

REFERENCE OF TENDER	DESCRIPTION OF TENDER	TIME PERIOD OF TENDER	DEPARTMENT/DIVISION/ UNIT REQUESTING TENDER	FEES	CLOSING DATE NOT LATER THAN 2.00PM	FOCAL PERSON
KK/308/2022/DSS	SUPPLY, DELIVER, INSTALL, TEST AND COMMISSION ONE (1) UNIT OF INDUCTIVELY COUPLED PLASMA – MASS SPECTROMETRY (ICP-MS) SYSTEM TO FOOD CHEMISTRY SECTION, DEPARTMENT OF SCIENTIFIC SERVICES, MINISTRY OF HEALTH	-	DEPARTMENT OF SCIENTIFIC SERVICES	\$50.00	13 th DECEMBER 2022	Norkhuzafah binti Kassim Food Chemistry Section Department of Scientific Services Ministry of Health Negara Brunei Darussalam Contact No.: 2382424 e-mail: norkhuzafah.kassim@moh.gov.bn

SECTION 2

SPECIFICATIONS AND REQUIREMENTS

TENDER REFERENCE NO: KK/308/2022/DSS

INVITATION TO TENDER
SUPPLY, DELIVER, INSTALL, TEST AND COMMISSION ONE (1) UNIT OF INDUCTIVELY COUPLED PLASMA – MASS SPECTROMETRY (ICP-MS) SYSTEM TO FOOD CHEMISTRY SECTION, DEPARTMENT OF SCIENTIFIC SERVICES, MINISTRY OF HEALTH

NAME OF ITEM	ONE (1) SET OF INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY (ICP-MS) SYSTEM
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NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
1	<u>GENERAL</u>
1.1	Tenderer is to supply (1) one completely functional, brand new, computer-controlled system for the analysis of trace, minor and major elements in a wide range of sample types. System to comprise as follows: <ul style="list-style-type: none">• Inductively Coupled Plasma Mass Spectrometry (ICP-MS)• Data acquisition and management system• Operating accessories (including UPS)
1.2	The instrument must be capable of performing semi-quantitative (SQ) surveys of the entire mass spectrum. In a single scan, the surveys must provide accurate determinations of all elements
1.3	A benchtop system for flexibility in positioning and to save on floor space.
1.4	The instrument must be capable of measuring concentrations of a monoisotopic element such as Sodium up to 1000 ppm, without dilution into a solvent and without adjusting quadrupole resolution to reduce sensitivity.
1.5	Safety interlocks throughout the system must allow safe shutdown with no damage to the instrument in case of loss of power, gas supply, water cooling, vacuum loss or other system malfunction. In addition, all events must be logged to an electronic error file and must include event description, time and date
1.6	The system shall consist of , but not limited to the following major components, complete with all software/hardware and interfacing necessary to make a fully integrated system: <ul style="list-style-type: none">• Sample introduction system• Inductively coupled plasma source• ICP-MS interface• Ion focusing system• Collision cell• Quadrupole mass analyzer• Vacuum system• Detector assembly• Autosampler• Water circulator• System controller and data acquisition• Accessories needed for the system
2	<u>TECHNICAL SPECIFICATION</u>
2.1	SAMPLE INTRODUCTION SYSTEM
2.1.1	Actual 3-dimensional observation of the sample introduction system must be possible when the instrument is operating without requiring any hood or covers to be opened.

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
2.1.2	The system shall be equipped with but not limited to as follows:
2.1.2.1	Nebulizer:
i	The instrument should feature a sample introduction system with nebulizer with low sample flow rate as standard (~0.2 ml/min).
ii	Must be able to tolerate matrix of samples containing high dissolved solids (upto 25% total dissolved solids) and micro-particulate materials thus allowing routine analysis of samples containing higher percentage of total dissolved solids.
2.1.2.2	Spray Chamber:
i	The spray chamber must be Peltier cooled for accurate and precise temperature control and fast equilibration time with no need for a separate external cooling water supply.
ii	Scott double pass spray chamber design.
iii	The spray chamber should allow the setting of temperatures below 0°C required for the analysis of volatile organic solvents.
iv	The spray chamber shall be resistant to nitric and sulfuric acids at all concentration levels for maximum applicability to routine samples.
2.1.2.3	Peristaltic Pump:
i	A low pulsation, high precision peristaltic pump, with 3 separate channels for precise delivery of sample and internal standard, plus spray chamber drain.
2.2	INDUCTIVELY COUPLE PLASMA SOURCE
2.2.1	The system must be equipped with a plasma radio frequency generator operating at 27 MHz with no consumable parts for generation of Inductively Coupled Plasma.
2.2.2	The torch injector must produce a highly robust plasma that efficiently decomposes the sample matrix, reducing many interferences and minimizing routine interface cleaning.
2.2.3	The torch auto-aligns with interface following maintenance.
2.2.4	The system must provide precise plasma potential and ion energy control, ensuring high sensitivity and effective interference removal in helium mode.
2.2.5	Signal suppression for high ionization potential elements such as Be, Zn, As and Cd in 10 vol% HNO ₃ matrix is typically less than 10%
2.3	ICP-MS INTERFACE
2.3.1	The interface shall consist of not more than two threaded interface cones to reduce operating and maintenance costs.
2.3.2	The sampling cone and skimmer cone must be easily removed and replaced without the need to remove any separate screws. No tool shall be used to remove the sampling cone.
2.3.3	Both cones must not require any O-rings for assembly to guard against potential contaminations.
2.3.4	The sampling cone orifice should be not more than 1 mm diameter with Ni-tipped or Pt-tipped with Cu base.
2.3.5	The skimmer cone orifice should be less than 0.5 mm with Ni or Pt- tipped
2.4	ION LENS
2.4.1	The ion lens must provide high ion transmission (>1GHz / ppm sensitivity at <2.5 % CeO/Ce) and low backgrounds to deliver superior detection limits.
2.4.2	The ion lens must be designed to ensure that fixed voltages can be used to achieve optimum ion transmission across the mass range.
2.4.3	The extraction lens must be positioned behind the skimmer cone.
2.4.4	The ion lenses should be configured in a 1-piece assembly that can be removed for maintenance, without the need to manually disconnect any electrical connections.

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
2.4.5	The lens assembly must not be a consumable item (i.e simple cleaning should restore the lenses to full performance in all cases)
2.5	MASS ANALYZER
2.5.1	The quadrupole rods must be truly hyperbolic and operating at high frequency (3 MHz) to generate a theoretically correct hyperbolic field, eliminating the need for multiple resolution settings to separate adjacent peaks.
2.5.2	The abundance sensitivity measured at Cs shall be $\leq 5 \times 10^{-7}$ on the low mass-side.
2.5.3	The abundance sensitivity measured at Cs shall be $\leq 1 \times 10^{-7}$ on the high-mass side.
2.5.4	The quadrupole mass filter shall be able to scan the mass range of 2 to 260 amu in increments of 0.05 amu or less.
2.5.5	The mass scan speed should be Slew rate (Li to U, no intervening peaks): 56.6 million amu/s.
2.5.6	The mass scan speed (Li to U, plus data collection at 40 intervening masses): >3000 amu/s
2.5.7	The orthogonal detector system should have a wide linear dynamic range of upto 11 orders of magnitude from 0.1 cps to 10 Gcps
2.6	VACUUM SYSTEM
2.6.1	The vacuum system must be a 3-stage differential vacuum system using a single, split-flow turbo molecular pump and single external rotary pump for fast pump-down and simple maintenance.
2.6.2	The vacuum system must have auto recover mode that returns the system to stand by (pumping) state when electrical power is resumed after a power failure. There is no need to manually start the vacuum system following an overnight power failure.
2.6.3	The valve must be solenoid or pneumatically controlled and held open against a spring so that it will close automatically in the event of a power failure during operation and not be dependent on sufficient gas supply pressure to protect the system in the event of failure.
2.6.4	The vacuum system must have an isolation gate valve between the interface and high vacuum area, to allow rapid routine maintenance, sample and skimmer cone changes, etc without requiring venting of the vacuum.
2.6.5	During full system shutdown or power failure, the analyser vacuum chamber shall be completely protected from oil-back streaming from the backing pump.
2.7	SOFTWARE
2.7.1	Must be supplied with software designed for use with the instrument which would allow, but not limited to: <ul style="list-style-type: none"> - LC and GC method setup - Instrument control - Sequencing - Chromatographic data analysis
2.7.2	Software must provide multi-level user logon control for enhanced security and audit purposes.
2.7.3	Software should permit: <ul style="list-style-type: none"> - automatic sequence recalibrations - retention time and ion ratio update, - compound independent calibration, - snapshot, - automated report generation
2.8	PERFORMANCE SPECIFICATIONS
2.8.1	Sensitivity in no gas mode (Mcps/ppm):
i	Li (7) ≥ 55 Mcps/ppm

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
ii	Y (89) ≥ 320 Mcps / ppm
iii	Ti (205) ≥ 250 Mcps / ppm
2.8.2	Oxide (CeO/Ce) < 1.5%
2.8.3	Double Charged (Ce ²⁺ /Ce ⁺) < 3.0%
2.8.2	No gas mode detection limit (ppt):
i	Be (9) < 0.2 ppt
ii	In (115) < 0.05ppt
iii	Bi (209) < 0.08 ppt
2.8.3	Short term stability (%RSD): Li, Y Ti: 2%
2.8.4	Long term stability (%RSD): Li, Y, Ti: 3%
2.8.5	Isotope Ratio Precision (% RSD): 0.1% Ag(107)/Ag (109)
2.8.6	Helium mode detection limit:
i	As (75) : 20 ppt
ii	Se (78) : 40 ppt
2.9	SYSTEM CONTROLLER
2.9.1	The instrument should feature a system controller to control the instrument independently of the data acquisition system.
2.9.2	<p>The system controller must be able to monitor:</p> <ul style="list-style-type: none"> - system status, - RF power, - gas supplies, - instrument temperatures, - electrical systems, - vacuum system and - cooling systems.
2.10	DATA ACQUISITION
2.10.1	<p>The system should include:</p> <ul style="list-style-type: none"> • Desktop system with specifications following manufacturer's recommendations • Genuine latest Microsoft Windows software compatible for use with the ICP-MS software • Genuine latest Microsoft Office Software which should include Word, Excel and Powerpoint • Colour Laserjet printer • 3 toner cartridges for each colour (staggered delivery; upon request over the warranty period) • ICP-MS software licence
2.10.2	Provide two (2) one terabyte (1TB) External USB SSD (with Password Protection)
2.10.3	Two (2) latest and compatible tablet, must also to be supplied with the latest Windows operating system and offline user license for icp-ms software with standard accessories to be discussed and agreed with end user.

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
3	<u>MANDATORY ACCESSORIES AND CONSUMABLES</u>
3.1	The following consumables and spares should be provided to ensure smooth operation of the system:
3.1.1	Three (3) Basic Consumables Kit includes a spare torch and graphite gasket for sampling cone
3.1.2	Five (5) packs Peristaltic Pump Tubing for sample Introduction, 12/pack
3.1.3	Five (5) packs Peristaltic Pump Tubing for Drainage, 12/pack
3.1.4	Five (5) packs Peristaltic Pump Tubing for ISTD, 12/pack
3.1.5	Twelve (12) sets Sample Tubing (0.5 mm ID, 1.6 mm OD, 5 m)
3.1.6	Two (2) Spare Nickel interface set consists of 1 Ni sampling cone and 1 Ni skimmer cone per set
3.1.7	One (1) Spare Platinum interface set consists of 1 Pt sampling cone and 1 Pt skimmer cone per set
3.1.8	Gas purification kit includes tubing cutter, base plate, filter cartridge (2pcs), 1/8' pre cleaned stainless steel tubing (6m), fittings, bracket and spare O ring
3.1.9	Ten (10) packs of 6ml polypropylene vials, 200/pack
3.1.10	Ten (10) packs of 18ml polypropylene vials, 55/pack
3.1.11	Five (5) bottles of ICP-MS Checkout Solutions which contain tuning solution, wash, water and blank solutions
3.1.12	Ten (10) bottles of ICP-MS internal standard mix contains: 100 mg/L of 6Li, Sc, Ge, Rh, In, Tb, Lu, Bi – 100 ml, Matrix: 10% HNO ₃
3.1.13	Ten (10) bottles of Multi Element Standard Solution: 1,000 mg/L: As, Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn; Matrix: 1 mol/L HNO ₃ ; 100 ml
3.1.14	Ten (10) bottles of Multi Element Standard Solution: 100 mg/L: As, Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Tl, Zn; Matrix: 1 mol/L HNO ₃ ; 100 ml
3.1.15	Five (5) bottles of Multi Element Standard Solution: 100 mg/L: Hf, Ir, Sb, Sn, Ta, Ti, Zr; Matrix = 15% HC;; 100 ml
3.1.16	Five (5) bottles of Mercury, ICP MS standard traceable to SRM from NIST Hg(NO ₃) ₂ in 10 % HNO ₃ – 1000 mg/L; 100 ml
3.1.17	Ten (10) bottles of NIST 1640/1640a/a643e ICPMS QC standard traceable to SRM from NIST Trace Elements in Natural Water, Std Reference Material Nat. Inst. Of std & tech, Gaithersburg, MD 20899, 250 ml
3.1.18	Three (3) bottles of Au 100 mg/l in HCl 2%, ICP MS Standard; 100ml
3.1.19	Three (3) bottles of stock standard solution Arsenic, As, ICP MS Standard; 1000ug/ml, 100ml
3.1.20	Three (3) bottles of stock standard solution Cadmium, Cd, ICP MS Standard; 1000ug/ml, 100ml
3.1.21	Three (3) bottles of stock standard solution Lead, Pb, ICP MS Standard; 1000ug/ml, 100ml
3.1.22	Three (3) bottles of stock standard solution Sodium, Na, ICP MS Standard; 1000ug/ml, 100ml
3.1.23	Three (3) bottles of stock standard solution Copper, Cu, ICP MS Standard; 1000ug/ml, 100ml
3.1.24	Twenty (20) bottles of concentrated Nitric Acid, high purity for trace analysis, 2.5litre
3.1.25	Twenty (20) bottles of concentrated Hydrochloric Acid, high purity for trace analysis, 2.5litre

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
3.1.26	Five (5) bottles of 30% Hydrogen Peroxide , 500ml
3.1.27	Twenty (20) bottles of Sodium Hydroxide pellets, 5kg
3.1.28	Five (5) bottles of Sodium Borohydride, 100g
3.2	VORTEX MIXER
3.2.1	This allow thorough mixing of sample and standards. True circular orbit for efficient mixing.
3.2.2	Speed type: variable (minimum range 0 - 3000 rpm)
3.3	UNINTERRUPTED POWER SUPPLY (UPS)
3.3.1	One (1) unit suitable power supply rating of uninterrupt power supply (UPS) must also be provided and connected to the instrument system and workstation.
4	<u>SITE PREPARATION</u>
4.1	Tenderer need to do site visit to inspect the feasibility of install and commission equipment; including the site preparation for the placement of the system taking into the consideration on the safety of the end user during operation of the instrument.
4.2	It is MANDATORY for the tenderer to do site visit for site preparation. A site visit form will be provided during the visit as evidence. Non-attendance will be considered as non-compliance.
4.3	All works involving supply and installation of gas piping, gas regulators, laboratory work benches, additional electrical supply including wiring, outlets and isolators, ducting and any others, deemed necessary to ensure safe and successful installation and operation of the complete system should be included.
4.4	Gas piping should be independent from the current existing pipe that is connected to the existing ICP MS.
5	<u>TRAINING</u>
5.1	Training shall be provided, at no additional cost, as follows:
5.1.1	On-site training for ALL staff members expected to handle the machine. Please ensure that adequate time is allocated such that training will take place in small groups to minimize staff shortage in the laboratory.
5.1.2	Certificate of competence is to be issued to all trainees after completion of training.
5.1.3	The successful tenderer should provide ONE (1) off-site benchwork / application training for TWO (2) key users at an accredited food laboratory that has similar or identical system unit as offered for a period of at least five (5) working days. All expenses for attending the benchwork training shall be borne by the vendor; full registration, air ticket, daily allowance, travel insurance, accommodation, transport to and from the airport and place of training.
6	<u>VALIDATION</u>
6.1	At the end of the installation, a certificate according to ISO 17025 or equivalent shall be supplied, certifying the proper installation and functioning of the instrument
6.2	After each preventive and /or correction maintenance, a certificate according to ISO 17025 or equivalent shall be supplied, listing the maintenance performed. Based on these results, a decision on the functioning of the instrument shall be made and this decision shall be mentioned on the certificate.
7	<u>DOCUMENTATION</u>
7.1	Factory product certification and verification report provided

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
7.2	Two (2) full set of operating and user manuals provided during commissioning
7.3	Instrument Control software license and user information
7.4	CD or USB Pendrive for software with registration keys provided
8	<u>WARRANTY AND PREVENTIVE MAINTENANCE</u>
8.1	A minimum of one (1) year warranty for manufacturer's defect on the hardware, software and all cost of repairs and/or replacements should be included
8.2	After-sales services must be provided for the product after one (1) year.
8.3	<p>One-off preventive maintenance to be carried out just before or soon after the one-year warranty period. Scope of work to follow manufacturer's manual / recommendation specific for the equipment offered, which include:</p> <ul style="list-style-type: none"> • Supply, delivery and installation of preventive maintenance kits and/or consumables • Software update (to obtain prior authorization from user and BME) • Inspection • cleaning • alignment • calibration • any other related preventive maintenance works required
9	<p><u>DELIVERY</u> Items offered MUST be delivered within _____ from date of approval. (Vendor to indicate the delivery period.)</p>
10	<p><u>PRICE VALIDITY</u> Price validity MUST NOT BE LESS THAN 90 days or three (3) months.</p>

NO.	GENERAL SPECIFICATIONS
A	Total Price: B\$
B	Delivery Period:
C	Model & Brand:
D	Country of Origin:
E	Where marketed:
F	Year of Manufacture:
G	Warranty:
H	Power Requirement:
I	Battery Back-up:
J	International Safety Standard:
K	Technical Support:
L	Equipment Whole Life Support:
M	Dimensions (WxHxD) cm:
N	User Manuals:
O	Service Manuals:
P	Spare-parts & Consumables Listing:
Q	Technical Training On-Site:
R	Site Requirements:

*To all participating companies, please fill in the table above along with your other documents during submission of tender.

Bahagian/Unit	Bahagian Kimia Makanan	
Bil. Rujukan Bahagian/Unit:	FORD / 2022 / 023	
Pegawai dirujuk	Nama : Norkhuzaifah Kassim	
	E-mail : Norkhuzaifah.kassim@moh.gov.bn	
	Tel. No.: 2382424	Fax No. :

SECTION 3

TENDER FORM

TENDER REFERENCE NO: KK/308/2022/DSS

INVITATION TO TENDER

SUPPLY, DELIVER, INSTALL, TEST AND COMMISSION ONE (1) UNIT OF INDUCTIVELY COUPLED PLASMA – MASS SPECTROMETRY (ICP-MS) SYSTEM TO FOOD CHEMISTRY SECTION, DEPARTMENT OF SCIENTIFIC SERVICES, MINISTRY OF HEALTH

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
1	<u>GENERAL</u>				
1.1	Tenderer is to supply (1) one completely functional, brand new, computer-controlled system for the analysis of trace, minor and major elements in a wide range of sample types. System to comprise as follows: <ul style="list-style-type: none"> • Inductively Coupled Plasma Mass Spectrometry (ICP-MS) • Data acquisition and management system • Operating accessories (including UPS) 				
1.2	The instrument must be capable of performing semi-quantitative (SQ) surveys of the entire mass spectrum. In a single scan, the surveys must provide accurate determinations of all elements				
1.3	A benchtop system for flexibility in positioning and to save on floor space.				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
1.4	The instrument must be capable of measuring concentrations of a monoisotopic element such as Sodium up to 1000 ppm, without dilution into a solvent and without adjusting quadrupole resolution to reduce sensitivity.				
1.5	Safety interlocks throughout the system must allow safe shutdown with no damage to the instrument in case of loss of power, gas supply, water cooling, vacuum loss or other system malfunction. In addition, all events must be logged to an electronic error file and must include event description, time and date				
1.6	The system shall consist of, but not limited to the following major components, complete with all software/hardware and interfacing necessary to make a fully integrated system: <ul style="list-style-type: none"> • Sample introduction system • Inductively coupled plasma source • ICP-MS interface • Ion focusing system • Collision cell • Quadrupole mass analyzer • Vacuum system • Detector assembly • Autosampler • Water circulator • System controller and data acquisition Accessories needed for the system				
2	<u>TECHNICAL SPECIFICATION</u>				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.1	SAMPLE INTRODUCTION SYSTEM				
2.1.1	Actual 3-dimensional observation of the sample introduction system must be possible when the instrument is operating without requiring any hood or covers to be opened.				
2.1.2	The system shall be equipped with but not limited to as follows:				
2.1.2.1	Nebulizer:				
i	The instrument should feature a sample introduction system with nebulizer with low sample flow rate as standard (~0.2 ml/min).				
ii	Must be able to tolerate matrix of samples containing high dissolved solids (upto 25% total dissolved solids) and micro-particulate materials thus allowing routine analysis of samples containing higher percentage of total dissolved solids.				
2.1.2.2	Spray Chamber:				
i	The spray chamber must be Peltier cooled for accurate and precise temperature control and fast equilibration time with no need for a separate external cooling water supply.				
ii	Scott double pass spray chamber design.				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
iii	The spray chamber should allow the setting of temperatures below 0°C required for the analysis of volatile organic solvents.				
iv	The spray chamber shall be resistant to nitric and sulfuric acids at all concentration levels for maximum applicability to routine samples.				
2.1.2.3	Peristaltic Pump:				
i	A low pulsation, high precision peristaltic pump, with 3 separate channels for precise delivery of sample and internal standard, plus spray chamber drain.				
2.2	INDUCTIVELY COUPLE PLASMA SOURCE				
2.2.1	The system must be equipped with a plasma radio frequency generator operating at 27 MHz with no consumable parts for generation of Inductively Coupled Plasma.				
2.2.2	The torch injector must produce a highly robust plasma that efficiently decomposes the sample matrix, reducing many interferences and minimizing routine interface cleaning.				
2.2.3	The torch auto-aligns with interface following maintenance.				
2.2.4	The system must provide precise plasma potential and ion energy control, ensuring high sensitivity and effective interference removal in helium mode.				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.2.5	Signal suppression for high ionization potential elements such as Be, Zn, As and Cd in 10 vol% HNO3 matrix is typically less than 10%				
2.3	ICP-MS INTERFACE				
2.3.1	The interface shall consist of not more than two threaded interface cones to reduce operating and maintenance costs.				
2.3.2	The sampling cone and skimmer cone must be easily removed and replaced without the need to remove any separate screws. No tool shall be used to remove the sampling cone.				
2.3.3	Both cones must not require any O-rings for assembly to guard against potential contaminations.				
2.3.4	The sampling cone orifice should be not more than 1 mm diameter with Ni-tipped or Pt-tipped with Cu base.				
2.3.5	The skimmer cone orifice should be less than 0.5 mm with Ni or Pt- tipped				
2.4	ION LENS				
2.4.1	The ion lens must provide high ion transmission (>1GHz / ppm sensitivity at <2.5 % CeO/Ce) and low backgrounds to deliver superior detection limits.				
2.4.2	The ion lens must be designed to ensure that fixed voltages can be used to achieve optimum ion transmission across the mass range.				

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		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.4.3	The extraction lens must be positioned behind the skimmer cone.				
2.4.4	The ion lenses should be configured in a 1-piece assembly that can be removed for maintenance, without the need to manually disconnect any electrical connections.				
2.4.5	The lens assembly must not be a consumable item (i.e simple cleaning should restore the lenses to full performance in all cases)				
2.5	MASS ANALYZER				
2.5.1	The quadrupole rods must be truly hyperbolic and operating at high frequency (3 MHz) to generate a theoretically correct hyperbolic field, eliminating the need for multiple resolution settings to separate adjacent peaks.				
2.5.2	The abundance sensitivity measured at Cs shall be $\leq 5 \times 10^{-7}$ on the low mass-side.				
2.5.3	The abundance sensitivity measured at Cs shall be $\leq 1 \times 10^{-7}$ on the high-mass side.				
2.5.4	The quadrupole mass filter shall be able to scan the mass range of 2 to 260 amu in increments of 0.05 amu or less.				
2.5.5	The mass scan speed should be Slew rate (Li to U, no intervening peaks): 56.6 million amu/s.				
2.5.6	The mass scan speed (Li to U, plus data collection at 40 intervening masses): >3000 amu/s				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.5.7	The orthogonal detector system should have a wide linear dynamic range of upto 11 orders of magnitude from 0.1 cps to 10 Gcps				
2.6	VACUUM SYSTEM				
2.6.1	The vacuum system must be a 3-stage differential vacuum system using a single, split-flow turbo molecular pump and single external rotary pump for fast pump-down and simple maintenance.				
2.6.2	The vacuum system must have auto recover mode that returns the system to stand by (pumping) state when electrical power is resumed after a power failure. There is no need to manually start the vacuum system following an overnight power failure.				
2.6.3	The valve must be solenoid or pneumatically controlled and held open against a spring so that it will close automatically in the event of a power failure during operation and not be dependent on sufficient gas supply pressure to protect the system in the event of failure.				
2.6.4	The vacuum system must have an isolation gate valve between the interface and high vacuum area, to allow rapid routine maintenance, sample and skimmer cone changes, etc without requiring venting of the vacuum.				
2.6.5	During full system shutdown or power failure, the analyser vacuum chamber shall be completely protected from oil-back streaming from the backing pump.				
2.7	SOFTWARE				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.7.1	Must be supplied with software designed for use with the instrument which would allow, but not limited to: <ul style="list-style-type: none"> - LC and GC method setup - Instrument control - Sequencing - Chromatographic data analysis 				
2.7.2	Software must provide multi-level user logon control for enhanced security and audit purposes.				
2.7.3	Software should permit: <ul style="list-style-type: none"> - automatic sequence recalibrations - retention time and ion ratio update, - compound independent calibration, - snapshot, - automated report generation 				
2.8	PERFORMANCE SPECIFICATIONS				
2.8.1	Sensitivity in no gas mode (Mcps/ppm):				
i	Li (7) \geq 55 Mcps/ppm				
ii	Y (89) \geq 320 Mcps / ppm				
iii	Tl (205) \geq 250 Mcps / ppm				
2.8.2	Oxide (CeO/Ce) < 1.5%				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.8.3	Double Charged (Ce ²⁺ /Ce ⁺) < 3.0%				
2.8.2	No gas mode detection limit (ppt):				
i	Be (9) < 0.2 ppt				
ii	In (115) < 0.05ppt				
iii	Bi (209) < 0.08 ppt				
2.8.3	Short term stability (%RSD): Li, Y Ti: 2%				
2.8.4	Long term stability (%RSD): Li, Y, Ti: 3%				
2.8.5	Isotope Ratio Precision (% RSD): 0.1% Ag(107)/Ag (109)				
2.8.6	Helium mode detection limit:				
i	As (75) : 20 ppt				
ii	Se (78) : 40 ppt				
2.9	SYSTEM CONTROLLER				

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		YES	NO		
2.9.1	The instrument should feature a system controller to control the instrument independently of the data acquisition system.				
2.9.2	The system controller must be able to monitor: <ul style="list-style-type: none"> - system status, - RF power, - gas supplies, - instrument temperatures, - electrical systems, - vacuum system and cooling systems. 				
2.10	DATA ACQUISITION				
2.10.1	The system should include: <ul style="list-style-type: none"> • Desktop system with specifications following manufacturer's recommendations • Genuine latest Microsoft Windows software compatible for use with the ICP-MS software • Genuine latest Microsoft Office Software which should include Word, Excel and Powerpoint • Colour Laserjet printer • 3 toner cartridges for each colour (staggered delivery; upon request over the warranty period) • ICP-MS software licence 				
2.10.2	Provide two (2) one terabyte (1TB) External USB SSD (with Password Protection)				
2.10.3	Two (2) latest and compatible tablet, must also to be supplied with the latest Windows operating system and offline user license for icp-ms software with standard accessories to be discussed and agreed with end user.				

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		YES	NO		
3	<u>MANDATORY ACCESSORIES AND CONSUMABLES</u>				
3.1	The following consumables and spares should be provided to ensure smooth operation of the system:				
3.1.1	Three (3) Basic Consumables Kit includes a spare torch and graphite gasket for sampling cone				
3.1.2	Five (5) packs Peristaltic Pump Tubing for sample Introduction, 12/pack				
3.1.3	Five (5) packs Peristaltic Pump Tubing for Drainage, 12/pack				
3.1.4	Five (5) packs Peristaltic Pump Tubing for ISTD, 12/pack				
3.1.5	Twelve (12) sets Sample Tubing (0.5 mm ID, 1.6 mm OD, 5 m)				
3.1.6	Two (2) Spare Nickel interface set consists of 1 Ni sampling cone and 1 Ni skimmer cone per set				
3.1.7	One (1) Spare Platinum interface set consists of 1 Pt sampling cone and 1 Pt skimmer cone per set				
3.1.8	Gas purification kit includes tubing cutter, base plate, filter cartridge (2pcs), 1/8' pre cleaned stainless steel tubing (6m), fittings, bracket and spare O ring				
3.1.9	Ten (10) packs of 6ml polypropylene vials, 200/pack				

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		YES	NO		
3.1.10	Ten (10) packs of 18ml polypropylene vials, 55/pack				
3.1.11	Five (5) bottles of ICP-MS Checkout Solutions which contain tuning solution, wash, water and blank solutions				
3.1.12	Ten (10) bottles of ICP-MS internal standard mix contains: 100 mg/L of 6Li, Sc, Ge, Rh, In, Tb, Lu, Bi – 100 ml, Matrix: 10% HNO3				
3.1.13	Ten (10) bottles of Multi Element Standard Solution: 1,000 mg/L: As, Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Ti, Zn; Matrix: 1 mol/L HNO3; 100 ml				
3.1.14	Ten (10) bottles of Multi Element Standard Solution: 100 mg/L: As, Ag, Al, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Na, Ni, Pb, Sr, Ti, Zn; Matrix: 1 mol/L HNO3; 100 ml				
3.1.15	Five (5) bottles of Multi Element Standard Solution: 100 mg/L: Hf, Ir, Sb, Sn, Ta, Ti, Zr; Matrix = 15% HC;; 100 ml				
3.1.16	Five (5) bottles of Mercury, ICP MS standard traceable to SRM from NIST Hg(NO3)2 in 10 % HNO3 – 1000 mg/L; 100 ml				
3.1.17	Ten (10) bottles of NIST 1640/1640a/a643e ICPMS QC standard traceable to SRM from NIST Trace Elements in Natural Water, Std Reference Material Nat. Inst. Of std & tech, Gaithersburg, MD 20899, 250 ml				
3.1.18	Three (3) bottles of Au 100 mg/l in HCl 2%, ICP MS Standard; 100ml				

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		YES	NO		
3.1.19	Three (3) bottles of stock standard solution Arsenic, As, ICP MS Standard; 1000ug/ml, 100ml				
3.1.20	Three (3) bottles of stock standard solution Cadmium, Cd, ICP MS Standard; 1000ug/ml, 100ml				
3.1.21	Three (3) bottles of stock standard solution Lead, Pb, ICP MS Standard; 1000ug/ml, 100ml				
3.1.22	Three (3) bottles of stock standard solution Sodium, Na, ICP MS Standard; 1000ug/ml, 100ml				
3.1.23	Three (3) bottles of stock standard solution Copper, Cu, ICP MS Standard; 1000ug/ml, 100ml				
3.1.24	Twenty (20) bottles of concentrated Nitric Acid, high purity for trace analysis, 2.5litre				
3.1.25	Twenty (20) bottles of concentrated Hydrochloric Acid, high purity for trace analysis, 2.5litre				
3.1.26	Five (5) bottles of 30% Hydrogen Peroxide , 500ml				
3.1.27	Twenty (20) bottles of Sodium Hydroxide pellets, 5kg				
3.1.28	Five (5) bottles of Sodium Borohydride, 100g				
3.2	VORTEX MIXER				
3.2.1	This allow thorough mixing of sample and standards. True circular orbit for efficient mixing.				

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		YES	NO		
3.2.2	Speed type: variable (minimum range 0 - 3000 rpm)				
3.3	UNINTERRUPTED POWER SUPPLY (UPS)				
3.3.1	One (1) unit suitable power supply rating of uninterrupted power supply (UPS) must also be provided and connected to the instrument system and workstation.				
4	<u>SITE PREPARATION</u>				
4.1	Tenderer need to do site visit to inspect the feasibility of install and commission equipment; including the site preparation for the placement of the system taking into the consideration on the safety of the end user during operation of the instrument.				
4.2	It is MANDATORY for the tenderer to do site visit for site preparation. A site visit form will be provided during the visit as evidence. Non-attendance will be considered as non-compliance.				
4.3	All works involving supply and installation of gas piping, gas regulators, laboratory work benches, additional electrical supply including wiring, outlets and isolators, ducting and any others, deemed necessary to ensure safe and successful installation and operation of the complete system should be included.				
4.4	Gas piping should be independent from the current existing pipe that is connected to the existing ICP MS.				

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		YES	NO		
5	<u>TRAINING</u>				
5.1	Training shall be provided, at no additional cost, as follows:				
5.1.1	On-site training for ALL staff members expected to handle the machine. Please ensure that adequate time is allocated such that training will take place in small groups to minimize staff shortage in the laboratory.				
5.1.2	Certificate of competence is to be issued to all trainees after completion of training.				
5.1.3	The successful tenderer should provide <u>ONE</u> (1) off-site benchwork / application training for <u>TWO</u> (2) key users at an accredited food laboratory that has similar or identical system unit as offered for a period of at least five (5) working days. All expenses for attending the benchwork training shall be borne by the vendor; full registration, air ticket, daily allowance, travel insurance, accommodation, transport to and from the airport and place of training.				
6	<u>VALIDATION</u>				
6.1	At the end of the installation, a certificate according to ISO 17025 or equivalent shall be supplied, certifying the proper installation and functioning of the instrument				
6.2	After each preventive and /or correction maintenance, a certificate according to ISO 17025 or equivalent shall be supplied, listing the maintenance performed. Based on				

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		YES	NO		
	these results, a decision on the functioning of the instrument shall be made and this decision shall be mentioned on the certificate.				
7	<u>DOCUMENTATION</u>				
7.1	Factory product certification and verification report provided				
7.2	Two (2) full set of operating and user manuals provided during commissioning				
7.3	Instrument Control software license and user information				
7.4	CD or USB Pendrive for software with registration keys provided				
8	<u>WARRANTY AND PREVENTIVE MAINTENANCE</u>				
8.1	A minimum of one (1) year warranty for manufacturer's defect on the hardware, software and all cost of repairs and/or replacements should be included				
8.2	After-sales services must be provided for the product after one (1) year.				
8.3	One-off preventive maintenance to be carried out just before or soon after the one-year warranty period. Scope of work to follow manufacturer's manual / recommendation specific for the equipment offered, which include: <ul style="list-style-type: none"> Supply, delivery and installation of preventive maintenance kits and/or consumables 				

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		YES	NO		
	<ul style="list-style-type: none"> • Software update (to obtain prior authorization from user and BME) • Inspection • cleaning • alignment • calibration • any other related preventive maintenance works required 				
9	<p><u>DELIVERY</u> Items offered MUST be delivered within _____ from date of approval. (Vendor to indicate the delivery period.)</p>				
10	<p><u>PRICE VALIDITY</u> Price validity MUST NOT BE LESS THAN 90 days or three (3) months.</p>				
TOTAL PRICE (\$)					

NO.	GENERAL SPECIFICATIONS	VENDOR'S OFFER
A	Total Price: B\$	
B	Delivery Period:	
C	Model & Brand:	
D	Country of Origin:	
E	Where marketed:	
F	Year of Manufacture:	
G	Warranty:	
H	Power Requirement:	
I	Battery Back-up:	
J	International Safety Standard:	
K	Technical Support:	
L	Equipment Whole Life Support:	
M	Dimensions (WxHxD) cm:	
N	User Manuals:	
O	Service Manuals:	
P	Spare-parts & Consumables Listing:	
Q	Technical Training On-Site:	
R	Site Requirements:	

*To all participating companies, please fill in the table above along with your other documents during submission of tender.

1. We offer and undertake on your acceptance of our Tender to provide the above mentioned services in accordance with your Invitation To Tender.
2. Our Tender is fully consistent with and does no contradict or derogate from anything in your Invitation To Tender. We have not qualified or changed any of the provisions of your Invitation To Tender.
3. OUR OFFER IS VALID FOR **TWELVE (12)** CALENDAR MONTHS FROM THE TENDER CLOSING DATE.
4. When requested by you, we shall extend the validity of this offer.
5. We further undertake to give you any further information which you may require.

Dated this _____ day of _____, _____.

[Signature of authorised officer of Tenderer]
Name:
Designation:

Tenderer's official stamp