

Metabolomics Workbench
mwTab file format specification
2/5/2019

First 3 lines of mwTab file

Line1: **#METABOLOMICS WORKBENCH**

NMDR-curated studies have additional STUDY_ID and ANALYSIS_ID identifiers

Line2: **VERSION<13 spaces><TAB>VERSION NUMBER**

Line3: **CREATED_ON<10 spaces><TAB>DATE in YYYY-MM-DD format**

Lines 2 and 3 are 20 characters wide up to the TAB

```
#METABOLOMICS · WORKBENCH · STUDY_ID:ST000001 · ANALYSIS_ID:AN000001↓  
VERSION · . . . . . 1↓  
CREATED_ON · . . . . . 2016-09-17↓  
#PROJECT↓  
PR:PROJECT_TITLE · . . . . . FatB · Gene · Project↓  
PR:PROJECT_TYPE · . . . . . Genotype · treatment↓  
PR:PROJECT_TITLE · . . . . . FatB · Gene · Project↓  
PR:PROJECT_TYPE · . . . . . Genotype · treatment↓
```

Project block

#PROJECT

The project block starts with #PROJECT followed by an end-of-line (no spaces, tabs or other characters)

Subsequent lines start with PR: followed by the project metadata item name, for example PR:PROJECT_TITLE The character width before the Tab is 33 characters.

Each metadata item value is placed after the Tab, for example FatB Gene Project

The maximum character width after the Tab is 80 characters. If the metadata item value exceeds 80 characters it is displayed on multiple lines (without using hyphenation), each starting with the same metadata item name, for example:

```
PR:PROJECT_SUMMARY      Experiment to test the consequence of a mutation at the FatB gene (At1g08510)
PR:PROJECT_SUMMARY      the wound-response of Arabidopsis
```

```
PR:PROJECT_TITLE      FatB Gene Project
PR:PROJECT_TYPE       Genotype treatment
PR:PROJECT_SUMMARY    Experiment to test the consequence of a mutation at the FatB gene (At1g08510)
PR:PROJECT_SUMMARY    the wound-response of Arabidopsis
PR:INSTITUTE          University of California, Davis
PR:DEPARTMENT         Davis Genome Center
PR:LABORATORY         Fiehn
PR:LAST_NAME          Fiehn
PR:FIRST_NAME         Oliver
PR:ADDRESS            451 E. Health Sci. Drive, Davis, CA, 95616, USA
PR:EMAIL              ofiehn@ucdavis.edu
PR:PHONE              -
PR:PUBLICATIONS       Quality control for plant metabolomics: reporting MSI-compliant studies.
PR:PUBLICATIONS       http://www.ncbi.nlm.nih.gov/pubmed/18269577 (PubMed)
```

Study block

#STUDY

The project block starts with #STUDY followed by an end-of-line (no spaces, tabs or other characters)

Subsequent lines start with ST: followed by the study metadata item name, for example ST:STUDY_TITLE The character width before the Tab is 33 characters.

Each metadata item value is placed after the Tab, for example Fatb Induction Experiment (FatBIE)

The maximum character width after the Tab is 80 characters. If the metadata item value exceeds 80 characters it is displayed on multiple lines, each starting with the same metadata item name, for example:

ST:STUDY_SUMMARY
ST:STUDY_SUMMARY

This experiment tests the consequence of a mutation at the FatB gene in the wound-response of Arabidopsis. The FatB mutant allele (fatb KD J.

```
#STUDY
ST:STUDY_TITLE      Fatb Induction Experiment (FatBIE)
ST:STUDY_TYPE       Genotype treatment
ST:STUDY_SUMMARY    This experiment tests the consequence of a mutation at the FatB gene
ST:STUDY_SUMMARY    in the wound-response of Arabidopsis. The FatB mutant allele (fatb KD J.
ST:STUDY_SUMMARY    (Plant Cell 2003, Vol 15, 1020-1033)) was obtained from Dr. Katayonn Dehesh,
ST:STUDY_SUMMARY    of California, Davis, Davis, CA. This allele is in the Ws background.The
ST:STUDY_SUMMARY    growth conditions are as follows: 1. Seeds (between 14 and 16) are sown on
ST:STUDY_SUMMARY    in 100 x 100 x 15mm square Falcon Petri Dishes (Fisher Scientific, catalogue
ST:STUDY_SUMMARY    Seeds were arranged on the plates in a single horizontal line at the 1-cm mark
ST:STUDY_SUMMARY    the top of the plate.2. Each plate contains between 20 and 25-ml of sterile MS
ST:STUDY_SUMMARY    containing 0.1% (w/v) sucrose.3. Prior to sowing, seeds were sterilized by
ST:STUDY_SUMMARY    for 1 minute at room temperature with a 300-1 solution of 50% (v/v) ethanol.
ST:STUDY_SUMMARY    solution was removed and replaced with a 300-1 solution consisting of 1% (v/v)
ST:STUDY_SUMMARY    20 (Fischer BioReagents, catalogue #BP33750), and 50% (v/v) bleach solution
ST:STUDY_SUMMARY    and incubated at room temperature for 10-minutes. The seeds were then washed
ST:STUDY_SUMMARY    three changes of 0.3-ml of sterile water.
ST:INSTITUTE        University of California, Davis
ST:DEPARTMENT       Davis Genome Center
ST:LABORATORY       Fiehn
ST:LAST_NAME        Kind
ST:FIRST_NAME       Tobias
ST:ADDRESS           451 E. Health Sci. Drive, Davis, CA 95616, USA
ST:EMAIL            tkind@ucdavis.edu
ST:PHONE            -
ST:SUBMIT_DATE      2013-01-15
ST:NUM_GROUPS       4
ST:TOTAL_SUBJECTS   24
```

Study design (SUBJECT_SAMPLE_FACTORS) block

The study design block starts with

#SUBJECT_SAMPLE_FACTORS: **SUBJECT(optional)[tab]SAMPLE[tab]FACTORS(NAME:VALUE pairs separated by |)[tab]Additional sample data**

Subsequent lines start with **#SUBJECT_SAMPLE_FACTORS <11 spaces>** (total of 33 characters in first tab-delimited column)

The 2nd column contains an optional subject identifier for that sample. If no subject identifiers are entered, use a dash (-) in this column.

The 3rd column contains a mandatory sample identifier (e.g. **LabF_115873**)

The 4th column contains 1 or more NAME/VALUE pairs of experimental factors (conditions) separated by a pipe (|) symbol with a space on either side. The NAME/VALUE items are separated by a colon (:). For example, if the experimental factors are Arabidopsis Genotype and Plant Wounding Treatment, a properly formatted entry would be:

Arabidopsis Genotype:Wassilewskija (Ws) | Plant Wounding Treatment:Control - Non-Wounded

Sample metadata which varies for every sample or most samples (such as age or BMI) is typically unsuitable for experimental factor designation because it results in too many sample groups, making statistical analysis difficult or impossible. These data should be instead be placed in the 5th column.

The 5th column contains optional additional metadata pertinent to each sample with NAME/VALUE pairs separated by a semicolon and a space (;). The NAME/VALUE items are separated by an 'equal' sign(=). For example,

Age=47; BMI=28.4

If no additional metadata are entered, leave this column blank.

#SUBJECT_SAMPLE_FACTORS:	SUBJECT(optional)	SAMPLE	FACTORS(NAME:VALUE pairs separated by)	Additional sample data
SUBJECT_SAMPLE_FACTORS	--	LabF_115873	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115878	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115883	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115888	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115893	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115898	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115811	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115816	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115821	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115826	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115831	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115836	Arabidopsis Genotype:Wassilewskija (Ws) Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115904	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115909	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115914	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115919	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115924	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115929	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Control - Non-Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115842	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115847	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115852	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115857	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115862	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Wounded	
SUBJECT_SAMPLE_FACTORS	--	LabF_115867	Arabidopsis Genotype:fatb-ko KD; At1g08510 Plant Wounding Treatment:Wounded	

SUBJECT, COLLECTION, TREATMENT, SAMPLEPREP, CHROMATOGRAPHY, ANALYSIS ,MS, NMR blocks

The formatting rules for these blocks are the same as for the Project and Study blocks. Each type of block starts with the block name preceded by # and followed by an end-of-line (no spaces, tabs or other characters), e.g:

#SUBJECT

Each subsequent line must start with the appropriate 2-letter identifier followed by a colon:

SUBJECT: SU:

COLLECTION: CO:

TREATMENT: TR:

SAMPLEPREP: SP:

CHROMATOGRAPHY: CH:

ANALYSIS: AN:

MS: MS:

NMR: NM:

In the case of MS analyses, there will be no NMR block. In the case of NMR analyses there will (typically) be no CHROMATOGRAPHY block and no MS block.

```
#MS ↓
MS:INSTRUMENT_NAME ..... Leco Pegasus III GC-TOF ↓
MS:INSTRUMENT_TYPE ..... GC-TOF ↓
MS:MS_TYPE ..... EI ↓
MS:ION_MODE ..... POSITIVE ↓
```

MS data (results) block

The MS data block starts with `#MS_METABOLITE_DATA` followed by an end-of-line (no spaces, tabs or other characters)

The 2nd line starts with `MS_METABOLITE_DATA:UNITS<Tab>` followed by the (mandatory) units type, e.g.:

`MS_METABOLITE_DATA:UNITS` `peak area`

The start of the results section is designated by `MS_METABOLITE_DATA_START` followed by an end-of-line (no spaces, tabs or other characters) and end of the MS results block is designated by `MS_METABOLITE_DATA_END` followed by an end-of-line (no spaces, tabs or other characters)

The 1st line after `MS_METABOLITE_DATA_START` must contain the sample identifiers which should be identical to those given in the Study design section. The 1st column of this line contains the word “`Samples`” and subsequent columns contain the sample identifiers.

The 2nd line optionally contains the name/value pairs of the corresponding experimental factors specified in the Study design section, with the word “`Factors`” in the 1st column. This line may be omitted.

Subsequent lines contain the results with the unique metabolite (feature) name in the 1st column followed by measurements for each listed sample.

```
#MS_METABOLITE_DATA↓
MS_METABOLITE_DATA:UNITS>                      peak area↓
MS_METABOLITE_DATA_START↓
Samples>LabF_115904>      LabF_115909>      LabF_115914>      LabF_115919>      LabF_115924>
Factors>Arabidopsis·Genotype:fatb-ko·KD;·At1g08510·|·Plant·Wounding·Treatment:Conti
1_2_4-benzenetriol>      1874.0000>      3566.0000>      1945.0000>      1456.0000>
1-monostearin>      987.0000>      450.0000>      1910.0000>      549.0000>      103
2-hydroxyvaleric acid>      771.0000>      931.0000>      1114.0000>      509.0000>
...↓
MS_METABOLITE_DATA_END↓
```

MS metabolite metadata block

The MS metabolite metadata block starts with **#METABOLITES** followed by an end-of-line (no spaces, tabs or other characters)

The start of the metabolite metadata section is designated by **METABOLITES_START** followed by an end-of-line (no spaces, tabs or other characters) and end is designated by **METABOLITES_END** followed by an end-of-line (no spaces, tabs or other characters)

The 1st line after **METABOLITES_START** must contain metabolite metadata headings. The first column of this line contains the word “**metabolite_name**”. The metabolite metadata headings may be specified by submitter. Typically these may include m/z, quantitated m/z, retention time, retention index, PubChem compound ID, InChiKey, etc.

Subsequent lines contain the metabolite metadata with the unique metabolite (feature) name in the 1st column followed by values for each listed heading. Metabolite (feature) names must exactly match those listed in the previous MS_METABOLITE_DATA block.

If no metabolite metadata is being supplied, this section must contain the metabolite (feature) names in the 1st column (and no other columns)

```
#METABOLITES↓
METABOLITES_START↓
metabolite_name> moverz_quant> retention_index> pubchem_id↓
1,2,4-benzenetriol> 239> 522741> 10787↓
1-monostearin> 399> 959625> 107036↓
2-hydroxyvaleric acid> 131> 310750> 98009↓
3-phosphoglycerate> 299> 611619> 724↓
...↓
METABOLITES_END
```


NMR binned data block

The NMR binned data block starts with `#NMR_BINNED_DATA` followed by an end-of-line (no spaces, tabs or other characters)

The start of the results section is designated by `NMR_BINNED_DATA_START` followed by an end-of-line (no spaces, tabs or other characters) and end of the results block is designated by `NMR_BINNED_DATA_END` followed by an end-of-line (no spaces, tabs or other characters)

The 1st line after `NMR_BINNED_DATA_START` must contain the sample identifiers which should be identical to those given in the Study design section. The 1st column of this line contains the word “`Bin range(ppm)`” and subsequent columns contain the sample identifiers.

Subsequent lines contain the results with the bin range in the 1st column followed by measurements for each listed sample. The 2 values in each bin range are separated by 3 periods (...)

```
#NMR_BINNED_DATA
NMR_BINNED_DATA_START
Bin range(ppm) s01 s02 s03 s04 s05
0.50...0.54 -0.2341 -0.1662 -0.1521 -0.2534 -0.2836
0.54...0.58 -0.2993 -0.2433 -0.2548 -0.2315 -0.1850
0.58...0.62 -0.1697 -0.0500 -0.0600 -0.2042 -0.3757
...
NMR_BINNED_DATA_END
```

Project fields

PR:PROJECT_TITLE
PR:PROJECT_TYPE
PR:PROJECT_SUMMARY
PR:INSTITUTE
PR:DEPARTMENT
PR:LABORATORY
PR:LAST_NAME
PR:FIRST_NAME
PR:ADDRESS
PR:EMAIL
PR:PHONE
PR:FUNDING_SOURCE
PR:PROJECT_COMMENTS
PR:PUBLICATIONS
PR:CONTRIBUTORS
PR:DOI (added by NMDR only)

(required fields in red)

Study fields

ST:STUDY_TITLE
ST:STUDY_TYPE
ST:STUDY_SUMMARY
ST:INSTITUTE
ST:DEPARTMENT
ST:LABORATORY
ST:LAST_NAME
ST:FIRST_NAME
ST:ADDRESS
ST:EMAIL
ST:PHONE
ST:NUM_GROUPS
ST:TOTAL_SUBJECTS
ST:NUM_MALES
ST:NUM_FEMALES
ST:STUDY_COMMENTS
ST:PUBLICATIONS

(required fields in red)

Subject fields

SU:SUBJECT_TYPE

SU:SUBJECT_SPECIES

SU:TAXONOMY_ID

SU:GENOTYPE_STRAIN

SU:AGE_OR_AGE_RANGE

SU:WEIGHT_OR_WEIGHT_RANGE

SU:HEIGHT_OR_HEIGHT_RANGE

SU:GENDER

SU:HUMAN_RACE

SU:HUMAN_ETHNICITY

SU:HUMAN_TRIAL_TYPE

SU:HUMAN_LIFESTYLE_FACTORS

SU:HUMAN_MEDICATIONS

SU:HUMAN_PRESCRIPTION_OTC

SU:HUMAN_SMOKING_STATUS

SU:HUMAN_ALCOHOL_DRUG_USE

SU:HUMAN_NUTRITION

SU:HUMAN_INCLUSION_CRITERIA

SU:HUMAN_EXCLUSION_CRITERIA

SU:ANIMAL_ANIMAL_SUPPLIER

SU:ANIMAL_HOUSING

SU:ANIMAL_LIGHT_CYCLE

SU:ANIMAL_FEED

SU:ANIMAL_WATER

SU:ANIMAL_INCLUSION_CRITERIA

SU:CELL_BIOSOURCE_OR_SUPPLIER

SU:CELL_STRAIN_DETAILS

SU:SUBJECT_COMMENTS

SU:CELL_PRIMARY_IMMORTALIZED

SU:CELL_PASSAGE_NUMBER

SU:CELL_COUNTS

SU:SPECIES_GROUP

(required fields in red)

Collection fields

CO:COLLECTION_SUMMARY

CO:COLLECTION_PROTOCOL_ID

CO:COLLECTION_PROTOCOL_FILENAME

CO:COLLECTION_PROTOCOL_COMMENTS

CO:SAMPLE_TYPE

CO:COLLECTION_METHOD

CO:COLLECTION_LOCATION

CO:COLLECTION_FREQUENCY

CO:COLLECTION_DURATION

CO:COLLECTION_TIME

CO:VOLUMEORAMOUNT_COLLECTED

CO:STORAGE_CONDITIONS

CO:COLLECTION_VIALS

CO:STORAGE_VIALS

CO:COLLECTION_TUBE_TEMP

CO:ADDITIVES

CO:BLOOD_SERUM_OR_PLASMA

CO:TISSUE_CELL_IDENTIFICATION

CO:TISSUE_CELL_QUANTITY_TAKEN

(required fields in red)

Treatment fields

TR:TREATMENT_SUMMARY

TR:TREATMENT_PROTOCOL_ID
TR:TREATMENT_PROTOCOL_FILENAME
TR:TREATMENT_PROTOCOL_COMMENTS
TR:TREATMENT
TR:TREATMENT_COMPOUND
TR:TREATMENT_ROUTE
TR:TREATMENT_DOSE
TR:TREATMENT_DOSEVOLUME
TR:TREATMENT_DOSEDURATION
TR:TREATMENT_VEHICLE
TR:ANIMAL_VET_TREATMENTS
TR:ANIMAL_ANESTHESIA
TR:ANIMAL_ACCLIMATION_DURATION
TR:ANIMAL_FASTING
TR:ANIMAL_ENDP_EUTHANASIA
TR:ANIMAL_ENDP_TISSUE_COLL_LIST
TR:ANIMAL_ENDP_TISSUE_PROC_METHOD
TR:ANIMAL_ENDP_CLINICAL_SIGNS

TR:HUMAN_FASTING
TR:HUMAN_ENDP_CLINICAL_SIGNS
TR:CELL_STORAGE
TR:CELL_GROWTH_CONTAINER
TR:CELL_GROWTH_CONFIG
TR:CELL_GROWTH_RATE
TR:CELL_INOC_PROC
TR:CELL_MEDIA
TR:CELL_ENVIR_COND
TR:CELL_HARVESTING
TR:PLANT_GROWTH_SUPPORT
TR:PLANT_GROWTH_LOCATION
TR:PLANT_PLOT_DESIGN
TR:PLANT_LIGHT_PERIOD
TR:PLANT_HUMIDITY
TR:PLANT_TEMP
TR:PLANT_WATERING_REGIME
TR:PLANT_NUTRITIONAL_REGIME
TR:PLANT_ESTAB_DATE

TR:PLANT_HARVEST_DATE
TR:PLANT_GROWTH_STAGE
TR:PLANT_METAB_QUENCH_METHOD
TR:PLANT_HARVEST_METHOD
TR:PLANT_STORAGE
TR:CELL_PCT_CONFLUENCE
TR:CELL_MEDIA_LASTCHANGED

(required fields in red)

Sampleprep fields

SP:SAMPLEPREP_SUMMARY

SP:SAMPLEPREP_PROTOCOL_ID
SP:SAMPLEPREP_PROTOCOL_FILENAME
SP:SAMPLEPREP_PROTOCOL_COMMENTS
SP:PROCESSING_METHOD
SP:PROCESSING_STORAGE_CONDITIONS
SP:EXTRACTION_METHOD
SP:EXTRACT_CONCENTRATION_DILUTION
SP:EXTRACT_ENRICHMENT
SP:EXTRACT_CLEANUP
SP:EXTRACT_STORAGE
SP:SAMPLE_RESUSPENSION
SP:SAMPLE_DERIVATIZATION
SP:SAMPLE_SPIKING
SP:ORGAN
SP:ORGAN_SPECIFICATION
SP:CELL_TYPE
SP:SUBCELLULAR_LOCATION

(required fields in red)

Chromatography fields

CH:CHROMATOGRAPHY_SUMMARY

CH:CHROMATOGRAPHY_TYPE

CH:INSTRUMENT_NAME

CH:COLUMN_NAME

CH:FLOW_GRADIENT

CH:FLOW_RATE

CH:COLUMN_TEMPERATURE

CH:METHODS_FILENAME

CH:SOLVENT_A

CH:SOLVENT_B

CH:METHODS_ID

CH:COLUMN_PRESSURE

CH:INJECTION_TEMPERATURE

CH:INTERNAL_STANDARD

CH:INTERNAL_STANDARD_MT

CH:RETENTION_INDEX

CH:RETENTION_TIME

CH:SAMPLE_INJECTION

CH:SAMPLING_CONE

CH:ANALYTICAL_TIME

CH:CAPILLARY_VOLTAGE

CH:MIGRATION_TIME

CH:OVEN_TEMPERATURE

CH:PRECONDITIONING

CH:RUNNING_BUFFER

CH:RUNNING_VOLTAGE

CH:SHEATH_LIQUID

CH:TIME_PROGRAM

CH:TRANSFERLINE_TEMPERATURE

CH:WASHING_BUFFER

CH:WEAK_WASH_SOLVENT_NAME

CH:WEAK_WASH_VOLUME

CH:STRONG_WASH_SOLVENT_NAME

CH:STRONG_WASH_VOLUME

CH:TARGET_SAMPLE_TEMPERATURE

CH:SAMPLE_LOOP_SIZE

CH:SAMPLE_SYRINGE_SIZE

CH:RANDOMIZATION_ORDER

CH:CHROMATOGRAPHY_COMMENTS

(required fields in red)

Analysis fields

AN:ANALYSIS_TYPE

AN:LABORATORY_NAME

AN:OPERATOR_NAME

AN:DETECTOR_TYPE

AN:SOFTWARE_VERSION

AN:ACQUISITION_DATE

AN:ANALYSIS_PROTOCOL_FILE

AN:ACQUISITION_PARAMETERS_FILE

AN:PROCESSING_PARAMETERS_FILE

AN:DATA_FORMAT

(required fields in red)

MS fields

MS:INSTRUMENT_NAME

MS:INSTRUMENT_TYPE

MS:MS_TYPE

MS:ION_MODE

MS:MS_COMMENTS

MS:CAPILLARY_TEMPERATURE

MS:CAPILLARY_VOLTAGE

MS:COLLISION_ENERGY

MS:COLLISION_GAS

MS:DRY_GAS_FLOW

MS:DRY_GAS_TEMP

MS:FRAGMENT_VOLTAGE

MS:FRAGMENTATION_METHOD

MS:GAS_PRESSURE

MS:HELIUM_FLOW

MS:ION_SOURCE_TEMPERATURE

MS:ION_SPRAY_VOLTAGE

MS:IONIZATION

MS:IONIZATION_ENERGY

MS:IONIZATION_POTENTIAL

MS:MASS_ACCURACY

MS:PRECURSOR_TYPE

MS:REAGENT_GAS

MS:SOURCE_TEMPERATURE

MS:SPRAY_VOLTAGE

MS:ACTIVATION_PARAMETER

MS:ACTIVATION_TIME

MS:ATOM_GUN_CURRENT

MS:AUTOMATIC_GAIN_CONTROL

MS:BOMBARDMENT

MS:CDL_SIDE_OCTOPOLES_BIAS_VOLTAGE

MS:CDL_TEMPERATURE

MS:DATAFORMAT

MS:DESOLVATION_GAS_FLOW

MS:DESOLVATION_TEMPERATURE

MS:INTERFACE_VOLTAGE

MS:IT_SIDE_OCTOPOLES_BIAS_VOLTAGE

MS:LASER

MS:MATRIX

MS:NEBULIZER

MS:OCTPOLE_VOLTAGE

MS:PROBE_TIP

MS:RESOLUTION_SETTING

MS:SAMPLE_DRIPPING

MS:SCAN_RANGE_MOVERZ

MS:SCANNING

MS:SCANNING_CYCLE

MS:SCANNING_RANGE

MS:SKIMMER_VOLTAGE

MS:TUBE_LENS_VOLTAGE

MS:MS_RESULTS_FILE

(required fields in red)

NMR fields

NM:INSTRUMENT_NAME

NM:INSTRUMENT_TYPE

NM:NMR_EXPERIMENT_TYPE

NM:NMR_COMMENTS

NM:FIELD_FREQUENCY_LOCK

NM:STANDARD_CONCENTRATION

NM:SPECTROMETER_FREQUENCY

NM:NMR_PROBE

NM:NMR_SOLVENT

NM:NMR_TUBE_SIZE

NM:SHIMMING_METHOD

NM:PULSE_SEQUENCE

NM:WATER_SUPPRESSION

NM:PULSE_WIDTH

NM:POWER_LEVEL

NM:RECEIVER_GAIN

NM:OFFSET_FREQUENCY

NM:PRESATURATION_POWER_LEVEL

NM:CHEMICAL_SHIFT_REF_CPD

NM:TEMPERATURE

NM:NUMBER_OF_SCANS

NM:DUMMY_SCANS

NM:ACQUISITION_TIME

NM:RELAXATION_DELAY

NM:SPECTRAL_WIDTH

NM:NUM_DATA_POINTS_ACQUIRED

NM:REAL_DATA_POINTS

NM:LINE_BROADENING

NM:ZERO_FILLING

NM:APODIZATION

NM:BASELINE_CORRECTION_METHOD

NM:CHEMICAL_SHIFT_REF_STD

NM:BINNED_INCREMENT

NM:BINNED_DATA_NORMALIZATION_METHOD -

NM:BINNED_DATA_PROTOCOL_FILE

NM:BINNED_DATA_CHEMICAL_SHIFT_RANGE -

NM:BINNED_DATA_EXCLUDED_RANGE

(required fields in red)

Order of metadata and data blocks (MS)

Results from **targeted experiments with named metabolites** are entered directly in the mwTab file within the **MS_METABOLITE_DATA** and **METABOLITES** blocks

```
#METABOLOMICS WORKBENCH STUDY_ID:ST000001 ANALYSIS_ID:AN000001
VERSION 1
CREATED_ON 2016-09-17
#PROJECT
...
#STUDY
...
#SUBJECT
...
#SUBJECT_SAMPLE_FACTORS: SUBJECT(optional)[tab]SAMPLE
...
#COLLECTION
...
#TREATMENT
...
#SAMPLEPREP
...
#CHROMATOGRAPHY
...
#ANALYSIS
...
#MS
...
#MS_METABOLITE_DATA
MS_METABOLITE_DATA:UNITS peak area
MS_METABOLITE_DATA_START
...
MS_METABOLITE_DATA_END
#METABOLITES
METABOLITES_START
...
METABOLITES_END
#END
```


Order of metadata and data blocks (NMR)

Note the absence of
a Chromatography
block

```
#METABOLOMICS WORKBENCH↓
VERSION ······ 1↓
CREATED_ON ······ 2016-09-17↓
#PROJECT↓
...↓
#STUDY↓
...↓
#SUBJECT↓
...↓
#SUBJECT_SAMPLE_FACTORS: ······ SUBJECT (optional) [tab]SAMPLE [tab]FA
...↓
#COLLECTION↓
...↓
#TREATMENT↓
...↓
#SAMPLEPREP↓
...↓
#ANALYSIS↓
...↓
#NMR↓
...↓
#NMR_BINNED_DATA↓
NMR_BINNED_DATA_START↓
...↓
NMR_BINNED_DATA_END↓
#END
```