

MANUAL FOR FORMATTING THE COMBASE TEMPLATE FILE

Table of Contents

- 1 GETTING STARTED: 2
- 2 SHEETS IN THE CB_TEMPLATE FILE 2
 - 2.1 LOGC SHEET 2
 - 2.2 MASTER AND MASTERDYN SHEETS 3
 - 2.3 SOURCE SHEET 13
 - 2.4 DETAILS SHEET 14
 - 2.5 CONDITION SHEET 14
 - 2.6 PROPERTY SHEET 14
 - 2.7 ORGANISM SHEET 14
 - 2.8 MEAS_METHOD SHEET 15
 - 2.9 B_F SHEET 15
 - 2.10 CONDITION GROUP SHEET..... 15

1 GETTING STARTED:

- A “CB_template.xls” file serves as a working file for formatting a new dataset.
- All the details of the data, provided by the donor in the data donation template, are transferred to the CB_template file and formatting is carried out.
- The CB_template file is renamed with the author’s last name and year of the study (e.g. CB_Salazar 2017.xls).

2 SHEETS IN THE CB_template FILE

The CB_template file contains the following sheets: Master, MasterDyn, Source, Details, Organism, Condition, ConditionGroup, Meas_method, Property and B_f. The original template however, does not contain the “Logc” sheet as this needs to be created by the person formatting the data.

2.1 Logc sheet:

- The logc sheet named as “[Organism]_logc “ is created for the specific organism(s) used in the study. A logc sheet must be created for each species, if more than one.

Example 1: “Ss_logc” for *Salmonella*, “Ec_logc” for *E. coli* (abbreviation for the organism is found in the “Organism” sheet in the template).

- The data from the “logc” sheet or the “Data entry” sheet in the data template provided by the donor is used to complete the “[organism]_logc” sheet in the CB_template.
- This sheet contains details of the time and the log₁₀ CFU of the data record. It has 3 columns, i.e., “key” “time” and logC. Time is always in **hours** and logC is always expressed as **log₁₀**.
- The record identification (ID) codes in the “key” column should be changed to fit the preferred ComBase format.

Example 2:

Identification code (Key): **Bc_Sp_5C_T1_R1**, where,
Bc - *Bacillus cereus* (the organism in the study)
Sp - Spinach (the test matrix in the study)
5C - Temperature (this can include other factors too, such as aw, pH or additives etc.)
T1 - Trial 1 (and T2, T3 and so on, for the respective number of trials).
R1 - Replicate 1 (and R1, R2 and so on, for each replicate per trial).

- The “time” column contains all of the time points when the microbial concentration was measured and is always expressed in “hours.”
- The “logc” column contains the log₁₀ CFU at each time point. The data may possibly be expressed as OD units, as well as other measurement units, such as those specified in the meas_method column in the Master sheet. (If the data are not logCFU, please contact us at data@combase.cc)

Figure 1: “logc” Sheet in the CB_template file

	A	B	C	D	E	F	G	H	I	J	K
1	key	time	logc								
2	Ec_Control_55C_R1	0.00	9.22								
3	Ec_Control_55C_R1	0.17	8.96								
4	Ec_Control_55C_R1	0.50	8.56								
5	Ec_Control_55C_R1	0.83	8.53								
6	Ec_Control_55C_R1	1.50	8.42								
7	Ec_Control_55C_R1	1.83	5.84								
8	Ec_Control_55C_R1	2.00	5.37								
9	Ec_Control_55C_R1	2.42	4.08								
10	Ec_Control_55C_R1	2.83	3.30								
11	Ec_Control_55C_R2	0.00	9.25								
12	Ec_Control_55C_R2	0.17	9.01								
13	Ec_Control_55C_R2	0.50	8.64								
14	Ec_Control_55C_R2	0.83	8.51								
15	Ec_Control_55C_R2	1.50	8.40								
16	Ec_Control_55C_R2	1.83	5.85								
17	Ec_Control_55C_R2	2.00	5.40								
18	Ec_Control_55C_R2	2.42	4.04								
19	Ec_Control_55C_R2	2.83	3.28								
20											
21	Ec_P1_55C_R1	0.00	9.13								
22	Ec_P1_55C_R1	0.17	8.72								
23	Ec_P1_55C_R1	0.42	7.78								
24	Ec_P1_55C_R1	0.67	6.92								
25	Ec_P1_55C_R1	0.92	5.15								
26	Ec_P1_55C_R1	1.17	3.70								
27	Ec_P1_55C_R1	1.42	3.03								
28	Ec_P1_55C_R2	0.00	9.10								
29	Ec_P1_55C_R2	0.17	8.79								
30	Ec_P1_55C_R2	0.42	7.70								
31	Ec_P1_55C_R2	0.67	7.00								
32	Ec_P1_55C_R2	0.92	5.17								
33	Ec_P1_55C_R2	1.17	3.60								
34	Ec_P1_55C_R2	1.42	3.10								
35											
36	Ec_P2_55C_R1	0.00	9.22								
37	Ec_P2_55C_R1	0.17	8.56								
38	Ec_P2_55C_R1	0.33	7.66								
39	Ec_P2_55C_R1	0.67	7.30								
40	Ec_P2_55C_R1	0.83	5.49								

2.2 Master and MasterDyn sheets

The **Master sheet** is used for data that have **static** environmental parameters, such as temperature, pH, or a_w . In other words, data for these environmental factors do not change (or have not been measured) as a function of time, and therefore are assumed to be constant throughout all time points during microbial enumeration.

Figure 2: Master sheet with static temperature and pH (highlighted in orange)

	D	E	F	G	H	I	J	K	L	M	N	O
	source	details	b_f	meas_meth	condition	temp	pH	aw	property	tObs	logc	logcVar
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	2.833	0.925;0.16	5.97
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.913;0.16	6.1
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.91;0.166	6
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.922;0.16	6.51
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.93;0.166	7.15
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.333	0.909;0.16	6.18
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.333	0.915;0.16	6.75
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	1	0.92;0.05	7.72
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	1	0.929;0.05	7.69
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.5	0.92;0.016	7.6
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.5	0.924;0.01	7.34
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4667	0.925;0.01	7.35
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4667	0.921;0.01	7.43
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4167	0.914;0.01	6.63
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4167	0.922;0.01	6.74
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.4167	0.923;0.05	6.91
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.4167	0.925;0.05	7.07
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.915;0.01	8.15
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.919;0.01	7.89
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.917;0.01	7.69
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.934;0.01	7.56
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.1667	0.914;0.01	6.14
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.1667	0.918;0.01	5.88
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.1333	0.922;0.01	7.44
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.1333	0.92;0.011	7.9
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.0667	0.916;0.01	7.68
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.0667	0.908;0.01	7.78
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.075	0.922;0.00	7.22
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.075	0.927;0.01	7.09
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.05	0.914;0.00	7.66
L2071 2011C 3493	Juneja_2016	Juneja_16_Ec	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.05	0.912;0.00	7.82
Meas_method	Property	B_F	Source	Details	MasterDyn	Master	Ec_logc	+				
						Sum=0						

In contrast to the **Master** sheet, the **MasterDyn** sheet is used for data that have dynamic environmental factors, such as pH, temperature, and aw, which were recorded over time. The values of the parameters are recorded at each time point during microbial enumeration. A separate “logc” sheet named “[Organism]_pH” or “[Organism]_aw, or “[Organism]_temperature”

is created for each dynamic profile, with columns that correspond to the key, time and logc values in the “[Organism]_logc” sheet.

Table 1: “[Organism]_logc” and “[Organism]_pH/aw/temperature” sheets

a) **[Organism]_logc sheet.** In this case **Bc_logc:**

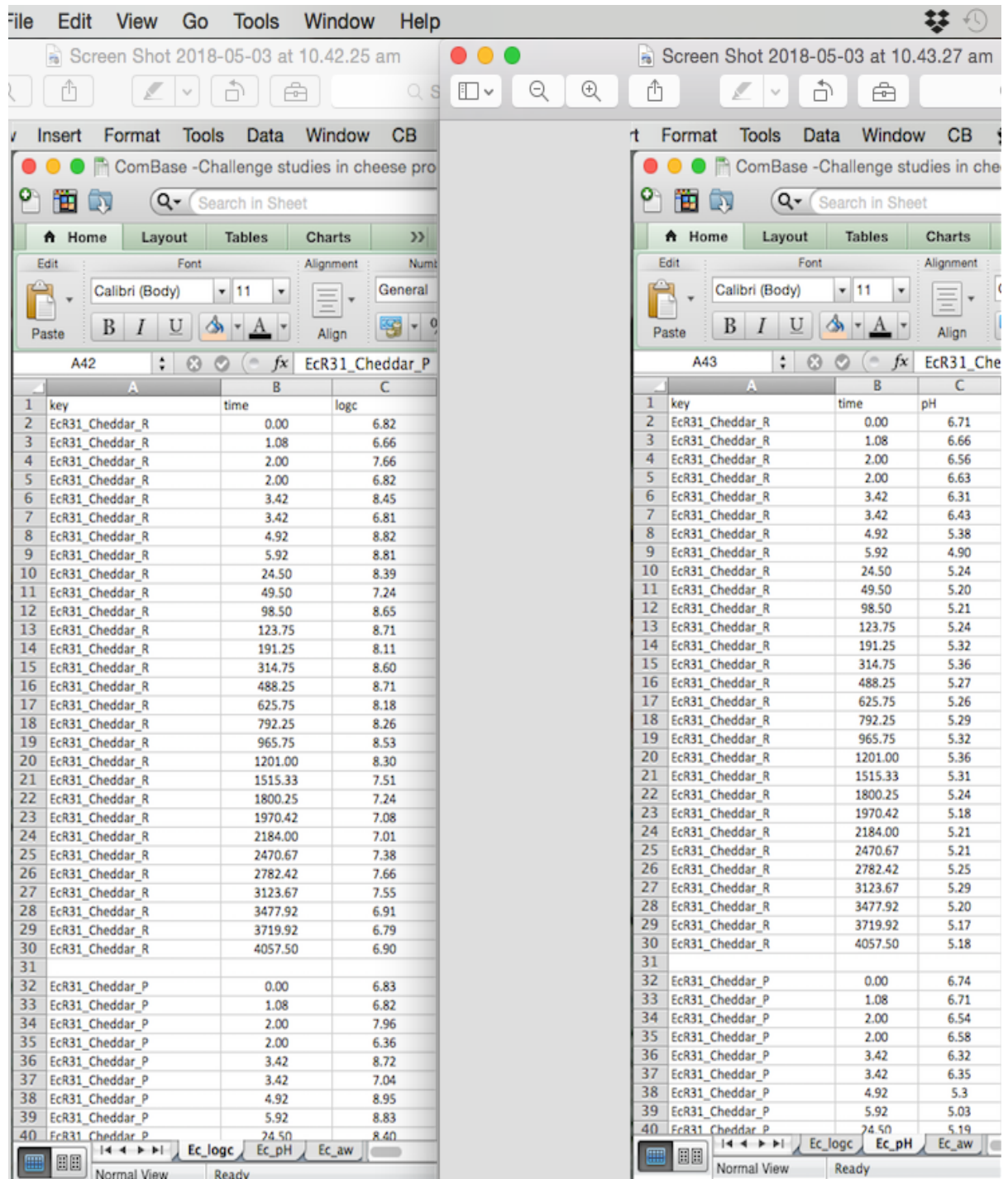
Key	time (h)	logc
Bc_Sp_5C_T1_R1	0	1.5
Bc_Sp_5C_T1_R1	5	3.1

b) **[Organism]_pH (or aw or temperature).** In this case **Bc_pH:**

Key	time (h)	pH
Bc_Sp_5C_T1_R1	0	6.8
Bc_Sp_5C_T1_R1	5	6.7

From the two tables above, at t=0 the logc is 1.5 and pH is 6.8.

Figure 3: “[Organism]_pH” sheet with key and time corresponding to “[Organism]_logc” sheet



The dynamic data from the “[organism]_logc” and “[organism]_pH/aw/temperature” sheets are then converted to a string format in their respective columns in the MasterDyn sheet, using the ComBase (CB) macros (Figure 4).

Figure 4: MasterDyn sheet with dynamic pH and water activity (a_w) fields.

	temp	pH	aw	property	tObs	logc	logcVar
22	10	0;6.71;1.083333333	0;0.9905;1.083333333	mixed_species	4058	0;6.81928343699448;1.083333	2.157
23	10	0;6.74;1.083333333	0;0.99;1.083333333	mixed_species	3720	0;6.83224841415885;1.083333	7.352
24	15	0;6.66;1.083333333	0;0.997;1.083333333	mixed_species	1992	0;6.79213119095086;1.083333	6.472
25	15	0;6.77;1.083333333	0;0.9915;1.083333333	mixed_species	1464	0;6.83224841415885;1.083333	6.512
26	5	0;6.75;1.083333333	0;0.9965;1.083333333	mixed_species	2856	0;6.69870950578863;1.083333	2.894
27	5	0;6.79;1.083333333	0;0.993;1.083333333	mixed_species	2856	0;6.93423795269618;1.083333	3.293
28	15	0;6.75;1.083333333	0;0.9965;1.083333333	mixed_species	2304	0;6.69870950578863;1.083333	7.347
29	15	0;6.79;1.083333333	0;0.993;1.083333333	mixed_species	2304	0;6.93423795269618;1.083333	7.758
30	15	0;6.57;1.083333333	0;0.9945;1.083333333	mixed_species	1009	0;4.80456018017377;1.083333	4.217
31	15	0;6.56;1.083333333	0;0.9915;1.083333333	mixed_species	1009	0;4.82839939798793;1.083333	3.985

2.2.1 Entering data in the Master and MasterDyn sheets

Both Master and MasterDyn sheets contain 21 fields (columns) that require information about the data.

- 2.2.1a Key:** The identification codes for the record from the “[Organism]_logc” sheet are entered in this column. See Example 2, above.
- 2.2.1b Organism:** The abbreviation specific for the organism used in the study is entered in this column. The “Organism” sheet in the template file contains the abbreviations for the organisms.
- 2.2.1c Specification:** This column contains Information about the serotype(s) or strains(s). See, Table 2 for the format used.

Table 2: Format for the Specification column

Serotypes/Strains used in the study	Specification column in the Master/MasterDyn sheet
<i>L. monocytogenes</i> ScottA	Strain(s): ScottA
<i>E. coli</i> O104:H4 strains FR324 and EL2050	Serotype(s): O104:H4, Strain(s): FR324 EL2050
Mixed strains of <i>E. coli</i> serotype O104:H4	Serotype(s): O104:H4, Strain(s): FR324 DC534 EL2050

2.2.1d Source: This column contains the specific code for the details about the Author and the publication. The code follows the format, “Last name of Author_Year published”.

Example 4: **Moshina_2014**

2.2.1e Details: The code for the experimental details used in the study is entered in this column. The code follows the format, “Last name of Author_Year published_Organism”.

Example 5 (a): **Moshina_14_Bc**

There are instances when a specific sequence (number or alphabet) is added to the detail code. This happens when there is more than one type of test matrix and the method used for processing the matrices is different.

Example 5 (b): If the method used in a study differs for two types of test matrices, such as culture medium and infant formula, the Detail code is written as,

Moshina_14_Bc_a for experiment in culture medium

Moshina_14_Bc_b for experiment in infant formula

2.2.1f B_f: This column specifies the food category of the test matrix. The “B_f” sheet in the CB_template contains a list of food categories.

Example 6: For experiments on **Chicken, Turkey**, the “b_f” entered will be “**Poultry**”.

2.2.1g Meas_Method: This indicates the type of method used to measure the microbial response. The “meas_method” sheet in the CB_template contains different types of measurement methods.

Example 7: “**plate_count**” is selected for studies that measure colonies-forming units (CFU), and “**od**” for studies that measured culture medium optical density.

If more than one measurement method is used in a study, one of them is mentioned in the “meas_method” column and all of them are indicated in the “comments” column.

2.2.1h Condition: Information about the condition of the food or media matrix is entered in this column. The “Condition” sheet in the template has a list of condition types. If a condition for the donated data is not found in the “condition” sheet, then the donor should enter it in the “Condition” sheet.

Example 8: “**acetic_acid(ppm):5000**” where there is 5000 ppm of acetic acid in the environment.

2.2.1i Temperature, pH and water activity (a_w): These fields are for temperature, pH, and/or a_w , which are constant or vary throughout the experiment. While temperature is nearly always measured, pH and a_w are not.

The dynamic values of these environmental parameters in the “[organism]_pH, [organism]_temperature, or [organism]_aw” sheets are placed in their respective fields in the MasterDyn sheet in a string format (Figures 3 and 4).

2.2.1a Property: This field describes specific properties of the organism. The property names are given in the “Property” sheet. If a property for the donated data is not found in the “Property” sheet, then the donor should enter it in the “Property” sheet.

2.2.1b

Example 9:

- a) “**mixed_serotype**” indicates the use of a cocktail (mixture) of different serotypes associated with a species.
- b) “**pre_heated**” indicates that the microbial cells were heated before the sample was inoculated.

2.2.1c tOBS and lo[gcVar: tOBS indicates the total time of the experiment. logcVar is the difference between the lowest and highest log₁₀ value for the entire experiment. tOBS and logcVar are calculated using the CB macro.

Figure 6: tObs and logcVar in the Master sheet

	aw	property	tObs	logc	logcVar	spe	assur	commer	in_on
1		mixed_strains	2.8333	0;9.22;0.16	5.92				In: Raw ground chicken
2		mixed_strains	2.8333	0;9.25;0.16	5.97				In: Raw ground chicken
3		mixed_strains	1.4167	0;9.13;0.16	6.1				In: Raw ground chicken
4		mixed_strains	1.4167	0;9.1;0.166	6				In: Raw ground chicken
5		mixed_strains	1.4167	0;9.22;0.16	6.51				In: Raw ground chicken
6		mixed_strains	1.4167	0;9.3;0.166	7.15				In: Raw ground chicken
7		mixed_strains	1.3333	0;9.09;0.16	6.18				In: Raw ground chicken
8		mixed_strains	1.3333	0;9.15;0.16	6.75				In: Raw ground chicken
9		mixed_strains	1	0;9.2;0.05;8	7.72				In: Raw ground chicken
10		mixed_strains	1	0;9.29;0.05	7.69				In: Raw ground chicken
11		mixed_strains	0.5	0;9.2;0.016	7.6				In: Raw ground chicken
12		mixed_strains	0.5	0;9.24;0.01	7.34				In: Raw ground chicken
13		mixed_strains	0.4667	0;9.25;0.01	7.35				In: Raw ground chicken
14		mixed_strains	0.4667	0;9.21;0.01	7.43				In: Raw ground chicken
15		mixed_strains	0.4167	0;9.14;0.01	6.63				In: Raw ground chicken
16		mixed_strains	0.4167	0;9.22;0.01	6.74				In: Raw ground chicken
17		mixed_strains	0.4167	0;9.23;0.05	6.91				In: Raw ground chicken
18		mixed_strains	0.4167	0;9.25;0.05	7.07				In: Raw ground chicken
19		mixed_strains	0.25	0;9.15;0.01	8.15				In: Raw ground chicken
20		mixed_strains	0.25	0;9.19;0.01	7.89				In: Raw ground chicken
21		mixed_strains	0.25	0;9.17;0.01	7.69				In: Raw ground chicken
22		mixed_strains	0.25	0;9.34;0.01	7.56				In: Raw ground chicken
23		mixed_strains							

2.2.1d Logc: logc is always entered as the log₁₀ cell concentration. The log₁₀ CFU values from the "[Organism]_logc" sheet are transcribed to the "logc" field in the Master/MasterDyn sheet in a string format (Figure 7).

Figure 7: “logc” field with logc values in strings.

	F	G	H	I	J	K	L	M	N	O
	b_f	meas_meth	condition	temp	pH	aw	property	tObs	logc	logcVar
2	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	2.833	0.9,22;0.166666666666667;8.96;0.5;8.56;0.8	5.92
3	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	2.833	0.9,25;0.166666666666667;9.01;0.5;8.64;0.8	5.97
4	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.9,13;0.166666666666667;8.72;0.41666666	6.1
5	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.9,1;0.166666666666667;8.79;0.41666666	6
6	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.9,22;0.166666666666667;8.56;0.33333333	6.51
7	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.417	0.9,3;0.166666666666667;8.64;0.33333333	7.15
8	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.333	0.9,09;0.166666666666667;8.11;0.33333333	6.18
9	Poultry	plate_count	cut, irradiated	55	6		mixed_strains	1.333	0.9,15;0.166666666666667;8.23;0.33333333	6.75
10	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	1	0.9,2;0.05;8.32;0.25;7.12;0.5;4.65;0.666666	7.72
11	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	1	0.9,29;0.05;8.26;0.25;7.15;0.5;4.72;0.666666	7.69
12	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.5	0.9,2;0.016666666666667;9.15;0.06666666	7.6
13	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.5	0.9,24;0.016666666666667;9.17;0.06666666	7.34
14	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4667	0.9,25;0.016666666666667;8.62;0.05;8;0.1	7.35
15	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4667	0.9,21;0.016666666666667;8.59;0.05;7.95;0	7.43
16	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4167	0.9,14;0.016666666666667;8.81;0.05;8.04;0	6.63
17	Poultry	plate_count	cut, irradiated	57.5	6		mixed_strains	0.4167	0.9,22;0.016666666666667;8.86;0.05;7.95;0	6.74
18	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.4167	0.9,23;0.05;8.38;0.133333333333333;5.6;0.2	6.91
19	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.4167	0.9,25;0.05;8.51;0.133333333333333;5.3;0.2	7.07
20	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.9,15;0.016666666666667;8.46;0.05;7.4;0	8.15
21	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.9,19;0.016666666666667;8.48;0.05;7.42;0	7.89
22	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.9,17;0.016666666666667;8.4;0.05;7.1;0.1	7.69
23	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.25	0.9,34;0.016666666666667;8.79;0.05;7.66;0	7.56
24	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.1667	0.9,14;0.016666666666667;8.41;0.05;7.28;0	6.14
25	Poultry	plate_count	cut, irradiated	60	6		mixed_strains	0.1667	0.9,18;0.016666666666667;8.52;0.05;7.26;0	5.88
26	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.1333	0.9,22;0.011;8;0.022166666666667;7.36;0.0	7.44
27	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.1333	0.9,2;0.011;7.9;0.022166666666667;7.3;0.0	7.9
28	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.0667	0.9,16;0.011;8.04;0.022166666666667;5.78	7.68
29	Poultry	plate_count	cut, irradiated	62.5	6		mixed_strains	0.0667	0.9,08;0.011;7.78;0.022166666666667;5.6;0	7.78

2.2.1e Spec_rate: This is the specific growth or inactivation rate of the organism of interest. Values are only placed in this column if the data donor provides only the growth rate and not logc data. The spec_rate is calculated by multiplying the log₁₀ value by 2.303.

2.2.1f Assumed: If the authors have not provided values for pH or a_w, a value from some other reference is entered. For example, if the food matrix was milk, and the author did not measure pH, the pH

of milk may be found in a technical publication and then entered in this field. If the data exist, it is preferred to suggest a value for pH and/or a_w .

2.2.1g Comments: This field is for other relevant information that has not been indicated in any of the other Master/MasterDyn sheets. For example, the authors may have measured the growth of *Listeria monocytogenes* in a specific variety of spinach. In this case, the name of the spinach variety in this field is specified in this field.

2.2.1h In_On: This important field indicates the specific food or media, such as 'raw ground chicken,' 'fresh cilantro,' 'cheddar cheese,' or 'BHI' (Brain Heart Infusion Broth). This should not be confused with the enumeration medium.

2.2.1i linkID: This field is used when more than one microbe was enumerated in the matrix, sometimes referred to as a 'co-culture' or 'mixed culture.' This field links two or more records, and remains empty for those records that are not linked.

When a group of records are linked, the "linkID" is depicted by a number. This number is the same for all of the records that are linked to each other. Table 3 shows how linkID is assigned to linked records.

Table 3: Assigning linkID to linked records

Co-Culture	Key	linkID
<i>E. coli</i> M23 (EcM23) & <i>L. monocytogenes</i> ScottA (LmScottA) at 5C in cheddar cheese	EcM23_5C_Cheddar	1
<i>E. coli</i> R31 (EcR31) & <i>L. innocua</i> (Li) at 5C in cheddar cheese	EcR31_5C_Cheddar	2
<i>E. coli</i> M23 (EcM23) & <i>L. monocytogenes</i> ScottA (LmScottA) at 5C in cheddar cheese	LmScottA_5C_Cheddar	1

<i>E. coli</i> R31 (EcR31) & <i>L. innocua</i> (Li) at 5C in cheddar cheese	Li_5C_Cheddar	2
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2.2.1j logc0: This field refers to the inoculum level. However, no value is entered if the “logc” field contains data. However, for records where only the specific rate is given, then enter the inoculum value in the “logc0” cell(s).

2.3 Source sheet

The source sheet contains information about the author(s) of the data, including the publication year and the journal in which the article was published. This sheet has the following fields:

- 2.3.1 Source:** This column contains the “Source code or ID” that is indicated in the source field of the Master/MasterDyn sheet. The format and an example for the Source code/ID are indicated in Example 4 of Section 2.2.1d.
- 2.3.2 Definition:** The details about the author(s) of the study, the year of publication and the journal in which the article was published and the URL to the study, are described here.
- 2.3.3 URL:** This field contains the link to the journal article associated with the donated data.
- 2.3.4 Author:** This is the last name of the author, as indicated in the source code.
- 2.3.5 Year:** This is the year of the publication. For unpublished studies, this is the year the study was completed, along with the name of institution that performed the research.

Example 10:

(a): **Published Data**

Source ID - Aryani_2015

Definition -

Aryani, D.C (et al.), 2015: Quantifying variability on thermal resistance of *Listeria monocytogenes*. International Journal of Food Microbiology. 193:130-138.

URL -

<http://www.sciencedirect.com/science/article/pii/S016816051400525X>

Author – Aryani

Year – 2015

(b): **Unpublished Data**

Source ID - Neri_2007

Definition -

Neri, E, 2007: Growth patterns of Salmonella enterica serotypes in non-irradiated and irradiated cilantro. Masters Thesis, Universidad Autónoma de Queretaro, Mexico

Author - Neri

Year – 2007

2.4 Details Sheet

The details sheet contains the “Details code/ID” and the description of the experimental procedure. This sheet contains two fields:

- 2.4.1 Details:** This column contains the “Details code or ID” that is also in the details field of the Master/MasterDyn sheet. The format and an example for the Details code/ID are shown in Examples 5(a) and 5(b) of Section 2.2.1e.
- 2.4.2 Definition:** This part of the details sheet specifies the Organisms (serotypes or strains), the preparation of the inoculum for the experiments, the details about the test matrix (food type or medium), and a clear and concise procedure.

2.5 Condition Sheet

This sheet contains a list of physical, chemical and atmospheric conditions of the experimental matrix. If a condition for the donated data is not found in the “condition” sheet, then the donor should enter it in the “Condition” sheet.

2.6 Property Sheet

This is a list of the specific properties of the organism(s), such as pre-treatments. Please follow examples in the CB_template file. If a property for the donated data is not found in the “Property” sheet, then the donor should enter it in the “Property” sheet.

2.7 Organism Sheet

The genus and the species name of the organism is indicated in this sheet. Each organism has a specific abbreviation and is mentioned in the “Organism” column of the Master/MasterDyn sheet. If the list does not show the species name for the donated data, then the donor should enter the name in the “Organism” sheet.

Example 11: **Bc** for Bacillus cereus
Lm for Listeria monocytogenes/innocua

Ss for Salmonella species

2.8 Meas_method Sheet

This sheet contains a list of methods used to measure the microbial kinetics. Please refer to the Example 7 in section 2.2.1g and in the CB_template file.

2.9 B_F Sheet

A list of the broad categories of text matrices are specified in this sheet. Refer to Example 6 in section 2.2.1f and in the CB_template file.

2.10 Condition Group Sheet

Please ignore this sheet.