support.

11. Software

11.1. Windows based software

- The software must be capable to perform measurement of sample with one data file for 300 samples or less and pasting sample information from the clipboard into sample tables
- The qualitative analysis should be with built-in database support, auto selection of Mass no of Each sample, Correction for data base

11.2. User-Friendly software that guides users through method and sequence development, and method templates for rapid development of commonly used methods.

Software should be capable of measuring mass no. applying suitable correction method based internal standard, interference element, drift, dilution etc



11.3.

- The software also should have facilities for exporting data to excel or equivalent for easy processing.
- The software should have built support facility to develop step by step method development as a standard feature
- Should be able to analyze all the elements apart from target elements in single run.
- Should have facility of isotope measurement of individual elements.
- The Software should also have support facility to check for spectral interface to ensure all the steps are well checked before it applies for analysis.

11.4. Quantitative analysis including external calibration, additions calibrations, method of standard additions, isotope ratios and isotope dilutions and semi quantitative analysis.

11.5. Internal standards, control blanks should be part of QA/QC monitoring section of software.

11.6. Editable interference correction equations.

11.7. Fully automated instrument initialization (start-up) routine, including instrument stabilization time,
plasma X/Y position adjustment, mass calibration, and quadrupole resolution.

11.8. Simultaneous real-time graphical display of signal as full mass scan, segments of mass scan, and signal response vs time for multiple isotopes or ratios.

11.9. Should have compatible software installed on a dedicated computer with Windows 10 or higher based personal computer having 4 USB high speed protocol (minimum requirement: 4 GB RAM, 1TB hard disk, Intel core i3 or higher processor and 24 inches or above LED computer monitors) and a laser printer along with keyboard and mouse. MS Office also should be included.

11.10 Data analysis licenses (5) should be provided with free upgrades and support for 5 years.

12. Warranty:

3 Years Comprehensive warranty and additional 3 years CMC and AMC for the complete system at rates frozen as on date of purchase.

13. Autosampler-

Autosampler with 200 OR more vials also to be supplied along with the instrument, auto sampler should be in an enclosed chamber

14. User List:

Details should be provided about at least 5 installations in India in reputed institutions (FSSAI organizations,

IITs, IISc, and Govt. laboratories) of the same model being quoted in the last 5 years.

Contact person Name, Email Id., Phone no. & Institution Name should be provided.

15. Pre installation requirement:



Complete technical details of pre-installation requirements should be furnished along with the technical bid.

16. Installation/Commissioning:

- Installation, complete interfacing of the system with its subsystems, and commissioning is to be carried out by the vendor's factory-trained engineers, followed by a demonstration of the system's performance.
- Back up equipment support for testing must be available at the supplier's facility during equipment breakdown
- The warranty shall commence only upon successful completion of the Acceptance Test or commissioning.
- The supplier must demonstrate that it has a proven appropriate set-up and capability to provide after-sales service efficiently and effectively. The supplier should have in his facility a similar system to that proposed in this tender for training purpose
- The Tenderer must have a local dedicated team, consists of sales, engineers and application engineers from direct factory/manufacturer for optimum support of the system

17. IQ,OQ and PQ

- To be done free of cost with traceable calibration standard for the first 3 years (at installation & at every maintenance visit of each year) with PM kits.
- Documents, PM Kits and calibration standards etc to be supply along with instrument at every PM visit free of cost during warranty period.
- IQ/OQ/PQ shall be done free of cost with supply of PM kits and Calibration standard during warranty period. Satisfactory performance certificate should submit to the laboratory after calibration of the instrument before one month of warranty period expired with supply and fixation of PM kits the instrument.

18. Training for operation:

The supplier must provide training for the users of the instruments at site as well as at the





supplier's

application laboratory after installation and commissioning at free of cost. Details of the training program

must be attached with the tender.

19. After sales support:

The vendor should have a technical service team for the equipment based in India.

20. Availability of service centre:

Service centre should be in India with a turnaround time of 48 hours after registration of complaint /Service support. Details should be furnished along with technical bid.

21. Local supplies

1. UPS 20 KVA with batteries-1 hr backup
2. Argon Gas Cylinder- 6 nos.
3. Argon Gas Regulator - 1 no.
4. Helium Gas Cylinder- 1 no. With tubing and other accessories
5. Helium Gas Regulator-1 no.
6. Oxygen/Hydrogen/ Methane /suitable Gas Cylinder-1 no.
7. Oxygen/ Hydrogen/ Methane/suitable gas Regulator-1 no.
8. 23 Multi Element Std- 1 no.
9. Exhaust Hood system- 1 set
10. Suitable PC with Laser Jet Printer- 1 no.
11. Internal standard 1000 ppm/100 ml of Rh, Ir, In,Tm,Au,As
12. Tuning solution
13. Gas tubing and installation of gas panels have to be done by the vendor.
14. Chiller (Compatible, Branded)

22. Additional consumable kits

- Sample cone - 5 Nos. additional
- Skimmer cone - 1 No. additional
- Torch for Aqueous samples- 3 Nos
- Concentric nebulizer- 1 no.
- Sample pump tubing (Aqueous)-24 set each
- Rotary pump oil- 1 liters
- Internal standard addition kit for in-line mixing of sample and internal standard solutions should be supplied.
- ICPMS system should be provided with hydride generator system employing use of sodium borohydride for high sensitivity analysis of elements like As, Se, Sb. System should also be capable of removing sample matrix from samples creating spectral interferences during analysis.
- ICPMS system should handle speciation analysis. Software for LC control and transient data acquisition should be provided along with it.
- Exhaust duct connection adapter should be available from instrument supplier.
- All modules must be GMP compliant; a declaration to that extent must be provided.
- Method development and validation for at least two commodities, Lead, Arsenic with fish matrices as per national and international standards.



Document 2022/101/25335 - GENERAL(modified version of 2022/25326/101) - File No. 2022/101/4424
Approved by Registrar on 11/11/2022 14:30:19

<http://www.kufos.ac.in/>
cxjyd-pge-ocjfh-ssmrN



KUFOS HQRS, Panangad, Ernakulam