

Liquid Chromatograph MS/MS Spectrometer (LC-MS/MS) – 1 No.
Doc. No: ST/12/LCMS-MS/2016-17/02

Proposed applications: The LC-MS/MS is intended to use for the qualitative and quantitative analysis of fat soluble and water soluble vitamins, polyphenols, anthocyanins, oligosaccharides, dextrans and other nutrients & nutraceuticals in food matrices.

LC-MS/MS system should have following capabilities:

1. Dual source capable of handling large batches of complex sample matrix like Agriculture products, Milk & Milk products ,grains ,cereals and food materials over a long period of time without performance degradation, cleaning of the source should be done without venting the system and facility to Vacuum Interlock.
2. Instrument should have capacity of connecting to liquid chromatographic system using 2 μm particle size columns.
3. LC-MS/MS should have suitable pre-filters for compacting ion beam, maximum ion throughput and maximum neutral removal for best signal to noise ratio.
4. Collision cells should provide advanced features to eliminate ion cross talk.
5. Software should be single powerful platform to control complete LC-MS/MS operations, calibrations, data analysis, quantification and data management etc.
6. Manual and auto tuning features should be available.
7. Should be able to carry self-test and diagnosis feature should be available.
8. Instrument should also be capable of handling solids, liquids and slurries without involving chromatographic separation and screening done directly by mass spectrometer.

SPECIFICATIONS FOR MS/MS SYSTEM:

Source

Ionization Source: ESI,APCI source, APPI and **solid analysis probe** must be provided with the instrument.

Mode of ionization

: Positive and Negative (or) dual mode

Mass analyzer:

Mass analyzer : Triple Quadrupole analyzer

Mass range : 2000m/z (or) better.

Mass stability : < 0.1 Da in 24 hours (or) better

Mass resolution : ≤ 1 Da (or) better

Scan rate : 10,000 Da /sec (or) better

Collision cell clearance : Low DWELL time of 1ms (or) better

Detector:

Detector : High efficiency Electron Multiplier/Photomultiplier.

- Detector sensitivity :1) A 50fg reserpine on column, should give chromatographic S/N greater than 7500:1 in MRM ESI+Ve or 1pg reserpine on column, S/N 150000:1 or better.
- 2) A 1pg chloramphenicol on column should give chromatographic S/N greater than 3000:1 in MRM ESI –Ve.

Linear dynamic range : Up to 10^6 (or) better.
 Scan options : Single Ion Monitor (SIM), Single Reaction Monitor (SRM), Multiple Reaction Monitor (MRM), MS/MS scan, MS & MSMS in a single run, Precursor ion scan, Product ion scan etc.

Vacuum system:

Powerful turbo molecular pump working under a mechanical vane pump with vacuum interlock.

SPECIFICATIONS FOR LIQUID CHROMATOGRAPHY SYSTEM

Degasser: On-line degasser with two ports.

Pump

Pump : Dual plunger binary gradient pump
 Flow rate : 10 μ l to 2 ml/min or better
 Pressure range : 0 to \geq 15000 psi
 Flow accuracy : \pm 1%
 Type of gradient : Linear and non-linear
 pH range : 1-10 pH

Auto sampler

Injection loop volume range : 0.5 to 40 μ l, in 0.1 μ l increment
 Capacity of sample tray : 96vials (or) more
 Temperature range : 5°C to 40°C
 Sample carryover : <0.005% or better

Column oven

Features: It must be peltier controlled Oven:

Temperature range : +10°C below ambient to 70°C or above with 1°C increments
 Temperature accuracy : \pm 2°C
 Column Oven Capacity : Two (or) more of 30 cm length.

Photodiode array detector

Wave length range : 190nm – 600nm
 Wave length accuracy : \pm 1 nm
 No. of arrays : 1024
 Flow cell volume : \leq 2.5 μ l
 Data Acquisition : \geq 80Hz
 Drift : \leq 2 mAU/hr
 Noise : \leq 10 μ AU with 4nm band width

SPECIFICATIONS FOR ACCESSORIES, CONTROL SOFTWARE AND SYSTEM.

Control software:

The software should be able to provide single platform for controlling liquid chromatography, syringe pump and mass spectrometer simultaneously as well as independent of each other, MS/MS

operations, calibrations, data analysis, quantification and data management software should have the capability for atomic calibration, auto tuning, automatic MRM data generation etc.

Computer and accessories

Latest branded PC compatible with the software and 20" LCD monitor with suitable powerful processor, 2TB Hard disk, 4GB RAM and original operating system (Original OS CD/DVD), duplex laser printer and licensed anti-virus to operate LC-MS/MS equipment through control software.

Optional:

Nano LC can be quoted separately.

Essential items:

A syringe pump option for direct infusion of samples into the MS/MS system for calibration and sample analysis. All required fused silica tubing, fittings etc. also should be included.

Essential spares such as needles, needle seats and lamps. A set of 1000 vials (~ 2 ml), flat bottom micro-inserts/volume reducers (~300 µl), screw caps and pre-slit to be quoted separately.

Installation

All accessories such as gas generators (International brand) N₂ with suitable purity and capacity for LC-MS (or) zero air generator and Helium gas cylinder, Argon (Ar) gas cylinder with suitable gauge. Any other items required to make the system complete installation should be included in the quote. Gas panel erection and complete installation of LC-MS/MS should be taken care by the supplier. Gas cylinders with test certificate from manufacturer and no objection certificate from the explosive department (Nagpur), gas pipes, ferules, fittings, gauges etc, should be included in the quote. Instrument installation kits, test reagents, test standards (reserpine, caffeine, MRFA, PPA, PEG etc.), tubing, fittings, seals, cables, vent and vanes for exhaust, solvent bottles etc. should be included in the quote. Instrument qualification (IQ), Operational qualification (OQ) and performance qualification (PQ) should be included in the quote.

Columns

Low bleed / MS grade columns with chemistries of C18, HILIC, Silica, Amide with 100 mm x 2.1 mm i.d., ≤ 2.6 µm particle size along with guard columns and cartridges, each of two numbers should be quoted.

Warranty: 3 years comprehensive warranty and 2 years non-comprehensive warranty for the LC-MS/MS system, vacuum pump, all the gas generators, computer and printer. **Tenders without this offer will not be considered.**

Electrical specification

All modules of LC, MS/MS, vacuum pump, gas generators should work at power ratings of 220 Volts and 50 Hz frequency on single phase.