

GMO Manuscript Guidelines and Format

General Guidelines

In this manuscript you will demonstrate the skills of summarization, as opposed to elaboration as was done with previous lab reports. The overall objective of this investigation would be to determine semi-quantitatively the degree of genetic modification of various foods using PCR and gel electrophoresis.

Advance background preparation is vital for achieving a high grade. Therefore download (from the BioTrek website) and read carefully the GMO manual, the GMO quick guide, and the GMO slides. Also please review the PCR procedure by exploring the PCR animation (follow the link from the BioTrek website).

The manuscript is due anytime before the exam time. Use 12 point font and double column for the text of your report. The title page, the references, and the appendix sections use single column (normal). Mark allocation is designated in square brackets below. Consult your teacher immediately if you need further clarification with the following expectations.

General Format

Title

- Include a title that incorporates a result or a major outcome from the lab. [1]
- Include your particulars (full name, date, course, and teacher's name).
- Include a relevant graphic (optional).

Abstract (Optional)

- Include a summary paragraph of the manuscript.

Introduction

- GMO (definition, foods, legislation; for distribution and labeling). [3]
- Cons and pros of the GM crop debate/issue (pg 8 of the GMO manual). [4]
- Summarize the 5 steps of producing a genetically modified crop (pg 6 of the GMO manual). [5]
- Summarize the 2 ways GMO can be detected with their pros and cons. [4]
- **State** the general objective of this investigation, and list the molecular techniques used. [2]
- PCR (theory description, and its specific purpose in this lab; refer also to appendix A from the GMO manual, in addition to your biology text). [3]
- Gel electrophoresis (theory description, and its purpose in this lab; refer to your biology text). [3]
- Experimental design/approach (emphasize your 3 types/source of primers, and what will they detect in this experiment. Also provide info about the positive and negative control samples, and your food sample. Also state your hypothesis or anticipated result. [6]

Methodology

- Describe the samples used (description of food samples, positive & negative controls, master mix, primers). [1]
- State the equipment used and their brand/model (PCR, gel electrophoresis apparatus, and microcentrifuge). [1]
- Describe DNA extraction procedure (using Cheelex/InstaGene matrix). [1]

- Describe the PCR reactions (master mix composition, and the PCR 3 step cycle amplification program). [2]
- Describe Gel electrophoresis protocol (type of matrix & solutions used, sample preparation with Orange G, loaded samples; include table, running conditions; time and volts). [2]
- Describe gel visualization (DNA gel staining using Fast Blast, and gel de-staining using water), and documentation (digital photography). [1]

Results

- Discuss the results from the gel picture only (band presence for each lane). [7]
- In addition, you may summarize your results using a table.

Discussion

- Interpret and provide explanation about the results (use a guided inquiry approach/style; refer to the flowchart on pg 25 of the GMO manual). [6]
- Explain DNA extraction at the molecular level, and state any potential pitfalls/sources of error. [2]
- Elaborate one source of error for the PCR stage. [1]
- Elaborate one source of error for the electrophoresis stage. Why do we use Orange G and not other dyes such as bromophenol blue? [2]
- Elaborate on one potential lab extension that can be implemented with this investigation. [1]
- Comment on genomics research, and the use of microarray technology to quantitatively determine GM status and its effects/implications on society. [3]

References

- Include at least 5 references; one reference should be from your biology textbook (eg PCR info, include page numbers). [5]
- Do not use the GMO manual as a reference; it is only a resource. However you may use its references (GMO manual Appendix H) as your references.
- You may include websites that show animations (include date of accession).

Appendix

- Include potential tables (that show results, or other information/data), and potential pictures (refer to the GMO lab pictures; to be uploaded in the near future), and figure(s)/graph(s) from the GMO slides. [5]

Acknowledgements (Optional)

- Include relevant acknowledgements.

SUMMATIVE INVESTIGATION: GMO Research Manuscript

FULL NAME: _____

Assessment and Evaluation

You are going to be evaluated according to the following marking scheme. Please note that this investigation is worth 10% of your final mark. Your contribution and participation will be assessed therefore your presence is vital. Please staple this marking scheme with your manuscript (insert it at the back; your title page should be the 1st page).

Marking Scheme

| | |
|---|-------------|
| Technical performance, contribution, and observation..... | /15 |
| Overall communication, expression, and research..... | /15 |
| Title..... | /1 |
| Introduction..... | /30 |
| Methodology..... | /8 |
| Results..... | /7 |
| Discussion..... | /15 |
| References..... | /5 |
| Appendix..... | /4 |
| TOTAL..... | /100 |

Comments