LCMSMS TRIPLE QUADRUPLE SYSTEM

TECHNICAL SPECIFICATION FOR TRIPLE QUARDRUPOLE LC-MSMS SYSTEM

• A Bench top compact High Sensitive Triple Quadrupole LC MSMS system for Food Contaminant (Pesticides, Mycotoxins, antibiotics etc) reduces analysis with user friendly software to meet the food regulations FSSAI, etc. • The system sensitivity should meet Indian- MRLs and MRPLs for contaminants in food matrix. (Proof document/ application note to be enclosed along with technical tender document)	
Mass Range, amu	Minimum 5-2000 amu or better
Mass accuracy	100 ppm or better over the entire mass range
Mass Stability	0.1 Da over 24 hours
Sensitivity	Lower detection and highest sensitivity 1. MRM ESI Positive mode:1pg on column reserpine should give chromatographic S/ N greater than 5,00,000:1 or better without smoothening (Proof document/ application note to be enclosed along with technical tender document) 2. MRM ESI negative mode: 1 pg of one µl of injection of Chloramphenicol on column should give, S/N> 5,00,000:1 or better without smoothening. (Proof document / application note to be enclosed along with technical tender document)
Scan Speed	Should have the scan spped of 20,000 amu per sec or better
Source Interface	• Orthogonal off-axis spray (Electrospray) or any other equally efficient technology capable of avoiding interference from solvents and other extraneous matter. • Interface should maintain cleanliness of ion optics and capable of handling large batches of complex samples. • Capable of handling large batches of complex sample matrix like Animal feeds, Fish and fishery products, poultry and poultry products, Honey, Milk and Milk products, Agriculture products (Fruits & Vegetables) etc. over a long period of time without performance degradation • Clearing of source should be done without venting the system and facility to vacuum interlock. • Electrospray with Concentric Gas flow for Nebulization to cover flow rates from 2µl/ min to 200 µl/ min without Split/ Heating and up to1 ml with either split or heating. • Interface capable of ambient temperature operation and without complex apertures to maintain structural integrity of thermally labile and fragile molecules.

Integrated Fluidic Device (to minimize space and tubing)	• An infusion device must be integral (to minimize space and tubing) to the instrument and must be controllable from the instrument software • The system should have built in user- changeable sample vials (at least 2) to allow tuning and calibration solutions to be infused into the probe via the switching valve.
Polarity switching time	• +ve/ -ve polarity switching time between alternate MRM scans should be:20 msec with supporting documents (The better one will be given preference during technical evaluation)
Vacuum System	• Robust high efficiency vacuum system with minimum maintenance and utility with low noise level. • Vacuum read backs must be digitally monitored and controlled through software to ensure fail-safe operation in the event of power failure. • All accessories required for the proper functioning of the vacuum system should be supplied.
Quadrupoles	• High quality mechanical tolerance and minimum coefficient of thermal expansion for high standard of mass stability in varying lab temperature conditions. • Prealigned filters to ensure excellent focusing of ions into Quadrupoles for high sensitivity and better resolution. • Support to minimize the ion loses for better sensitivity in ion optics. • Neutrals and gas load are passively removed for enhanced transmission with the ions actively transferred into the ass analyzer, improving sensitivity and robustness
Collision Cell	• To allow very low dwell times allows inter channel delays (1 milliseconds or better) without sacrificing sensitivity (Proof document/ application note to be enclosed along with technical tender document) • Eliminate cross talk to enable multiple MRM studies with a single run. • Fast data collection of at least 500MRM data points per sec or better without compromising performance • MS and MS/MS or better along with matrix monitoring to be performed in single run (Technical document should be provided for technical evaluation)
Gas Control	• All gases must be controlled by the software
Dynamic range	• 6 orders of magnitude or better
Operating modes	Mass spectrometer should have the following scan options

	• Full Scan • Selected Ion monitoring/ recording (SIM/ SIR) • Product ion scan • Precursor ion scan • Neutral loss scan • Multiple Reaction Monitoring (MRM) • MS and MS/MS in a single injection with matrix background monitoring (Proof document/ application note to be enclosed along with technical tender document with onsite verification) • Simultaneous full scan and MRM or better
Nitrogen Generator	• Should be supplied with the system along with the trouble free inbuilt compressor and appropriate capacity reservoir which should be sufficient enough to deliver the gases (purity> 99.999%) required to run the system • Should be complete with all necessary accessories with Two Years comprehensive warranty with at least one Preventive maintenance along with PM kit each year and Five years CAMC after the warranty period including all spares, accessories and consumables, at least one Preventive maintenance along with PM kit each year and unlimited breakdown visits.
Computer and Operating System	• Suitable branded Personnel Computer, i7 or advanced processor with 12 GB DDR 3 Meory, Upto 1 TB SATA hard drive (7200 RPM) or better for software requirements of LC-MSMS or better or equivalent latest one. Compatible for operation of LCMSMC instrument. • DVD-RW 24" LED Monitor with suitable authorized operating system, 4 USB port or higher configuration. Original licensed software CD of Operating System and MS Office (MS-WORD, MS-EXCEL, MS-POWERPOINT). • Reputed branded heavy duty Laser jet printer has to be provided • Should be complete with all necessary accessories with comprehensive • Warranty of minimum 5 years of all the electronic components as well as wear and tear consumables (PC, Hard Drive, Printer, etc.)
Computer platform software and operating system	• Software must be Multitasking type. It must acquire and process the data simultaneously. • 21 CFR & food safety compliance (Part 11 may be quoted optional) • Must be capable of performing the following functions and should be upgradable: ○ Workstation must be able to control the MS, acqire,

	store, process and reproduce the data by the same computer o Workstation must be able to control LC, Detector and auto sampler o It must be able to regulate the gas pressure and flow during the data acquisition and append to the relevant data file. o Software must have automated calibration and Quantitative optimization. o Automated MS to MS/MS switching during a single run with user selectable criteria o Perform alternating positive/ negative scans in one run o Automated Quantization and reporting of acquired samples. o Data may be processed as it is being acquired o Software is required to be updated whenever updation is reflected in original software.
Data processing software	• Application software for Quantification applications having the additional requirement of Quality Control (QC) checks to satisfy the statutory or regulatory requirements must be available. • Application manager must allow to monitor the molecular ion and up to 04 (four) confirmatory ions or better • Application software must flag samples in a single Quantification window when minimum of the following observations are attained (Proof document/ application note to be enclosed along with technical tender document): 1. Ion ratios fall out with the user-defined values 2. QC samples fall outside a user defined number of standard deviations from the mean 3. The concentration falls below / above the recovery % level (user input) 4. Peak of the compound of interest falls below user defined S/N ratio 5. Retention times fall out with the user-defined values 6. The coefficient of determination for a calibration curve falls below a user-set level 7. Software should have capability to plot the analysis trend of QC/ regulatory samples defined by user defined values. • Application Software should have the database of Contaminants (Antibiotic residues, veterinary drugs residue, Aminoglycodies, macrolides, Dyes, Mycotoxins, Vitamins, Pesticides, etc.) pertaining to the following: 1. Molecular formula 2. Mono isotopic mass

	3. Parent ion I 4. Collision energy (eV) 5. Product ion II 6. RT 7. Sensitivity 8. MRM match with standard database Technology for the system optimization and status monitoring, performing the following parameters: • System parameters checks and alerts • Integrated Sample/ callibrant delivery system and programmable divert valve • Automated mass calibration • Automated Sample tuning • Automated SIR and MRM method Development • MS and MS/MS in a single run • Software should have the latest library database of around 1000 compounds viz.(Antibiotic residurs, veterinary drugs residue, Aminoglycosides, macrolides, Dyes, Mycotoxins, Vitamins, Pesticides, etc.)
HIGH PERFORMANCE LIQUID CHROMATOGRAPHY SYSTEM	
• Binary solvent system with degasser, Auto sampler, Column oven • The complete system and the MS should be controlled by the single software • The system should have the capability to operate the column range from sub 2 µm particle size • Total system (including pump and auto sampler) should be capable of operation at 18000psi	
Pump	• Binary pumps, capable of switching between four solvents capable of operation 15000 psi or better • Vacuum Degassing Capability • Operating flow range: 0.010-2.0ml/ min with 0.01ml increments • Effective system dead volume<400µl, independent of system back pressure • Plunger seal wash integral, active, programmable • Gradient profiles • Composition accuracy :±0.5% • Composition precision:0.15% RSD or better or ±0.04 min SD whichever is greater, based on retention time. • Flow Accuracy :±1.0% • Flow precision: 0.075% RSD
Auto sampler	• Number of sample plates: Two; Vial plate 1.5ml to 2 ml vials • Number of sample injection: 1-90 or better • Injection volume range: 0.5- 50µl in 0.1 µl increments with

	partial or full loop mode • 50µl loop one with the system and one spare shall be provided with other necessary accessories required for injection • Sample delivery precision:<0.3% RSD or better • Injector linearity : r2>0.999 or better • Sample temperature:4-40^{0}C • Sample carry over <0.005% or better
Column oven	• Column oven to accommodate at least Two columns or better 15 cm length. It should have leak sensor and high temperature cut off facility • Column temperature control 5 deg C above ambient to 60 deg C • Column Tracking & Storage Device should be provided
UPS and other	• A branded UPS System with SMF Batteries, of appropriate capacity (minimum 15 KVA) and input/ output phases as per requirement of the LC MS/MS system, capable of providing a backup time of minimum 2 hours, with comprehensive warranty of minimum 5 years inclusive of SMF or latest • Pre requisite for MS: Any other gas cylinder for the working of the system shall be provided minimum one number with all accessories such as regulator, gas purification panel unit, cylinder cage or bracket etc should be supplied and commissioned. The gas lining panel work should be done by the supplier for the connection of instrument. • All the items cylinder, regulator, gas purification panel unit, cylinder cage or Bracket etc should be covered under Two years comprehensive warranty with at least one preventive maintenance along with PM kit each year and Five years CAMC after the warranty period including all spare, accessories and consumable, at least one preventive maintenance along with PM kit each year and unlimited breakdown visits.
Installation and Demonstration	• IQ/ QC/PQ to be performed as per IEM protocol, should be done free of cost with necessary traceable standards along with necessary performance kit standard solutions. • Documents, Kits & Standards etc as required being supply along with the instrument. • Demonstration and Training on system to our Lab personal at site to be incorporated, responsibility of the supplier for training of the lab personnel at supplier site/ installation site • The instrument supplier has to demonstrate on site validation of chilly matrix with carbandazime and

	hexaconazole at 2ppb level and as per the laboratory/ regulatory requirements/ protocols at least for four parameters, as selected/ preferred by the lab. • Basic training for a period of not less than two weeks after installation & commissioning of the equipment to technical personnel at one technical personnel training at Factory site of the supplier • Trouble shooting training along with Application support for developing validating and at least one polar parameter or selected by the lab.
Spares and accessories	• LC-MS/MS startup kit should be supplied as standard • All required standards for Mass calibration and tuning, HPLC calibration should be provided • Columns-C 18-100 x 2.1mm, 3 sub microne- 5 nos. • Columns-C 18-100 x 2.1mm, 2 sub microne- 5 nos • Vial with cap (1.5 ml)- 5000nos. • Capillary- 2 nos. • Auto samples syringe- 2, Vacuum pump oil and any other material required to made the instrument functional should be provided • Standard Tool kit should be provided for Instrument maintenance • Reputed highly branded solvent filtration unit with pump and required accessories- 02 nos.
After sales service	• Should have a good after sales service/ technical support capable of reaching at short notice the places where LC-MS/MS is proposed to be installed, visits and unlimited breakdown calls by service/ application support, engineers should attend immediately without fail. • Trouble shooting training (Instrumentation/ application) as and when required free of cost • The vendor should also assure supply of spares, accessories, consumables and service for at least 10 years including Nitrogen generator.
Warranty and AMC	• Three years comprehensive warranty with at least one preventive maintenance along with PM kit each year with OQ/ PQ from the date of completion of installation, training & validation to the satisfaction of respective labs. • Five years CAMC after the warranty period including all spare, accessories and consumables, at least one preventive maintenance along with PM kit & OQ/PQ each year and unlimited breakdown visits. • It should cover hardware, software as well as wear and tear consumables (except column and sample preparation), prompt service (within 24 hours on-call), training and

	application support during the period.
General conditions of supply	• The instrument and all its sub units should operate on 240 volts 50 Hz power supply • All the operation and maintenance manuals, circuit diagrams, application notes and application softwares supplied should be in English language. • In case of breakdown of the system, the servicing to be done immediately by the supplier during the warranty period and maximum down tome period is 24 hrs, if its not attend the warranty will extends accordingly.
Delivery	• The instrument supplied to the site of address provided. If an permit such as road permit/ way bill, customs/ excise duty, octroi etc. if any all should be borne b the supplier. If any documents required for the above purpose the office may consider to provide on request prior intimation
Experience	• The supplier should have experience of at least 10 installations or more and 5 installations from food testing lab in India handling Statutory and export samples using LCMSMS.