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CORRIGENDUM

This has reference to our Tender No. 8/I/NIPGR/S&P/2018-19 towards supply and installation of **LC-MS/MS**. In this context, this is to mention that the dates for submission/opening of Tenders have been revised and extended upto **9/8/2018** (3.00 P.M/3.30 P.M respectively). Placed below are the revised specifications, however, all other terms and conditions of the tender remain unchanged.

Specification for LC-MS

A High end Sensitive LC-MS/MS system for qualitative (non-targeted) and quantitative(targeted) analysis of plant phytohormones, secondary metabolites, amino acids, flavonoids, lipids and small molecules with product ion library of these compounds. The system should be ideally suited for sensitive, specific and simultaneous quantification & identification/confirmation of low abundant metabolites in plants, besides being capable for analysis and quantification of secondary metabolites, lipids and small molecules. To satisfy all the functional requirements, the equipment should have the following specifications:

A. Micro LC system:

Flow rate range: Analytical gradient 5-50 ul/min or better

Maximum pressure 10,000 PSI or better

Retention time reproducibility < 0.5% RSD or better

Gradient delay volume/delay volume < 3 µL or better

Autosampler:

Sample capacity- 6 micro titer plates (96 or 384 well) or better

Syringe 100 µL or better

Injection volume range 2-80 µL or better

Injection volume precision < 1% RSD full loop or better

Carryover < 0.005% or better

Sample compartment temperature range 4 - 40º C (ambient must be 24º C or less to reach 4º C) or better

Column oven: Fits stainless steel columns up to 25 cm or better

B - Fast and High Resolution UHPLC system:

Analytical UHPLC system (Equipped with temperature controlled Auto-sampler, thermostat column compartment, Degasser).

1. Pump
    a) Binary Gradient Pump.

b) Operating flow rate range to be 0.0001 to 2.000 mL/min or higher and suitable for LC-MS/MS operation.
c) Sould have maximum operating pressure of 18000 psi or better.
d) Flow Rate Precision should be - RSD ± 0.06%
e) Capability of isocratic and gradient flow system
f) Vacuum Degasser with sufficient number of channels

2. Auto sampler:
   a) Injection volume: 0.1 µl to 50 µL or more
   b) Autosampler should be available with a capacity of minimum 90 vials or more of vials with capacity ~1.2/1.5ml vial or better capacity and compatible with 96 well plates
   c) Sample carryover < 0.0015 % or better
   d) Temperature controlled auto-sampler compartment from 4°C – 40°C
3. Column Heater:
   a) Column Oven–Room Temperature to 85 °C or better
   b) For column length 300 nm or better and minimum 2 columns or more can be accommodated
4. Columns

U-HPLC columns:

a) C18 RP column (50 mm × 4.6 mm ID, particle size <2.0 µm) - 2 nos. with guard column of the same chemistry.
b) C18 RP column (150mm x 2.1 mm ID, particle size <2.0 µm) – 1 nos. with guard column of the same chemistry.

Trap columns:

c) C18 trap column - 250 mm x 4.6 mm, 5 µm particle size - 1 nos. with guard column of the same chemistry.
d) Phenyl-Hexyl trap column (150 × 4.6 mm, 5µm particle size) – 1 nos. with guard column
e) Micro LC Column: C18 Column (300µm x 100 mm, particle size 3.0 µm or less) - 1 nos.
f) C30 carotenoid column (250 X 4.6 mm ID, 5 µm particle size)-1 nos. with guard column of the same chemistry
g) Carbohydrate and sugar column pH range 2-11 or better- 1 nos. with suitable guard column of the same chemistry.
h) HILIC column- (2.1 × 100 mm with 5 µm particle size) – 1 nos. as optional

5. Detector

Photo Diode Array Detector
Wavelength Range: 700 nm or better
Photodiodes should be 512 or more
Optical resolution: 1.4 nm or better
Linearity range: at 2 AU
Base line noise: 2x10-6
Light source: Deuterium lamp and /or Tungsten lamp with 2000 hour warranty

C- Targeted analysis (for verification and validation) –High End Triple Quad Mass Spectrometry Platform

1. Technology required: Combined Triple Quadrupole with Linear Ion Trap
2. System should have dual and interchangeable ionization source (ESI & APCI) to cater broader range of applications. The instrument ionization source housing will have a source housing hosting interchangeable APCI (Atmospheric Pressure Chemical Ionization) probe and ESI probes.
3. The source will have orthogonal spraying for improved robustness
4. The source will have two viewing ports – one large frontal and one lateral - for best performance optimization.
5. The source housing will be fully vented to eliminate contamination of lab air.

6. The source housing will be fully interlocked. All gas and power supplies to the source are automatically shut down when the housing is removed from the host system.
7. ESI & APCI source flow rate range compatibility in ESI mode will be from 5 µL/min to 2000 µL/min and APCI mode from 50 µL/min to 2000 µL/min; without flow splitting in both positive and negative mode.
8. The mass range of system should be minimum 5 -2000 amu or better
9. Resolution should be less than or equal to 0.7±0.1amu over the entire mass range in both the quadrupoles
10. Mass stability 0.1 Da over 24 hours
11. Sensitivity: MRM ESI positive mode: in MRM mode at ~ 600 m/z 1 pg on column injection at unit mass resolution, the instrument must have S/N > 500,000:1 or better.
12. Sensitivity MRM mode -negative Chloramphenicol 1 pg on column S/N > 180,000
13. APCI source in positive ionization mode, for 10 pg/uL, 5 uL fixed loop injection of a standard compound on column the instrument must have S/N > 200,000:1 or better, where the noise is defined as the standard deviation of the baseline.
14. Scan speed should be of 20,000 amu per sec or better.
15. System should have polarity switching ~5 msec in MRM or better
16. Collision cell must have MS/MS capability in Q2/MS2) to eliminate cross talk
17. Ion mobility- System should have Ion mobility as part of the module which adds the additional dimension of separation for separating the isobaric compounds/ co-eluting compounds, improve the spectra quality, to detect molecules at low level or resolve chimeric spectra.
18. Source Interface should maintain cleanliness of ion optics and capable of handling large batches of complex samples & cleaning of source should be done without venting the system.
19. The desolvation temperature will be user selectable from ambient to 650 deg celsius or better.
20. A complete compatible infusion device to be quoted with the system.
21. System should have the provision for real time monitoring of various run parameter of instruments remotely.
22. Dynamic range 6 orders of magnitude or better.
23. The system should be able to perform MS/MS or any advance scan and fragmentation mode, capability for metabolite identification
24. Mass spectrometer should have the following operating modes or scan options: Full scan, Product ion scan, Precursor ion scan, Neutral loss scan, Multiple Reaction Monitoring (MRM), Simultaneous full scan and MRM or better Detector, simultaneous negative and positive MRM scan or time period based MRM method for analysis in different polarity, MS/MS/MS or MS^3, MRM3 for complex challenging molecule, Enhanced MS Scan, Enhanced Product Ion Scan, Enhanced Resolution Scan.
25. Pre-configured method (as evident from publications and use of the equipment at plant metabolome facilities in premier plant science institutes worldwide) which is specific and sensitive for phytohormone estimation is essential.
26. Suitable independent nitrogen generators for mass spectrometer with noise free inbuilt compressor should be provided.
27. Company should provide a trained and qualified (Post graduation or higher) person for functioning and maintenance of the instrument at NIPGR (full time) for first 2 years after installation.

3. Softwares and Workstations

1. Softwares should be able to seamlessly control all the frontends mentioned above.
2. Original and licensed universal perpetual softwares and all interfacing hardware and software for instrument control, data acquisition and data processing must be supplied compatible to the LC-MS/MS system.
3. Software for targeted and untargeted metabolite screening must be provided. Software must have formula finder, automatic online database search, and fragmentation prediction tool to identify unknowns -01 nos. Additional 1 nos may be quoted as optional

4. The software allows the user to load, process and view results from their metabolomics datasets. -02 nos
5. Appropriate library of commonly occurring plant compounds/natural products and with software to build own library must be provided -01 nos. Additional 1 nos may be quoted as optional
6. Software for plant lipid analysis/Lipidomics must be provided -01 nos
7. Software should have following Functions: set predefined queries and interrogate the data for peak quality, peak ratios, and other parameters, Create and edit quantitation methods quickly and able to perform both relative and absolute quantification.
8. should have algorithm that integrates chromatographic peaks with exceptional consistency and accuracy—especially in cases of low level peaks and difficult baselines
9. Software should be able to perform the statistical analysis like PCA plot, PCVG etc.
10. Software should have visual tools to help us to understand trends within dataset and allow us to exclude outliers in data, for example xenobiotic metabolites or contaminants, before further analysis.
11. Original and licensed universal perpetual software, computers and workstations and all interfacing hardware and software for instrument control, data acquisition and data processing must be supplied compatible to the LC-MS system.
12. All databases should be upgraded free of cost during the entire warranty period of 5 years
13. The system should be quoted along with 3 independent computers for data processing -02 nos and acquisition-01nos each and printer (Heavy duty, Color and Auto duplex) -02 nos. The processing PC/workstation should have the following minimum configuration or better:

T7910 XL processor: E5-2667 v3 (8C HT, 20MB Cache, 3.2GHz Turbo); RAM: 32GB (4x8GB) 2133MHz DDR4 RDIMM ECC; 4x2TB SATA 7.2k RPM HDD; 512MB NVIDIA Quadro NVS 310 (2DP). Monitor: 27 inches; Microsoft Office: compatible version with the operating system. If the quoted computer is unable to process the total data from multiple samples, then a higher model should be provided free of cost during the warranty period.

Accessories :

1. Calibration kits system should be quoted.
2. The vendor must provide one online UPS each of 10 KV with minimum 1 hour backup along with the system.
3. Any other gas cylinder for the working of the system shall be provided minimum two numbers with all accessories, such as, regulator, gas purification panel unit, cylinder cage or bracket etc. should be supplied and commissioned during warranty period.
4. The gas lining panel work should be done by the supplier for the connection of instrument.
5. Only Principal/Manufacturer should quote.
6. All specification must be supported by the official brochures from the company.
7. Only those bids/offers with the complete specifications mentioned above will be considered.

Warranty:

1. 5 Year comprehensive warranty should be quoted for the whole instruments and parts. Comprehensive warranty should be provided by principal equipment manufacturer and for all other related accessories.
2. The system should come with PM kit per year during the warranty period.
3. Two preventive maintenances for the complete platform should be performed every year during the warranty period.
4. Instruments must be attended within 48 hr in case of any breakdown. The uptime for the facility should be 95% per year or more. Vendor should assure the availability of the spares for next 10 years from the date of installation.

<u>Optional</u>

1. CMC for additional 5 years post warranty should be optionally quoted year wise.

Corrigendum for LC-MS tender after pre-bid

1) Micro LC system: Added gradient delay volume*/delay volume*

2) Analytical U-HPLC changed flow rate from 0.0001 to *2.000 mL/min*

3) Micro LC Column: changed C18 Column (*300µm x 100 mm, particle size 3.0 µm or less*) specification

4) Deleted in Detector linearity range: <5%

5) Changed the flow rate from 3000 to 2000ul/min- ESI & APCI source flow rate range compatibility in ESI mode will be from 5 micro L/min to *2000 µL/min* and APCI mode from 50 microL/min to *2000 µL/min*; without flow splitting in both positive and negative mode.

6) The desolvation temperature changed to *650 deg celsius or better*.