INDIAN INSTITUTE OF TECHNOLOGY KANPUR
DEPARTMENT OF CHEMICAL ENGINEERING
PG Research Lab
STANDARD OPERATING PROCEDURE
ICP-MS

1. Startup Procedure

1.1 Switch on the blower. Now let it run for 20 minutes with open pipe.

1.2 After 20 minutes, connect the blower suction pipe to the instrument.

1.3 Switch on the ICPMS back switch.

1.4 Switch on the ICPMS front switch.

1.5 After 2 minutes, switch on the computer.

1.6 Open the Masshunter software.

1.7 Click on the hardware symbol on the upper left corner and turn on the vacuum.

1.8 Now wait for 3hrs until TMP-100% is reached.

2. Batch Making Procedure

2.1 Click on ☐ **File** ☐ **New batch folde**r ☐ User name ☐ **Present method** ☐ Select **Generic method** ☐ **General purpose** ☐ **Ok** ☐ File batch name ☐ **Create batch** ☐ New batch is created.

2.2 **Acquisition methods** ☐ **Tune** ☐ Only **No Gas** selected. Rest all deleted.

2.3 **Peripump** ☐ No change

2.4 **Acquisition parameter** ☐ Right Click ☐ **Select elements** ☐ **Clear all** (Periodic Table) ☐ **Correct Equation** (Isotope Uncheck) ☐ Now select elements ☐ **Ok**

2.5 **Data analysis method** ☐ **Basic Information** ☐ Uncheck **Semi quant Analysis**.

2.6 **Analyte** ☐ Right click ☐ **Delete** ☐ Right click ☐ **Load list from acquisition methods**.

2.7 **Full quant** ☐ Fill **Units** as ppb ☐ Fill standards as follows: -

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6

0	100	200	300	400	500

2.8 Sample List ☐ Put Levels as follows: -

Sample Type	Sample Name	Level
Calblk	Blank	Level 1
CalStd	100	Level 2
CalStd	200	Level 3
CalStd	300	Level 4
CalStd	400	Level 5
CalStd	500	Level 6
Sample	Blank	
Sample	S1	
Sample	S2	
And so on		
Last Sample	Blank	

2.9 Now **Validate Method** ☐ If no Error found then ☐ Save Batch.

3   Maintenance

3.1 Maintenance should be done before and after the run.

3.2 Maintenance after the run should be done with 2% Nitric acid solution for cleaning of the machine. If Maintenance of the machine in last run is done with 2% nitric acid solution, the maintenance before run can be done with Millipore

water (but it is recommended that it should be done with 2% Nitric acid solution).

3.3 Go to the top left option of the screen and click on the **Hardware** ☐ **Sample Introduction** ☐ **Maintenance.**

3.4 Tight the tubes in the peristaltic pump.

3.5 Put the open end of the tube in the Millipore Water.

3.6 In maintenance dialogue box, put these values:

Argon valve	Open
Plasma Gas	15
Auxiliary Gas	1
Carrier Gas	1
Dilution Gas	0.5
Nebulizer RPM	0.3

3.7 Press Enter and run for 20 minutes.

3.8 Close after 20 minutes.

4 Analysis

4.1 Switch on the chiller.

4.2 Make sure that the Argon Gas Cylinder in the Gas Cabinet downstairs has been turned on.

4.3 Switch on the toggle valve of Argon gas.

4.4 Go to the **Plasma** Icon on the screen and click on the **Plasma on** option.

4.5 Open batch that we want to run.

4.6 Click on **Add batch to Queue** and delete all the unwanted batches.

4.7 Warm-up will be done on Millipore water and a timer of 10 minutes will start.

4.8 When 2 minutes are remaining, then put the end of the tube in the tuning solution.

4.9 After this Sample, Rinse & Rinse1 should be done in the same tuning solution. Take screen shot of tuning counts during this & save it as JPEG file.

4.10   Program will ask of blank sample, then put the tube end in the Millipore water.

4.11   Now continue the analysis in blank.

4.12   Rinse & Rinse1 should be dining with 2% Nitric acid solution between the samples.

4.13   During running of samples, press on the **Process Batch** Option to save the data.

4.14   After run, click on **Process Batch** □ Press **Ok** □ After Process Batch data □ **Plasma Off**□ Switch off the Chiller.

4.15   Execute the after run maintenance for 10 minutes using 2% Nitric acid solution & 10 minutes using Millipore water.

4.16   Close the Maintenance dialogue box.

4.17   Press Vacuum off & wait for until TMP-0.6% is reached (ICP-MS light start blinking).

4.18   Release peristaltic pump tubes.

4.19   Switch off the toggle valve for Argon gas.

4.20   Switch off the front & back switch of ICP-MS.

4.21   After 15 minutes, remove the fume hood & cover with Foil.

4.22   Close the software & shutdown the desktop.

4.23   Switch off the Blower.