

Lab Report 2 Guidelines – Option 1 – Food Microbiology

Lab Report 2 is due on **Sunday, March 19th at 11:59** pm and must be submitted by Nexus dropbox as a **pdf** document. There will be a penalty of 5% for each 24 hours late or part thereof. Lab reports will no longer be accepted after Sunday, March 26th at 11:59 pm (one week late). Prior to reading these guidelines, read the *General Lab Report Writing Guidelines*, which will provide you with the general expectations for preparing your lab reports. This document contains specific information for lab report 1, and does not include everything you need to know to write a successful report.

The following sections **must** be included in your report:

- Title page
- Abstract: 250 to 300 words
- Introduction: 650 to 800 words
- Methods: no word limit
- Results: no word limit
- Discussion: 800 to 1000 words
- Citations and References

Please ensure that you understand what defines plagiarism. If you are not sure, ask!

Formatting

The text of the lab report should be double-spaced and left-aligned, and each paragraph should be indented (like this document). Figure and table captions should be single-spaced and not indented. Text should be size 12 and an easy to read font should be selected (Arial, Times New Romans, Century Gothic etc). Please refer to the citation guidelines in the *Lab Report Writing Guidelines* posted to Nexus.

Title Page (1 mark)

The title page should be a separate page at the beginning of your lab report. Writing with the text aligned to the center of the page, the title page should include the following: a descriptive title for the lab report, your first and last name, student number, lab section, and the due date of the assignment. Failure to include any of these details will result in score of 0 for this section.

Abstract (4 marks)

The abstract should be the first written portion of your lab report and appear on a separate page following the title page. Although it comes first in the organization of your report, it will likely be the last part of the report that you will write. This is because your abstract must contain information from all of the other sections of the report. Your abstract should be a maximum of 300 words. *You will be penalized 1 mark for every 10% you go over the word limit of this section.* References are NOT required in the abstract.

- 1 mark for including a statement of context for the study and overall study purpose
- 1 mark for outlining the basics of the methodology used
- 1 mark for outlining the most relevant results
- 1 mark for providing major conclusions and how your findings apply to a broader application.

Introduction (15 marks)

This section should begin with an introductory paragraph. Following this paragraph should be background information pertaining to the concepts and techniques covered in this report. Explain, using references, the general scientific principles behind the experiments. Provide the necessary information for the reader to understand your results. Explain how the contents of the report are related and not just a collection of isolated experiments (you are using these tests to create a panel for identifying an unknown organism). Assume your reader has background knowledge of university biology, but is not familiar with this course. Do not end the introduction with a summary of your findings; this is redundant to both the results and the abstract. Instead, the end of your introduction should introduce your hypothesis and lead the reader into your methods section. Your introduction should be a maximum of 800 words. *You will be penalized 1 mark for every 10% you go over the word limit of this section.* References are required to support external information included in this section.

- 2 marks for introductory paragraph which provides report context – food microbiology
- 1 mark for including the study purpose
- 1 marks for outlining the group of organisms which are the focus of the study (Gram-negatives)
- 2 marks for outlining the agar selective/differential tests
- 2 marks for outlining the biochemical tube tests
- 2 marks for outlining the API test strip
- 1 mark for outlining the different food sources/conditions under observation
- 1 mark for a concluding paragraph which leads into the methods
- 1 mark for including your hypothesis(es)
- 2 marks awarded for the quality of writing in this section (grammar/spelling (0.5), organization of information (0.5), and quality of content (1.0))

Methods (7 marks)

The methods section should provide a detailed description of how the experiments were performed and using what resources. It is not necessary to describe how to perform basic lab techniques (i.e. 4-quadrant streak plating, sterilization of inoculating loops); rather you should focus on the overall details of each method employed. Always clearly describe the species you worked with, the procedures performed, and any media or reagents used. All bacterial stocks are provided by the University of Winnipeg. Never use point-form notation, bullet-point lists or numbered lists of instructions in your methodology; your methodology must be written in paragraph format. Someone with laboratory experience should be able to read your methodology and reproduce your experiments.

- 0.5 mark for reference to the lab manual
- 0.5 mark for outlining where the samples were sourced from (food from a local grocery store – mixed with water and blended)
- 1 marks for outlining procedures for selective/differential plates
- 1 marks for outlining procedures for biochemical tube tests
- 1 mark for outlining how to perform the API inoculation
- 1 mark for outlining how to read the API test
- 1 mark for outlining proper incubation parameters for all tests

Results (10 marks)

The results for this lab report can be logically divided into three groups of tests: agar plates, biochemical tubes, and API. Keep this in mind when you organize the data you are including in your results section. Remember you are telling a story through your lab report, and logically ordering and displaying your results is an important part of that.

You must include results for all six food samples. Create your tables to show comparisons between each food type under the two storage conditions. Most of your results should be organized into tables. Make sure to include a descriptive caption for all tables included in the report. Lastly, make sure all results you intend to discuss in the discussion are first mentioned in the results.

It is important to note that while the ramifications of identifying an unknown organism from each sample should be analyzed in the discussion (Does it make sense to find this type of organism in this type of food? Are more dangerous food pathogens found in those samples improperly stored?), you should outline the identity for this organism in your results section.

- 3 marks for written text included to support data presented in tables
- 4 marks for appropriate inclusion and production of tables
- 2 marks for table captions
- 1 mark for addressing identity of the unknown

Discussion (20 marks)

The discussion section of your report should begin with an introductory paragraph which revisits the purpose and basic methodology of the report. Make sure you plan out your discussion before you begin writing. This will help you to keep your thoughts ordered and your arguments and ideas concise and aligned with one another. You must connect the many ideas you wish to address in your discussion. Failure to do so reduces the efficacy of your arguments and often leaves the reader confused about the take home message of your report.

Along with addressing common concerns, such as possible sources of error, you should include a discussion of questions more specific to the experiments performed in this report. For example, the discussion should put your results within the context of established scientific knowledge (Are these tests used in industrial/food processing practices? Are there other more effective tests?). You must include references for any information that is not: a) original data from this report or b) an original idea/point you are making. Failure to validate your results (when possible) and support your ideas/arguments with external references will result in a reduction in marks awarded for the discussion section.

Do not forget to address your hypothesis and draw conclusions as to its validity. You should also address the robustness of the methodology used, and how this could be improved or built upon with further experimentation. Your discussion should end with a clear concluding paragraph that reflects back on the take home message of your report. Your discussion should be a maximum of 1000 words. *You will be penalized 1 mark for every 10% you go over the word limit of this section.* References are required to support external information included in this section.

- 1 mark for the inclusion of an introductory paragraph which revisits the study purpose and how data was collected
- 6 marks for comparing and contrasting between the data collected for a) food types and b) storage conditions
- 2 marks for supporting your data with confirmation from external sources (do the isolated species of bacteria from each sample match with that sample)
- 2 marks for outlining errors which may have affected the results
- 1 mark for providing examples of data affected by the errors discussed
- 2 marks for discussing the overall efficacy of the techniques used in the study
- 2 marks for suggesting alternative techniques which could improve/build on the findings of this study

- 2 marks for the inclusion of a concluding paragraph which revisits the hypothesis and provides final comments on the future direction of the study/overall importance of the findings
- 2 marks awarded for the quality of writing in this section (grammar/spelling (0.5), organization of information (0.5), and quality of content (1.0))

Citations and References (3 marks)

On a separate page, at the end of the lab report, you must include a list of the external references cited in your report. These references should be numbered in order of appearance in the lab report. Please refer to the *General Lab Report Writing Guidelines* for proper referencing formats of common external sources. Failure to include an organized and full reference section or to properly cite references within your report will result in a loss of marks.

Reports entirely lacking referencing will not be accepted for marking and may be submitted for departmental review under suspicion of academic misconduct.

- 1 mark for proper formatting within the text of the report
- 1 mark for proper inclusion of a reference section at the end of the report
- 1 mark for the inclusion of 5 external sources in addition to the lab manual

Grading of Lab Report 1

Title page	/1
Abstract	/4
Introduction	/15
Methods	/7
Results	/10
Discussion	/20
Citations and references	/3
Total	/60