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FDST 132- Practical Applications in Food Science – A Peer Review of Teaching Project: Benchmark Portfolio

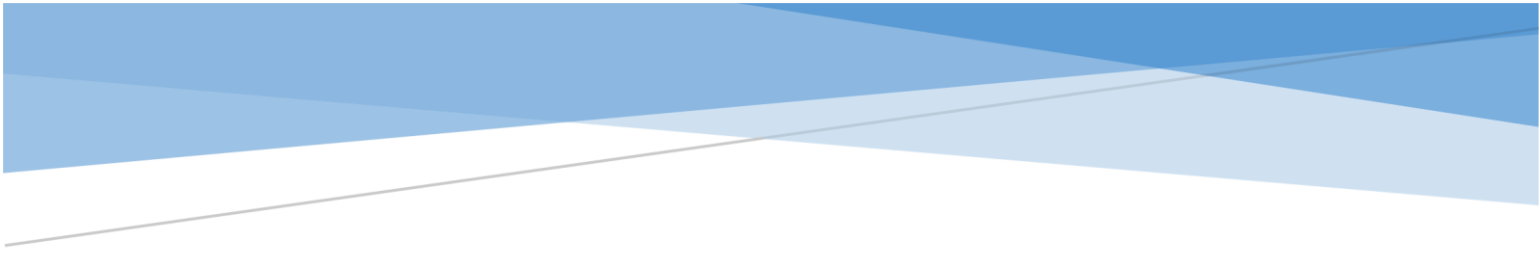
Rossana Villa-Rojas

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FDST 132- Practical Applications in Food Science – A Peer Review of Teaching
Project: Benchmark Portfolio

Spring 2022

Rossana Villa-Rojas

Assistant Professor of Practice
Department of Food Science and Technology
University of Nebraska-Lincoln
1901 N 21st Street Room 263
Food Innovation Campus, NE 68588-6205
Rvillarojas2@unl.edu

PEER REVIEW OF TEACHING PROJECT 2021-2022
First Year Program Benchmark Portfolio
FDST 132 – Practical Applications in Food Science
Rossana Villa Rojas, PhD.
Assistant Professor of Practice
Department of Food Science and Technology
University of Nebraska-Lincoln

Abstract

The aim of this course portfolio was to assess improvement of students' literature research skills and scientific writing after embedding communication lectures, activities and assignments in FDST 132 Practical Applications in Food Science. This is a terminal laboratory course for first year Food Science majors with basic science knowledge. The goal of the course is to allow students to put in practice some basic food science principles and work with their cohort. This portfolio outlines the changes made to this course, the rationale for embedding lectures and assessments in scientific communication. The specific skills and topics I aimed to teach students, and examples of the assessments and rubrics used to evaluate said skills. Through this portfolio I evaluate samples of student writing and reflect on their progressive improvement. I also reflect on the class modifications and what improvements could be made based on my own experience and students on the course and their attitudes towards the course content.

Keywords: scientific writing, laboratory reports, first-year students

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1. Objectives of the Course Portfolio

I enrolled in the FIRST program to learn how to appropriately assess and document curriculum development and improvement in my courses. The objectives of this portfolio are to: 1) document the design of lectures, activities, and assessments to improve literature research skills and scientific writing of first-year students, 2) assess improvement of students' performance and 3) reflect on the experience and outcomes to inform future improvement of the course.

I chose the course FDST 132 Practical Applications in Food Science as it presents an opportunity to guide first-year students to practice, improve and integrate skills in literature research and scientific writing within their major. One challenge to address will be to develop adequate material for practice and assessment without exceeding the expectations for one credit hour course. The second challenge will be to keep students engaged after a laboratory session.

2. Description of the Course

2.1 Course goals

This class is designed to give students a hands-on experience in the world of the food scientist. The laboratory activities cover different food processes, microbiology techniques, basic food analysis and food chemistry. This semester I added scientific writing component to develop literature research skills and writing of introduction and materials and methodology sections of the laboratory report. A copy of the syllabus can be found in Appendix 1.

2.2 Course learning outcomes

At the end of the semester student will

1. Relate basic food science and technology concepts to everyday products/processes
2. Associate the different elements of the scientific methods to their laboratory experience
3. Describe the purpose and key elements of the sections in a laboratory report
4. Integrate the key elements of the introduction and material and methodology sections in their laboratory reports
5. Evaluate appropriate scientific sources
6. Paraphrase, summarize and appropriately cite relevant information

2.3 Context

FDST 132 Practical Applications in Food Science is a first-year terminal core course for Food Science and Technology majors not cross-listed in any other major. This course is the first food science related hands-on experience for students in a laboratory setting but is not pre-requisite for any other classes. The overall goal of the course is for students to experience basic processes and techniques related to food science and technology while getting to know their cohort. Students usually take another core course, FDST 101 Introductory Food Science, before this course where they learn the most relevant concepts related to these core areas in food science.

FDST 101 and 132 are the first two core courses students have in their major and the gateway for students to understand what their major entails. FDST 132 is also designed have other faculty in the department as guest lecturers in their areas of expertise, allowing students to interact with their future professors during their first year in their program.

2.4 Enrollment/demographics

This is a terminal core course for first-year Food Science and Technology students. There are no pre-requisites for the class and the class is not pre-requisite for any other course. Historical enrollment is seven to fifteen students, in spring of 2022 twelve students were enrolled for the class. The background knowledge I will expect students to have basic food science core concepts from FDST 101 and basic science knowledge from general STEM courses.

3. Teaching methods, course materials and activities

3.1 Laboratory sessions

This course is a hands-on laboratory experience, with each laboratory sessions divided into three parts: short introductory lecture, performance of the experiment/activity and discussion of results. The introductory lecture is gives students background of the scientific principle involved in the experiment or overview of the process/technique in the food industry. The lecture also includes and overall review of the protocol for each experiment or activity.

The hands-on experience is the active part of the laboratory when students get to follow the protocol to do experiments or activities related to food science. Experiments or activities are performed in groups of varied sizes depending on the nature or complexity of the experiment and usually take from 45 to 90 minutes. Twelve experiments/activities have been historically taught in this class: three are expository experiments, five are processing laboratories to create a processed food e.g., canned food or cheese, three teach them to use equipment or techniques relevant to food science and one is tour/demo of pilot plant equipment used in the food industry. The final part of the laboratory is discussion of results for any of the expository experiments.

3.1.1 Scientific communications section

This semester I implemented short lectures on communication after the laboratory session to teach and practice literature research skills and scientific communication i.e., laboratory reports. The goal of these sessions was to re-enforce some of the research and writing skills students have learned and guide student to apply these skills within food science. Additionally, student would learn conventionalities and expectations to write the introduction and material and methods sections of a laboratory report for their discipline.

I limited the focus of these lectures, in-class activities and assignments to skills and topics that would help students write good introduction and material and methods sections. The topics were scaffolded to allow students to build up research and writing skills needed to write the aforementioned sections of the report. The rationale to limit the communication section to only those two sections was to keep lectures focused and brief and avoid over burdening students in a one credit course. Additionally, not all the laboratory activities taught are experiments from which they may derive conclusions but could serve to develop other skills. The framework of the course structure and design along with the brief description of in-class activities, assignments and

used for each topic can be found on Appendix 2.

3.2 Material

No textbook is required, protocols for each laboratory session are posted on Canvas a few days before the class. Lecture slides for scientific writing are also posted on Canvas after the lecture. Analytical rubrics were created for each assignment and posted on Canvas with the assignment instructions.

3.3 Activities and assessments

Students have been previously graded on attendance and participation in the laboratory. This semester the course was graded based on attendance (46%) and assignments (54%). Nine writing assignments and one quiz were designed to develop different literature research and scientific writing skills. Seven assignments were done in pairs, the quiz was assigned individually, and two laboratory reports were done in groups of three. The pairs and groups were consistent throughout the course.

One of the reports was the students first assignment after the first laboratory session, the report served as a baseline for their scientific writing skills. In this first report, students were given instructions for the assignment that included a description of the contents for each section of the report, the rubric was posted with the assignment (Appendix 3). To assess improvement on scientific writing a second report was assigned at the end of the course after the second to last laboratory session. Students were given more general instructions for the introduction and materials and methods section of the report. The rubric developed for this assignment had more detailed categories in accordance with what students had learned throughout the course (Appendix 4). The grading rubrics for both reports had a first section that function as a checklist for student followed by the analytic section of the rubric.

The remaining six writing assignments are briefly described in Appendix 2. One of these assignments was designed to work on the student's literature research and evaluation of sources skills. Six were designed to develop scientific writing skills e.g., paraphrasing, incorporate information of sources in an introduction. Each assignment used the laboratory theme as topic for the assignment. The intention was not only to connect both sections of the class but to also help students get familiarized with journals and other sources from their major.

The quiz used five hypothetical scenarios to test student's ability to determine if plagiarism was committed in different scenarios. The questions were obtained from Turn it in's online quiz ([Turnitin Plagiarism Quiz](#)) and resources from plagiarism.org. The quiz had no time limit and allowed the students to take it twice, preserving the highest score.

4. Analysis of Student Learning

4.1 Performance in literature research assignment

This was the second assignment after the laboratory report and after they had their second communications lectures. In this assignment students conducted a literature search using keywords and Boolean in a database or search engine. Then chose six sources three reliable and three unreliable and explained the rationale for the classification. All their sources should be appropriated listed in the APA style.

Overall students used a combination of search engine and databases, some groups used both

some used one type searching aid. Most students used Boolean operators to help broaden or narrow down their search. Most groups correctly assess their source reliability, the few instances of incorrect assessment included thesis or article from a lesser known but peer-reviewed journal labeled as unreliable. However, five out of 6 groups were still using the wrong citation style or missing elements in the citation.

4.2 Improvement of writing skills and understanding plagiarism

4.2.1 Paraphrasing, citation, and references

Both in-text citation and reference list got progressively better with the subsequent assignments. Most students made minor mistakes in style or elements included e.g., using “and” instead of “&”, missing commas between author and year, including a recovery date for web sources without a “last updated” date. There were a few instances of mistaken identification of the source, which was more common with articles obtained online as students sometimes mixed elements of web sources in these citations. The assignments showed students had some misconceptions before the class about the style of citation and classification of the sources i.e., journal articles as web sources. However, after the lectures and continues feedback students made minor mistake that can be avoided if they pay attention to the style format and details. For the paraphrasing and summarizing assignments students did well overall but the majority tended to miss adding some relevant idea or misinterpreted some of the information. This problem is not due to student ignorance but lack of background in the topic. Some of the articles they used were complex and required deeper understanding of experimental design, specific techniques or specialized fields in food science. Samples of this assignments can be found in append.

4.2.2 Plagiarism

The average quiz grade was $86\% \pm 4\%$, with a minimum grade 67% and maximum of 100%. Most students (92%) used both allowed attempts for the quiz. Students that used to attempts generally improved their grade (45%) in the second attempt by 17 to 50%. However, some students (36%) maintained their grade while others worsen their grade (18%). The quiz shows students tend to miss some key details of citation guidelines even though they understand the gravity of the misconduct and the overall idea of giving credit. Some of the common mistakes were missing the in-text citations were not included in the manuscript or quotations marks were missing in a direct quote, graphics and picture require citations even if they are creative commons, not citing a source if you used the ideas to create a diagram or other graphic representation.

4.2.3 Writing introduction and material and methods sections

One of the assignments related to the introduction and the overall direction of the laboratory was for students to write a hypothesis. We had a lecture on the topic and an in-class activity. Then students were assigned to write the hypothesis for one of the laboratories using the objective of the lab and to come up with their own. The intention of this assignment was to evaluate their understanding of the structure of a hypothesis and assess whether they could identify the variables that were being tested in the laboratory. Being able to identify those variables would help them understand the information their introduction would need to include.

I made clear to students I was not expecting them to come up with a perfectly written hypothesis, but I wanted to assess their thought process. The students in general were able to identify the variables related in the experiment and follow a structure similar to that of a hypothesis. Not all groups were as concise and used appropriate technical language however their performance is in accordance with what I would expect from a first-year student. Below are four samples of student writing.

Objective of the lab: The purpose of this experiment is to demonstrate the effects of ingredients and methodology on emulsions

Hypothesis of the students:

- If the ingredients and methodology are changed, the viscosity and appearance of the emulsified solution will change
- If the ingredients and the methodology behind emulsions are changed then the product will be affected based on what changes are made
- If we replace the oil in a standard mayonnaise with melted butter, and the vinegar with lemon juice, we will achieve an emulsified mixture with a texture and flavor similar to that of traditional hollandaise sauce
- Using non-traditional ingredients will negatively affect the ability of mayonnaise to emulsify because the emulsifiers are not present in the correct ways for the non-traditional ways.

The introduction assignment aimed to give students the opportunity to follow the “funnel” structure typically expected of an introduction. Details of the assignment instructions and rubrics can be found in Appendix 5. Overall the majority of the teams were able to successfully use the “funnel” structure to write their introduction. A couple of team struggled with appropriate citation and progressive organization of ideas to state the need and justify the objective of the experiment. One team struggled with the objective and mistook the intent of the laboratory, use simple experiments to train food scientists, for the objective of the experiment. The difference changed the introduction to change the objective to an educational aspect that students would not be able to assess through their laboratory experience. These mistaken objective and other writing samples in laboratory 1 exemplify students have a hard time separating the experience of the lab with the objective of the experiment. And sometimes miss the “big picture” that would allow them to write better laboratory reports that focus on the goal of the experiment and not the experience of the lab.

The last assignment before students had to write the second laboratory report was converting a laboratory protocol into the narrative section of materials and methods. Details of the assignment instructions and rubric can be found in Appendix 7. Half of the teams were able to write a very concise narrative of the methodology with enough detail to serve as a valid support of the experimental method. The other half of the teams had a few extra details but overall they were successful at writing a good narrative for the material and methods section. Half of the teams included a list of material which I explained in lecture is not usually part of the narrative but it is part of protocols. All teams avoided first person narrative and were successful at narrating the methodology rather than the laboratory experience which was a more common

occurrence in their first laboratory report.

This is a writing sample of a concise narrative from group A

Moisture content in cereal was measured using an O’Haus MB 200 moisture analyzer from the United States of America. A fluff breakfast cereal was tested in this experiment. First a ten-gram sample was weighed using an analytical balance and then crushed into a fine dust. Once crushed the sample was placed onto a weighing tray evenly in the moisture analyzer. The initial weight was recorded. The sample was then in the moisture analyzer for nine minutes at 140 degrees Celsius. Once the analysis was complete, a value is given for moisture which is the percentage for the sample.

The next paragraph is the writing sample form group F which is less concise

The moisture content of a red delicious apple was measured by use of a moisture analyzer (Mb200, O’Haus, United States). The apple sample was prepared by finely dicing and then grinding into a rough puree. A 10g sample of apple was then measured out using an 0.0001g precision analytical balance (VWR-224AC). The sample was then run in the moisture analyzer at 190 C for 10 minutes, and 120 C for 10 minutes. The moisture content of an extruded oat cereal was measured by the use of the same moisture analyzer (Mb200, O’Haus, United States). The cereal sample was crushed before being measured using a 0.0001g precision analytical balance (VWR-224AC). The sample was run on the standard setting, 140 C for 9 minutes. The moisture content was provided by the moisture analyzer.

4.3 Comparison of the two laboratory reports

Overall, the introduction of the first laboratory reports had relevant background information, few of the reports included more specific information that would talk about the state of the science or the problem/need and none made a connection between the topic and the objective of the lab.

The material and methods sections included some details that were not necessarily relevant but was generally good. Most teams gave a description of their laboratory experience instead of constructing a narrative of the methodology. As expressed before, this shows students have a hard time separating their laboratory experience with the objective of the experiment and “big picture” narrative typical of scientific writing. All teams had errors in citation style and references, only one source was not reliable, most sources were peer-reviewed, and all were relevant to the topic.

The overall improvement after the semester was evident in the second laboratory report. The structure and organization of the introduction followed “funnel” idea when at topic goes from general to specific information. Most groups also stated a problem or need, state of science and organized the information in a progressive manner that justified the objective. They would need more practice and food science background to reach higher levels of performance, but they included all the elements taught in-class.

The students used more technical and precise language in the material and methods sections in

the second report. They only included relevant information of the experiment and used concise narrative. There was no use of first-person narrative, and the section appropriately described the methodology and not the experience in the laboratory.

All teams improved in their use of proper citation and reference style. Only one team struggled with citations.

In both reports most teams turned in a cohesive narrative style but one team clearly struggled from the beginning at editing the final report to keep the narrative cohesive. Examples of two teams for both sections are included in Appendix 8. No samples from the team that showed the lowest performance are shown as one of their members did not consent for their work to be used in the teaching inquiry.

4.4 Student surveys

To assess the opinion and attitude of the students on the course overall I used the results of the survey the university gives students to evaluate courses. The response rate for the survey was 58.33%. Selected statements and the average score obtained are shown in Figure 1 students had a positive impression of respect in the class, understood expectations, thought the learning tools supported their learning and appreciated the active participation in the class and with others. On the other hand they were more neutral toward communication with instructor and useful feedback, course activities and being challenged by the course.

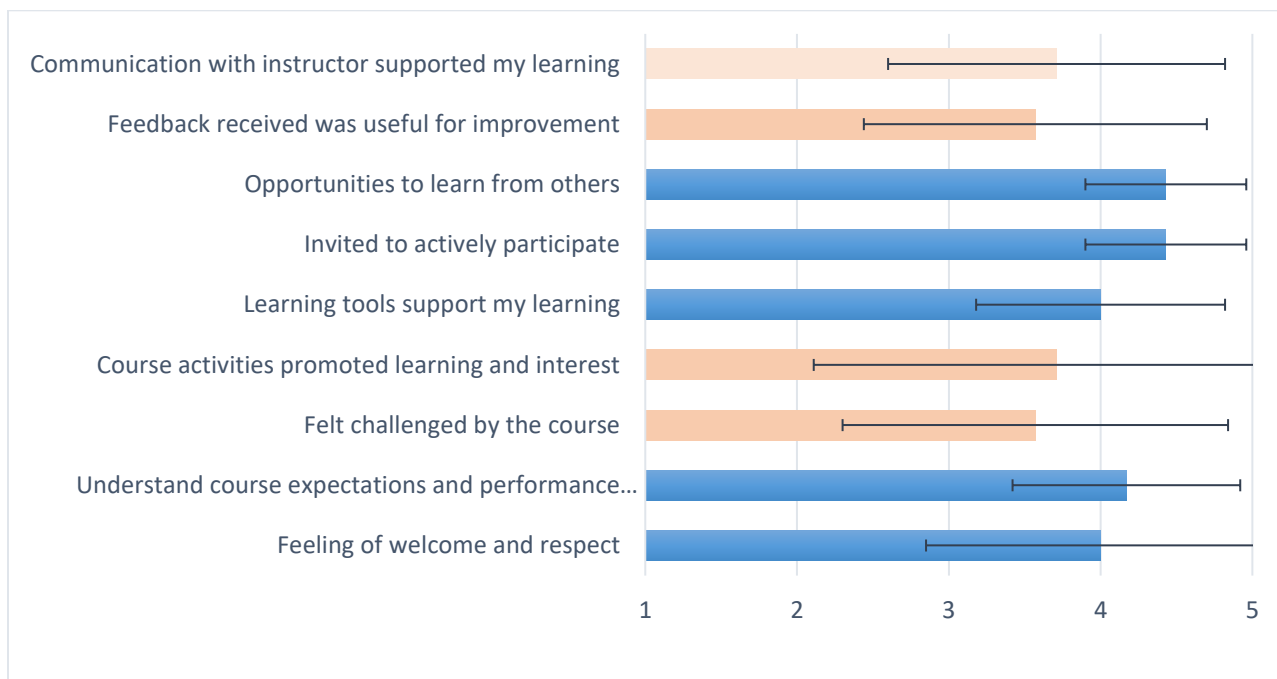


Figure 1. Student evaluation of educational elements relevant for student learning. Statements were evaluated in a 5 point likert scale with 1 being "strongly disagree" and 5 "strongly agree". Categories in blue received an average ≥ 4 , those in orange received an average of < 4 .

Figure 2 shows aspects students found beneficial for their learning experience were the active learning opportunities and quality interaction with other students. Comments of student in this question remarked liking the hands-on activities and working with their cohort. Most of the comments expressed they found useful and fun to understand the effects caused by when ingredients are changed "It fun and beneficial to actually put to practice what we were learning."

A student appreciated the instructor would explain why some experiments went wrong and stated “she (instructor) did a good job of explaining what was expected and made her expectations of us very clear”.

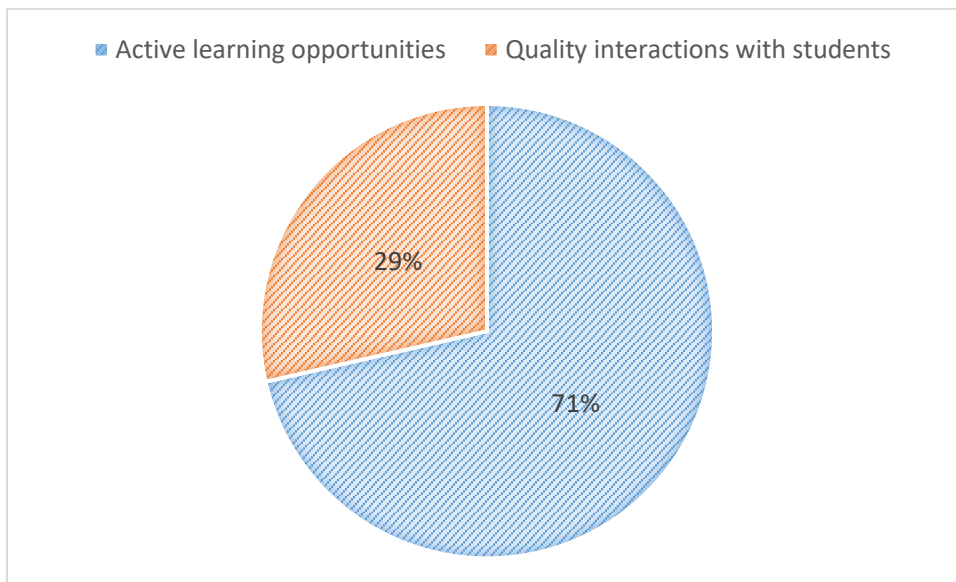


Figure 2. Aspects of the class students found beneficial for their learning

Regarding opportunities for improvement, some participants did not feel improvement was necessary, others thought the learning material could be improved followed. A smaller group of students saw engagement in assignments, performance expectations and instructor communication as opportunities for improvement. The overall comments of the student were on the writing assignments and lectures, a couple said some of the concepts they were already familiarized with and felt some lectures and assignments were redundant. One student found the literature research of basic food science concept challenging and stressful.

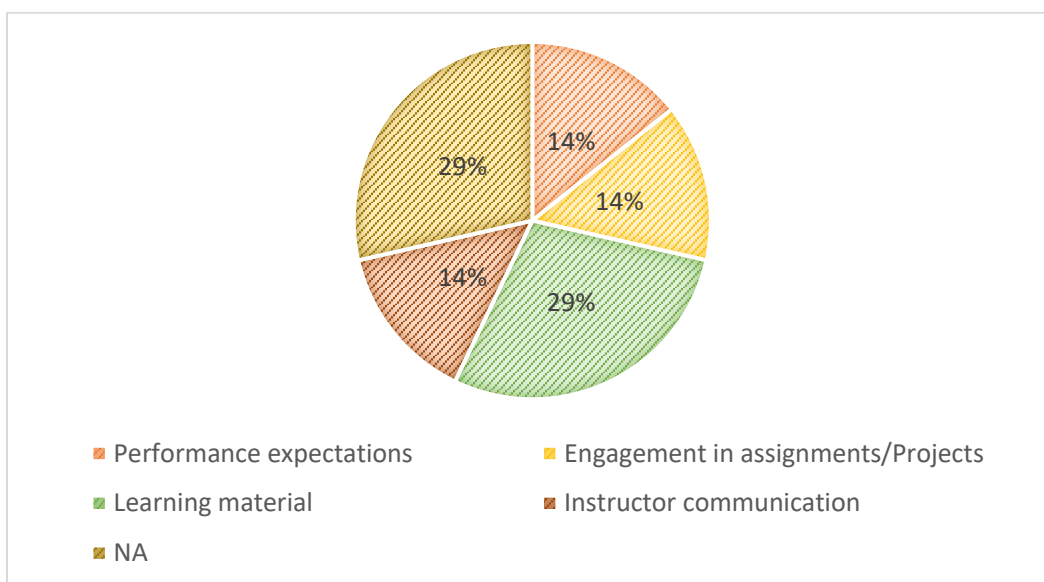


Figure 3. Opportunities for improvement

The majority of the students spend less than 4 hours outside of the laboratory sessions to

prepare for the class or do assignments. A small portion (29%) spent more than 4 hours on the course (Figure 4).

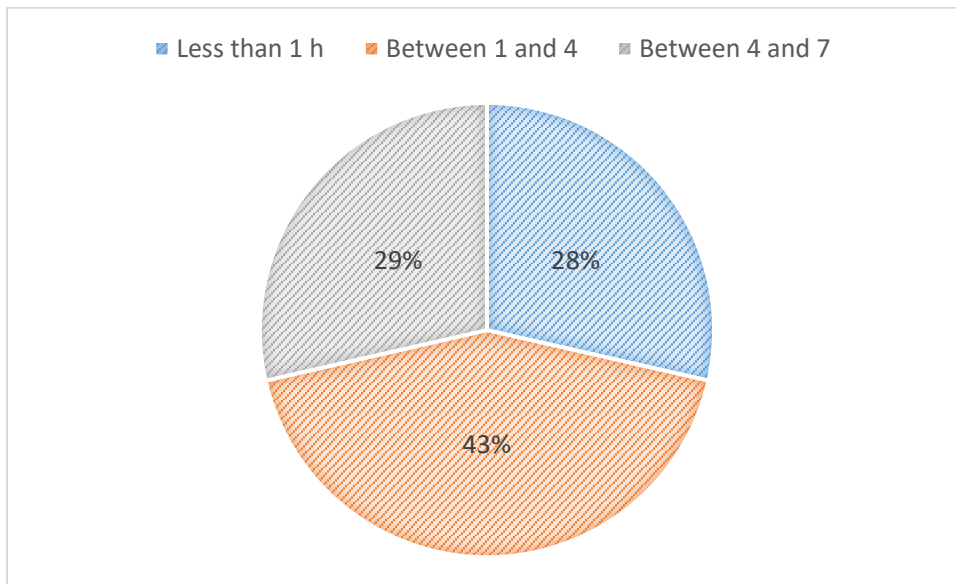


Figure 4. Time spent on the class outside of the laboratory

Overall positive comments on the class were about the laboratory sessions and enjoying applying scientific principles related to their major. On the other hand, students had a negative attitude towards the writing assignments. Some students found the assignments redundant with what they had learned about writing. Other students thought they did not learn enough because most of the small assignments were done in teams.

5. Reflection on the Course

Overall, the lectures and assignments successfully helped students improve their research and writing skills and brought their abilities to a more professional level. However, some students did not find all activities useful and thought they were redundant. Moving forward with the course there are three objectives I would like to achieve:

1. Modify some of the lab activities to make them more inquiry based
2. Consolidate some of the communication lectures to topics students have more problems with
3. Make the communication part more interactive
4. Reduce the number of assignments and make the small ones individual
5. Add roles to the team assignments to promote team work that is more cohesive and collaborative rather than dividing tasks

This project has taught me some valuable lessons about student perception of their skills and their performance. As novices in the field they do not know what they don't know or what skills they are not proficient at. Even though they all have cited and paraphrased before their performance at the beginning of class was that of a novice, which is to be expected. However, students expect novel material and find refinement of skills tedious and even boring. Therefore, trying different approaches or even different technical writing like memorandums may help students polish their skills while offering a more "novel" type of document that would be necessary for their professional careers.

Appendix 1 Syllabus

Instructor: Rossana Villa Rojas

Office: 263 Food Innovation Center (FIC), Lincoln, NE, USA

E-mail: rvillarojas2@unl.edu

Office hours: by appointment

Teaching Assistant: Jess Humphrey

E-mail: jshumphrey@huskers.unl.edu

Office hours: by appointment

Syllabus last updated on: January, 2022

Course information

FDST 132: Practical Applications in Food Science

1 credit hours of laboratory undergraduate level

Class time: Tuesdays 2 to 5 pm

Classroom:

January 18, room 220 at Food Innovation Campus (FIC)

Most classes room 107 at FIC

March 8, April 12 and 19, room 106 at FIC

April 26, Animal Science building (instructions on Canvas)

Prerequisites: none

Textbook and Supplemental Resources

Required textbook: none

Supplemental readings and assignments: Provided via Canvas

Course description

Welcome! This class is designed to give you an orientation/introduction to the world of the food scientist and basics of scientific communication. Most of you are aware that every person lives with food science every day but, for the most part, may be totally unaware of the importance of this field of study.

Course Goals

1. Relate basic FST concepts to everyday products/processes
2. Associate the different elements of the scientific methods to their laboratory experience
3. Describe the purpose and key elements of the sections in a laboratory report
4. Integrate the key elements of the introduction and material and methodology sections in their laboratory reports
5. Evaluate appropriate scientific sources
6. Paraphrase, summarize and appropriately cite relevant information

Responsibilities and expectations

1. Your instructor is responsible for:
 - a. Upload to Canvas manuals, report instructions and rubrics for the laboratory

- b. Hold office hours
 - c. Give timely feedback
2. Each week you will be responsible for:
- a. Print and read the manual for the laboratory session ahead of time
 - b. Attend and perform the laboratory activities with your team
 - c. Write the laboratory report or activity with your team according to the posted instructions and upload it to Canvas

Lecture schedule and report due dates

The following is a tentative schedule for our course, if there are any changes I will let you know in advance through Canvas.

If in-person classes are canceled, you will be notified of the instructional continuity plan for this class by Canvas announcement.

Students in this course must work in close physical proximity to one another for extended periods of time in order to achieve the academic goals of the course. For this reason, the Department of Food Science and Technology and the College of Agricultural Sciences and Natural Resources have determined that ***face coverings will be required in this course***. If you are unwilling to comply with this requirement, please visit with your advisor about possible alternative courses that you might take in lieu of this one.

Date	Lab topic	Communication topic	Assignment	Assignment Points
18-Jan	Introduction	Scientific discovery and communication		
25-Jan	Food Processing-emulsion (lab divides in 4 groups)		Write a lab report using the instructions posted on Canvas (Teams of 3)	50
1-Feb	Food Processing-sugar (lab divides in 5 groups)	Literature research and evaluation of sources	Find 6 sources that talk about how sugar and how temperature affects its properties to make candy, classify sources as credible or non-credible	40
8-Feb	Sensory laboratory (lab divides in 2 groups)	Citations and plagiarism	Find 6 sources (one of each type) that talk about emulsions and create in-text and list of reference for each	40
15-Feb	Food Processing-fermentation	Paraphrasing	Find two credible sources that talk about the fermentation process during kimchi making. Copy paste two paragraphs from each source and then paraphrase each paragraph	60
22-Feb	Food Processing-canning (Work in pairs)	Summarizing	Find two credible sources that talk about the canning. Copy paste two paragraphs from each source and then summarize each paragraph	60

1-Mar	Food Processing-dairy: mozzarella (lab divides in 4 groups)	Scientific discovery and the purpose of the hypothesis or research question	Using the objectives, write the hypothesis for the emulsion, and mozzarella labs	50
8-Mar	Food safety-Bacteria (Stratton FIC 106)			
15-Mar	Spring break			
22-Mar	Food Engineering-extrusion/ dairy plant visit	Objective and key elements of an effective lab report introduction		
29-Mar	Food Processing-baking: cookies (lab divides in 4 groups)	Integrating literature research into a lab report introduction (Jess)	Identify the objective of this lab session and then construct an introduction about the effect of ingredients on baking of cookies that serves to introduce the objective	60
5-Apr	Food Engineering-Freezing and boiling (work in pairs)	Objective and key elements of an effective lab report materials and methods section		
12-Apr	Food Chemistry- pH and moisture (work in pairs, FIC 106)	From activities in the lab to material and methods section	Use the instructions of the lab manual to write a material and methods section for this laboratory	60
19-Apr	Food Chemistry-enzymes (work in 4 groups, FIC 106)	Creating a full report	Write a full lab report on PPO inactivation by chemicals or catalase inactivation with temperature (Teams of 3)	80
26-Apr	Food processing-meats (Sullivan-East campus Animal Science)			
3-May	No class			
10-May	Final exams week (no final exam)			
			Total points	500

Attendance

A class may be missed if there is a good reason (illness; need to attend an interview or travel) AND you notify me ahead of time or if proof of problem is shown, e.g. doctor's report.

Grading

The final grade will be calculated based on 1000 points distributed as follows

Assignment	Points
Attendance	450
9 Laboratory reports/activities	500
Quiz on plagiarism	30
Total	980

Letter grades will be assigned as follows:

%	Letter grade	%	Letter grade
100	A+	72 – 77.99	C
92 – 99.99	A	70 – 71.99	C-
90 – 91.99	A-	68 – 69.99	D+
88 – 89.99	B+	62 – 67.99	D
82 – 87.99	B	60 – 61.99	D-
80 – 81.99	B-	<60	F
78 – 79.99	C+		

The two full laboratory reports (first and last assignment) will be done in teams of three. All other assignments are to be done in teams of two students except the quiz. All assignments are due a week after they are assigned. Requirements and rubric for each laboratory report or activity will be posted on Canvas. Each full laboratory report should have a self-check list as the first page (also posted on Canvas).

Late assignments

Any assignment turned in after the deadline will be considered a late assignment and have a 5% deduction for every day late. No assignments will be accepted three days after the deadline.

Excuses for extraordinary circumstances (sickness, family problems and others) can be made if you e-mail me before the assignment is due or as soon as it is possible.

UNL Course Policies and Resources

Students are responsible for knowing the university policies and resources found on this page (<https://go.unl.edu/coursepolicies>Links to an external site.):

- University-wide Attendance Policy
- Academic Honesty Policy (see Student Code of Conduct, Section B. Conduct - rules and Regulations, 1. Acts of Academic Dishonesty)
- Services for Students with Disabilities (see [Services for Students with Disabilities](#)Links to an external site.)
- Mental Health and Well-Being Resources
- Final Exam Schedule
- Fifteenth Week Policy
- Emergency Procedures
- Diversity & Inclusiveness
- Title IX Policy
- Other Relevant University-Wide Policies

Food Science department policies for academic honesty and grade appeal may be found on this page <https://foodsci.unl.edu/academic-honesty>Links to an external site.

For up to date Covid-19 updates and policies please visit <https://covid19.unl.edu/>

Appendix 2 Framework of the communication section of the course

Learning outcome	Lecture topic	In-class activity	Assessment
2. Associate the different elements of the scientific methods to their laboratory experience	Review of the scientific method and how it is reflected in the laboratory report		
	No lecture just laboratory experiment		Write a lab report using the instructions posted on Canvas
5. Evaluate appropriate scientific sources	Literature research and evaluation of sources		Find six sources that talk about how sugar and how temperature affects its properties to make candy, classify sources as credible or non-credible
	Citations and plagiarism	Discuss case studies	Find six sources (at least one book or book chapter, one journal article, one webpage from an organization/group) that talk about sensory analysis and create in-text and list of reference for each
6. Paraphrase, summarize and appropriately cite relevant information	Paraphrasing	Paraphrase two paragraphs of a source. Share results and discuss performance	Find two credible sources that talk about the fermentation process during kimchi making. Copy pastes two paragraphs from each source and then paraphrase each paragraph
	Summarizing	Summarize two studies. Share	Find two credible sources that talk about the canning. Copy pastes two paragraphs

		results and discuss performance	from each source and then summarize each paragraph
3. Describe the purpose and key elements of the sections in a laboratory report	<p>The purpose of the hypothesis in scientific discovery</p> <p>Objective and key elements of an effective laboratory report introduction</p>		Using the objectives, write the hypothesis for the emulsion, and mozzarella labs
4. Integrate the key elements of the introduction and material and methodology sections in their laboratory reports	<p>Integrating literature research into a lab report introduction</p> <p>Objectives and key elements of the materials and methods section</p> <p>From activities in the laboratory to writing the materials and methods section</p>		<p>Identify the objective of this lab session and then construct an introduction about the effect of ingredients on baking of cookies that serves to introduce the objective</p> <p>Use the instructions of the lab manual to write a material and methods section for this laboratory</p>
	No lecture just laboratory experiment		Write a full lab report on PPO inactivation by chemicals or catalase inactivation with temperature

Appendix 3 Assignment instructions for laboratory 1 and grading rubric

Lab report for emulsion lab

Due date: 01-Feb before class

Upload your report to Canvas, if you cannot access Canvas, e-mail it to rvillarojas2@unl.edu
You will work with your lab team (3 people) on the report, only one report should be uploaded per team.

Format:

1.5 space, sans serif font (Arial or Calibri preferred)

Title centered font size 14 and bold.

Subtitles for sections aligned to the left, 12 size font.

Body: font size 12, aligned left

This lab report will be less than two pages not including references

Instructions and sections
Name of all team members (student ID) example Rossana Villa (XXXXX)
Class code (FDST 132)
Date

Emulsion lab report

Introduction (maximum 3/4 of a page minimum half a page)

Define what an emulsion is and how different ingredients and processing affect its formation (**use appropriate references**). Use library link on Canvas to do research.

Include the objective of the laboratory in your introduction as the last sentence.

Make sure to use in-text citations for your references. Use Journal of Food Science style (see reference section).

Materials and Methods

One paragraph describing the recipe that your group used, and how this recipe was different from the other groups'.

Results and discussion

One paragraph discussing the sensory characters of the different recipes in lab and explain why we observed differences (use appropriate references).

Conclusion

With three to four sentences discussing how changing ingredients or technique can affect emulsions.

References

Any information you used should be referenced appropriately in the text (introduction and results and discussion sections). All references cited in text should be listed in the references section. All references should be from a trusted source. For citation style refer to JFS

(<https://www.ift.org/news-and-publications/scientific-journals/journal-of-food-science/author-guidelines> (Links to an external site.))

https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_style_introduction.html (Links to an external site.)

FDST 132 lab report 1

You've already rated students with this rubric. Any major changes could affect their assessment results.

FDST 132 lab report 1			
Criteria	Ratings		Pts
Included: Student name	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Student ID	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Class code	0.2 pts Full Marks	0 pts No Marks	0.2 pts
Included: Date	0.3 pts Full Marks	0 pts No Marks	0.3 pts
Included: Report title	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Introduction	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Objective	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Result and discussion	0.5 pts Full Marks	0 pts No Marks	0.5 pts

FDST 132 lab report 1

Criteria	Ratings				Pts
Included: Conclusion statement	0.5 pts Full Marks	0 pts No Marks			0.5 pts
Included: References in text	0.5 pts Full Marks	0 pts No Marks			0.5 pts
Included: List of references	0.5 pts Full Marks	0 pts No Marks			0.5 pts
Report elements: Title	1.5 pts Full Marks The title of the report reflects the information in the report	0.9 pts title is somewhat related	0 pts No Marks		1.5 pts
Report elements: Introduction	5 pts Full Marks The introduction clearly explains the topic and justifies its importance	4.5 pts it mostly explains and justifies importance	3.5 pts requires work	0 pts No Marks	5 pts
Report elements: Objective	2 pts Full Marks The objective (last sentence of your introduction) says why you did the experiment	1.6 pts their objective needs some rewording but is good	1.2 pts a direction or theme for the writing is stated but no objective is clearly written	0 pts No Marks	2 pts
Report elements: Materials and methods	5 pts Full Marks The materials and methods briefly describe what was done in the laboratory with enough detail to	4.66 pts the methodology is a bit too descriptive of actions taken in the lab instead of the methods used	4.34 pts is not a narrative is a list of steps	0 pts No Marks	5 pts

FDST 132 lab report 1

Criteria	Ratings					Pts
	be repeated by others.					
Report elements Results and discussion	5 pts Full Marks The results and discussion state what was observed in the laboratory, explain why it happened and compare it to publish data when available	4.75 pts some information or discussion is missing but overall, the section is good	4.25 pts it needs more discussion or description of results	3.75 pts there is little discussion or missing result description	0 pts No Marks	5 pts
Report elements: The conclusion	2.5 pts Full Marks The conclusion clearly states the overall results of the research	2.25 pts the conclusion needs more details but is overall good	1.75 pts the conclusion does not include the results or talks about the results in the context of the report topic		0 pts No Marks	2.5 pts
Organization and style	2 pts Full Marks The paper is easy to follow, and ideas are complete	1.6 pts there are few awkward sentences but overall ok	0.8 pts there are too many awkward sentences and jumping between ideas		0 pts No Marks	2 pts

FDST 132 lab report 1

Criteria	Ratings				Pts
Writing and structure	4 pts Full Marks The organization of the report is logical, uses a compelling progression of ideas and is easy to read	3.73 pts Some sentences are awkward	0 pts No Marks		4 pts
Source integration	4 pts Full Marks The information from references is smoothly integrated into the text	1.87 pts no reference integrated into the text	0 pts No Marks		4 pts
Grammar and spelling	4 pts Full Marks The sentence structure is generally correct with few awkward sentences and minimal punctuation errors	3.47 pts too many awkward sentences and punctuation errors	0 pts No Marks		4 pts
References	2 pts Full Marks All information has a source	1.6 pts few places are missing sources	1.2 pts various sources are missing	0 pts No Marks	2 pts
References	2 pts Full Marks In text citations follow the correct format (Journal of Food Science)	1.6 pts references are there but format is incorrect	0 pts No Marks		2 pts
References trustworthiness	3 pts Full Marks All references are trusted sources	2.7 pts one or two references are dubious sources	2.1 pts various sources are not trusted	0 pts No Marks	3 pts
References list	3 pts Full Marks The references in the reference	2.4 pts some information is missing or in	1.2 pts the references are missing a	0 pts No Marks	3 pts

FDST 132 lab report 1

Criteria	Ratings				Pts
	list are in the correct format	the wrong order	lot of information		
Total Points: 50					

Appendix 4 Assignment instructions for laboratory 2 and grading rubric

Due date: 29-April by the end of day

Upload your report to Canvas, if you cannot access Canvas, e-mail it to rvillarojas2@unl.edu

You will work with your lab team (3 people) on the report, only one report should be uploaded per team.

Format:

1.5 space, sans serif font (Arial or Calibri preferred)

Title centered font size 14 and bold.

Subtitles for sections aligned to the left, 12 size font.

Body: font size 12, aligned left

This lab report will be less than two pages not including references

Instructions and sections

Name of all team members (student ID) example Rossana Villa (XXXXX)

Class code (FDST 132)

Date

Inactivation of enzymatic activity

Introduction (maximum a page minimum half a page)

Using the knowledge acquired in class compose an introduction for the laboratory report on inactivation of enzymatic activity. For this report you will chose one of the laboratory activities to report on: catalase inactivation by thermal treatment OR PPO inactivation by chemical treatment. Include the objective of the laboratory in your introduction as the last sentence. You will have to modify the objective of the laboratory to only reflect one of the activities.

Materials and Methods

Using the protocol from your manual construct a narrative description of material and methodology. Make notes of any equipment or material details during the laboratory session.

Results and discussion

In this section you will report the results from your experiment. For catalase inactivation you will use the end point, and for the PPO inactivation you will use the table with color rating for the different treatments. Make sure to describe what you observe, this is the result section. And then explain your observations and compare them to anything reported in the literature; this is the discussion section.

Conclusion

With three to four sentences explain how thermal or chemical treatments impacts enzymatic activity in foods and the implication in food processing.

References

Any information you used should be referenced appropriately in the text (introduction and results and discussion sections). All references cited in text should be listed in the references section. All references should be from a trusted source. For citation style refer to JFS (<https://www.ift.org/news-and-publications/scientific-journals/journal-of-food-science/author-guidelines> (Links to an external site.))

https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_style_introduction.html (Links to an external site.)

FDST 132 Final laboratory report			
FDST 132 Final laboratory report			
Criteria	Ratings		Pts
Included: Student name	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Student ID	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Class code	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Date	0.5 pts Full Marks	0 pts No Marks	0.5 pts
Included: Report title	1 pts Full Marks	0 pts No Marks	1 pts

FDST 132 Final laboratory report

Criteria	Ratings			Pts
Introduction: General background	<p>6 pts Advanced The introduction starts with a general background of the area of research/topic. The authors give the audience enough information to understand the area or topic in general.</p>	<p>5.04 pts Intermediate The introduction starts with some general background of the area of research/topic. The authors give the audience some information to understand the area or topic in general</p>	<p>3 pts Novice The introduction does not start with a general background of the area of research/topic. The authors give the audience vague, irrelevant or insufficient information to understand the area or topic in general</p>	6 pts
Introduction: Problem/need/knowledge gap	<p>6 pts Advanced There is a clear statement of a problem, need or gap in knowledge that needs to be addressed.</p>	<p>5.04 pts Intermediate There is a statement that somewhat relates to a problem, need or gap in knowledge that needs to be addressed.</p>	<p>3 pts Novice There is a statement that indicates a general direction to a problem, need or gap in knowledge that needs to be addressed.</p>	6 pts
Introduction: Justification	<p>8 pts Advanced There is a clear statement that indicates why this problem/need/gap in knowledge is relevant and justifies solving it or searching for an answer</p>	<p>7.04 pts Intermediate There is a vague statement that indicates why this problem/need/gap in knowledge is relevant and somewhat justifies solving it or searching for an answer</p>	<p>4 pts Novice There is a statement that gives a general direction of why this problem/need/gap in knowledge may be relevant without justifying solving it or searching for an answer</p>	8 pts

FDST 132 Final laboratory report

Criteria	Ratings			Pts
Introduction: State of the Science	<p>6 pts Advanced The authors clearly mention information and/or experiments previously published and relevant to the topic that helps the reader understand what has been done or is known in this area.</p>	<p>5.28 pts Intermediate The authors mention some information and/or experiments previously published and somewhat relevant to the topic but only paints a vague picture of what has been done or is known in this area.</p>	<p>3 pts Novice The authors mention some information and/or experiments previously published but is irrelevant to the topic and does not help the reader understand what has been done or is known in this area.</p>	6 pts
Introduction: Objective and/or hypothesis	<p>6 pts Advanced There is clearly stated objective(s) in the last paragraph. The objectives are SMART, are clearly related to the goal and frame the scope of the research. The authors might have included a hypothesis related to the objective. The hypothesis clearly states the variables that will be studied and the relationship between the</p>	<p>5.28 pts Intermediate There is a statement that somewhat similar to an objective(s) in the last paragraph. The objectives are missing on or two SMART elements OR are not clearly related to the goal OR do not frame the scope of the research.</p>	<p>3 pts Novice There is a statement explaining the general direction of the research but is not an objective. The "objectives" are not SMART elements OR are not clearly related to the goal OR do not frame the scope of the research.</p>	6 pts

FDST 132 Final laboratory report

Criteria	Ratings			Pts
	<p>variables. The type of evidence required to refute the hypothesis is clear.</p>			
<p>Materials and Methods: general format</p>	<p>6 pts Advanced Presents the material and methodology in a simple and direct manner. The section answers how, and when, data was obtained. This section provides all the information needed to allow another researcher to judge the study or actually repeat the experiment. No unnecessary details are present.</p>	<p>5.04 pts Intermediate Presents the material and methodology mostly in a simple and direct manner. The section mostly answers how, and when, data was obtained. This section provides most of the information needed to allow another researcher to judge the study or actually repeat the experiment. Some unnecessary details are present.</p>	<p>3 pts Novice There somewhat a mention of the plants or animals involved, but little specific details are given. The section also indicates few of the materials used and may include technical specifications and quantities (in SI units). Generic or</p>	<p>6 pts</p>

FDST 132 Final laboratory report

Criteria	Ratings		Pts
		chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned. Several details are missing.	

FDST 132 Final laboratory report

Criteria	Ratings			Pts
<p>Materials and Methods: Materials</p>	<p>6 pts Advanced There is a clear description of the plants or animals involved, with exact descriptions (genus, species, strain, cultivar, line, etc.); include Latin names in italics, even for common plants, upon first mention in text (e.g., maize or corn, <i>Zea mays</i> L.). The section also indicates materials used, with exact technical specifications and quantities and their source or method of preparation. Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned</p>	<p>5.04 pts Intermediate There somewhat a description of the plants or animals involved, with descriptions (genus, species, strain, cultivar, line, etc.); and may include Latin names in italics, even for common plants, upon first mention in text (e.g., maize or corn, <i>Zea mays</i> L.). The section also indicates some materials used and may include technical specifications and quantities (in SI units) and their source or method of preparation. Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned. Some details might be missing.</p>	<p>3 pts Novice There is little description of the plants or animals involved, with descriptions (genus, species, strain, cultivar, line, etc.); and may include Latin names in italics, even for common plants, upon first mention in text (e.g., maize or corn, <i>Zea mays</i> L.). The section also indicates few materials used and may include few technical specifications and quantities (in SI units) and their source or method of preparation. Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned. Most details might be missing.</p>	<p>6 pts</p>

FDST 132 Final laboratory report

Criteria	Ratings			Pts
Material and Methods: methodology	<p>6 pts Advanced Standard methods, modifications to published methods and/or new methods followed were described in chronological order with the necessary detail and precision but without excessive description of common procedures.</p>	<p>5.28 pts Intermediate Standard methods, modifications to published methods and/or new methods followed were described in somewhat chronological order with most of the detail and precision, but some excessive description of common procedures is present.</p>	<p>3 pts Novice Standard methods, modifications to published methods and/or new methods followed were described in with some chronological order with some of the detail and precision, but various excessive details of common procedures are present.</p>	6 pts
Materials and Methods: sentence structure	<p>5 pts Advanced The Materials and Methods section was presented in past tense and passive form.</p>	<p>4.4 pts Intermediate The Materials and Methods section was presented mostly in past tense and passive form.</p>	<p>2.5 pts Novice The Materials and Methods section was presented sometimes in past tense and passive form.</p>	5 pts

FDST 132 Final laboratory report

Criteria	Ratings			Pts
Results and discussion	<p>6 pts Advanced The results and discussion state what was observed in the laboratory, explain why it happened and compare it to publish data when available</p>	<p>4.5 pts Intermediate The results and discussion mostly state what was observed in the laboratory, mostly explain why it happened and compare it to publish data when available</p>	<p>3 pts Novice The results and discussion somewhat state what was observed in the laboratory, somewhat explain why it happened and compare it to publish data when available</p>	6 pts
Conclusion	<p>6 pts Advanced The conclusion clearly states the overall results of the research and relates them to the objective of the experiment. There is a clear statement on how the results can impact the broader field of study.</p>	<p>4.5 pts Intermediate The conclusion mostly states the overall results of the research and relates them to the objective of the experiment. There is a statement that mostly explains how the results can impact the broader field of study.</p>	<p>3 pts Novice The conclusion somewhat states the overall results of the research and relates them to the objective of the experiment. There is a statement that somewhat explains how the results can impact the broader field of study.</p>	6 pts

FDST 132 Final laboratory report

Criteria	Ratings			Pts		
Organization, writing and structure	<p>5 pts Advanced The paper is easy to follow with a logical progression of ideas and sentences express complete thoughts. The information from references is smoothly integrated into the text and there are few awkward sentences and/or spelling errors.</p>	<p>3.75 pts Intermediate The paper is mostly easy to follow with a logical progression of ideas and most sentences express complete thoughts. The information from references is mostly integrated into the text and there are some awkward sentences and/or spelling errors.</p>	<p>2.5 pts Novice The paper is somewhat easy to follow with a logical progression of ideas and some sentences express complete thoughts. The information from references is sometimes smoothly integrated into the text and there are several awkward sentences and/or spelling errors.</p>	5 pts		
References: Reference type	<table border="1"> <tr> <td data-bbox="521 984 935 1323"> <p>1 pts Advanced The type of reference was identified correctly demonstrated in the proper use of citation style, elements, format and punctuation</p> </td> <td data-bbox="935 984 1365 1323"> <p>0.5 pts Novice The type of reference was incorrectly identified demonstrated in the improper use of citation style, elements, format and/or punctuation</p> </td> </tr> </table>			<p>1 pts Advanced The type of reference was identified correctly demonstrated in the proper use of citation style, elements, format and punctuation</p>	<p>0.5 pts Novice The type of reference was incorrectly identified demonstrated in the improper use of citation style, elements, format and/or punctuation</p>	1 pts
<p>1 pts Advanced The type of reference was identified correctly demonstrated in the proper use of citation style, elements, format and punctuation</p>	<p>0.5 pts Novice The type of reference was incorrectly identified demonstrated in the improper use of citation style, elements, format and/or punctuation</p>					
References: elements	<p>1 pts Advanced All appropriate elements necessary to construct an appropriate citation according to the APA style for the list of references are present (authors, title, year/date, etc.)</p>	<p>0.75 pts Intermediate Most of citation information of the source is in the correct order according to the APA style (1 or 2 types of mistakes)</p>	<p>0.5 pts Novice Some of citation information of the source is in the correct order according to the APA style (more than 2 types of mistakes)</p>	1 pts		

FDST 132 Final laboratory report

Criteria	Ratings			Pts
References: Style	<p>1 pts Advanced The citation information of the source is in the correct order according to the APA style</p>	<p>0.75 pts Intermediate Some appropriate elements necessary to construct an appropriate citation for the list of references are missing (one or two missing per citation) according to the APA style</p>	<p>0.5 pts Novice Most appropriate elements necessary to construct an appropriate citation for the list of references are missing (more than 2 missing per citation) according to the APA style</p>	1 pts
References: Format	<p>1 pts Advanced The citation information uses the appropriate APA style for each category (abbreviations, italics, bold)</p>	<p>0.75 pts Intermediate The citation information mostly uses the appropriate APA style for each category (abbreviations, italics, bold) (1 or 2 types of mistakes)</p>	<p>0.5 pts Novice The citation information rarely uses the appropriate APA style for each category (abbreviations, italics, bold) (more than 2 types of mistakes)</p>	1 pts
References: Punctuation	<p>1 pts Advanced Punctuation used in the APA citation style before and after reference elements was used correctly</p>	<p>0.75 pts Intermediate Punctuation used in the APA citation style before and after reference elements was mostly used correctly (1 or 2 types of mistakes)</p>	<p>0.5 pts Novice Punctuation used in the APA citation style before and after reference elements was rarely used correctly (more than 2 types of mistakes)</p>	1 pts

FDST 132 Final laboratory report

Criteria	Ratings	Pts
Total Points: 80		

Appendix 5 Instructions and rubrics for introduction writing assignment

Due date: 5-April before class

Upload your homework to Canvas, if you cannot access Canvas, e-mail it to rvillarojas2@unl.edu

You will work with your lab team (2 people) on the report, only one report should be uploaded per team.

Format:

5 space, sans serif font (Arial or Calibri)

Title centered font size 14 and bold

Subtitles for sections aligned to the left 12 size font

Body, font size 12 aligned to the left

Instructions and sections

Name of all team members (student ID) example Rossana Villa (XXXXX)

Class code (FDST 132)

Date

Introduction

Instructions:

Using objective from the lab, what you have learned about introductions and how to integrate information from sources into your own introduction. Write an introduction for the baking laboratory. Remember to:

- Go from general to specific information
- Identify the problem, gap in knowledge or need
- Justify the need to solve or prove the hypothesis
- Talk about the state of the science
- Your introduction should be one to two pages long.

Reference format

For citation style refer to JFS (<https://www.ift.org/news-and-publications/scientific-journals/journal-of-food-science/author-guidelines> (Links to an external site.))

FDST 132 Introduction

You've already rated students with this rubric. Any major changes could affect their assessment results.

FDST 132 Introduction

Criteria	Ratings			Pts				
Included: Student name	<table border="1"> <tr> <td data-bbox="521 279 906 447">1 pts Full Marks</td> <td data-bbox="906 279 1273 447">0 pts No Marks</td> <td data-bbox="1273 279 1321 447"></td> </tr> </table>			1 pts Full Marks	0 pts No Marks		1 pts	
1 pts Full Marks	0 pts No Marks							
Included: Student ID	<table border="1"> <tr> <td data-bbox="521 447 906 615">1 pts Full Marks</td> <td data-bbox="906 447 1273 615">0 pts No Marks</td> <td data-bbox="1273 447 1321 615"></td> </tr> </table>			1 pts Full Marks	0 pts No Marks		1 pts	
1 pts Full Marks	0 pts No Marks							
Included: Class code	<table border="1"> <tr> <td data-bbox="521 615 906 784">1 pts Full Marks</td> <td data-bbox="906 615 1273 784">0 pts No Marks</td> <td data-bbox="1273 615 1321 784"></td> </tr> </table>			1 pts Full Marks	0 pts No Marks		1 pts	
1 pts Full Marks	0 pts No Marks							
Included: Date	<table border="1"> <tr> <td data-bbox="521 784 906 952">1 pts Full Marks</td> <td data-bbox="906 784 1273 952">0 pts No Marks</td> <td data-bbox="1273 784 1321 952"></td> </tr> </table>			1 pts Full Marks	0 pts No Marks		1 pts	
1 pts Full Marks	0 pts No Marks							
Homework elements: General background	<table border="1"> <tr> <td data-bbox="521 952 768 1585"> 15 pts Advanced The introduction starts with a general background of the are of research/topic. The authors give the audience enough information to understand the area or topic in general. </td> <td data-bbox="768 952 1015 1585"> 12.6 pts Intermediate The introduction starts with some general background of the are of research/topic. The authors give the audience some information to understand the area or topic in general </td> <td data-bbox="1015 952 1273 1585"> 7.5 pts Novice The introduction does not start with a general background of the are of research/topic. The authors give the audience vague, irrelevant or insufficient information to understand the area or topic in general </td> <td data-bbox="1273 952 1321 1585"></td> </tr> </table>			15 pts Advanced The introduction starts with a general background of the are of research/topic. The authors give the audience enough information to understand the area or topic in general.	12.6 pts Intermediate The introduction starts with some general background of the are of research/topic. The authors give the audience some information to understand the area or topic in general	7.5 pts Novice The introduction does not start with a general background of the are of research/topic. The authors give the audience vague, irrelevant or insufficient information to understand the area or topic in general		15 pts
15 pts Advanced The introduction starts with a general background of the are of research/topic. The authors give the audience enough information to understand the area or topic in general.	12.6 pts Intermediate The introduction starts with some general background of the are of research/topic. The authors give the audience some information to understand the area or topic in general	7.5 pts Novice The introduction does not start with a general background of the are of research/topic. The authors give the audience vague, irrelevant or insufficient information to understand the area or topic in general						
Homework elements: Problem/need/knowledge gap	<table border="1"> <tr> <td data-bbox="521 1585 751 1969"> 5 pts Advanced There is a clear statement of a problem, need or gap in knowledge that needs to be addressed. </td> <td data-bbox="751 1585 1024 1969"> 4.2 pts Intermediate There is a statement that somewhat relates to a problem, need or gap in knowledge that </td> <td data-bbox="1024 1585 1281 1969"> 2.5 pts Novice There is a statement that indicates a general direction to a problem, need or gap in knowledge that </td> <td data-bbox="1281 1585 1321 1969"></td> </tr> </table>			5 pts Advanced There is a clear statement of a problem, need or gap in knowledge that needs to be addressed.	4.2 pts Intermediate There is a statement that somewhat relates to a problem, need or gap in knowledge that	2.5 pts Novice There is a statement that indicates a general direction to a problem, need or gap in knowledge that		5 pts
5 pts Advanced There is a clear statement of a problem, need or gap in knowledge that needs to be addressed.	4.2 pts Intermediate There is a statement that somewhat relates to a problem, need or gap in knowledge that	2.5 pts Novice There is a statement that indicates a general direction to a problem, need or gap in knowledge that						

FDST 132 Introduction

Criteria	Ratings			Pts
		needs to be addressed.	needs to be addressed.	
Homework elements: Justification	<p>5 pts Advanced There is a clear statement that indicates why this problem/need/gap in knowledge is relevant and justifies solving it or searching for an answer</p>	<p>4.4 pts Intermediate There is a vague statement that indicates why this problem/need/gap in knowledge is relevant and somewhat justifies solving it or searching for an answer</p>	<p>2.5 pts Novice There is a statement that gives a general direction of why this problem/need/gap in knowledge may be relevant without justifying solving it or searching for an answer</p>	5 pts
Homework elements: State of the science	<p>20 pts Advanced The authors clearly mention information and/or experiments previously published and relevant to the topic that helps the reader understand what has been done or is known in this area.</p>	<p>17.6 pts Intermediate The authors mention some information and/or experiments previously published and somewhat relevant to the topic but only paints a vague picture of what has been done or is known in this area.</p>	<p>10 pts Novice The authors mention some information and/or experiments previously published but is irrelevant to the topic and does not help the reader understand what has been done or is known in this area.</p>	20 pts

FDST 132 Introduction

Criteria	Ratings			Pts
Homework elements: Objective and/or hypothesis	<p>5 pts Advanced There is clearly stated objective(s) in the last paragraph. The objectives are SMART, are clearly related to the goal and frame the scope of the research. The authors might have included a hypothesis related to the objective. The hypothesis clearly state the variables that will be studied and the relationship between the variables. The type of evidence required to refute the hypothesis is clear.</p>	<p>4.4 pts Intermediate There is a statement that somewhat similar to an objective(s) in the last paragraph. The objectives are missing on or two SMART elements OR are not clearly related to the goal OR do not frame the scope of the research.</p>	<p>2.5 pts Novice There is a statement explaining the general direction of the research but is not an objective. The "objectives" are not SMART elements OR are not clearly related to the goal OR do not frame the scope of the research.</p>	5 pts
Reference: Reference type	<p>1 pts Advanced The type of reference was identified correctly demonstrated in the proper use of citation style, elements, format and punctuation</p>	<p>0.5 pts Novice The type of reference was incorrectly identified demonstrated in the improper use of citation style, elements, format and/or punctuation</p>		1 pts
Reference: Elements	<p>2 pts Advanced All appropriate elements necessary to construct an appropriate citation according to the APA style for the list of references are present (authors,</p>	<p>1.76 pts Intermediate Most of citation information of the source is in the correct order according to the APA style (1 or 2 types of mistakes)</p>	<p>1 pts Novice Some of citation information of the source is in the correct order according to the APA style (more than 2 types of mistakes)</p>	2 pts

FDST 132 Introduction

Criteria	Ratings			Pts
	title, year/date, etc)			
Reference: Style	<p>1 pts Advanced The citation information of the source is in the correct order according to the APA style</p>	<p>0.88 pts Intermediate Some appropriate elements necessary to construct an appropriate citation for the list of references are missing (one or two missing per citation) according to the APA style</p>	<p>0.5 pts Novice Most appropriate elements necessary to construct an appropriate citation for the list of references are missing (more than 2 missing per citation) according to the APA style</p>	1 pts
Reference: Format	<p>1 pts Advanced The citation information uses the appropriate APA style for each category (abbreviations, italics, bold)</p>	<p>0.88 pts Intermediate The citation information mostly uses the appropriate APA style for each category (abbreviations, italics, bold) (1 or 2 types of mistakes)</p>	<p>0.5 pts Novice The citation information rarely uses the appropriate APA style for each category (abbreviations, italics, bold) (more than 2 types of mistakes)</p>	1 pts

FDST 132 Introduction

Criteria	Ratings			Pts
Reference: Punctuation	1 pts Advanced Punctuation used in the APA citation style before and after reference elements was used correctly	0.88 pts Intermediate Punctuation used in the APA citation style before and after reference elements was mostly used correctly (1 or 2 types of mistakes)	0.5 pts Novice Punctuation used in the APA citation style before and after reference elements was rarely used correctly (more than 2 types of mistakes)	1 pts
Total Points: 60				

Appendix 6 Writing samples for Introduction assignment

Writing sample of successful Introduction section

Cookies are a popular dessert that is made in many different ways around the globe. This scrumptious dessert can be bite-size or meant for six bites, chocolatey or plain, and customizable in so many other ways. Cookies can be made homemade from scratch, but they can also be produced on a large-scale basis in the food industry. In order to produce hundreds of cookies daily that have an appearance and taste that is consistently attained, product developers research and experiment with different ingredients and baking procedures to perfect a cookie recipe. This essential process of creating, critiquing, and/or revising products is a core process within food companies (Manley, 2011). This process also has the ability to help a company save millions of dollars by discovering small or large flaws in a product's composition or design.

Within product development, a procedure that is commonly utilized is experimenting with several similar ingredients to determine what ingredient is best qualified for a specific recipe. Flour, an ingredient often used in baking, can have an effect of several components of a baked good, including the taste, texture, and structure. Flour is produced from milling wheat and is primarily composed of starches (Goesaert et al., 2005). When flour mixes with water, it forms a gluten matrix that is responsible for the shape and structure of the cookie. Two flours that have been previously used for cookie baking are cookie flour and all-purpose flour. Previous studies have shown that the major difference between cookie flour and all-purpose flour is protein content, which is close to 8% and 12% respectively (Barak, 2012). This percentage of protein difference can affect the particle size of the flour which also affects the product (Barak, 2012). Understanding how this difference will impact on the final product is extremely important considering the massive scale it is used on. The different flour has the potential to affect taste, texture, structure, and all other sorts of aspects of the flavor.

By knowing the difference between the types of flour large companies in the industry can choose different ingredients based off of cost, overall outcome of the product, and any other factors the company wants to consider. In this experiment, the objective was to determine the effects that utilizing different types of flour would have on cookies in their taste, texture, stability, and overall encompassing flavor.

Writing sample of Introduction section with an educational goal

Since flour is the predominant ingredient in cookies, which flour is used will majorly affect the outcome of the cookies, in terms of variables like moisture, flavor, density, and crumbliness. A number of studies have been done on how different flour affect attributes like cookie spread (HadiNezhad & Butler, 2009), maillard reactions (Žilić, Aktağ, Dodig, & Gökmen, 2021), and general acceptability (McWatters, Ouedraogo, Resurreccion, Hung, & Phillips, 2003).

In the study on acceptability of using different flours, each variation either used

one flour or a combination of the three total flours. It was found that only two formulations (100% wheat flour and 50% wheat/50% fonio) were acceptable to test audiences (McWatters et al., 2003). In the study on Maillard reaction in different flours, thirteen different grain flours were tested, including hard and soft, bread, and refined wheat flour. It was found that bread flour resulted in cookies with the lowest hydroxymethylfurfural content, which is a compound produced by the Maillard reaction (Žilić et al., 2021). In the study on the spread of cookies using different flours, seven different flours were used and their expansion rates were observed and recorded. The results found that during the first minute of baking, cookies expanded at very different rates based on their assigned flour, with English grade III flour having the best initial spread and lowest shrinkage (HadiNezhad & Butler, 2009). While these studies touch on important areas of the effects of ingredients on products, there is a distinct lack of simplistic, repeatable studies that use terminology and technology that is accessible for the general public. This, a simple experiment to showcase the different effects of ingredients on cookies in a straightforward manner that is suited to students early in their collegiate careers, is the best way to introduce the concepts of food science without causing unnecessary confusion. When introducing new students to the basic pillars of food science, it is imperative to use experiments and examples that are accessible to them.

Thus, this experiment is designed so that lay people can perform it, without any prior knowledge of food science or the effects different ingredients have on baking cookies. In doing so, it fills a void that exists in simple experiments that are accessible for non-food scientists. As many colleges that offer food science majors also offer courses for students early in their collegiate careers, it is important that the information being presented in these courses are palatable for the students, making simple experiments paramount.

The purpose of this study is to create an experiment that demonstrates the effects of ingredients on a baked product in a single class period. Specifically, this study will demonstrate the effects of different flours, sugars, and fats on sugar cookies by making cookie recipes with these differences in the lab and comparing them through basic sensory analysis.

Writing sample of Introduction section with errors in citation and progressive organization of ideas

Cookies are a popular treat across the world. They come in many shapes and sizes in many diverse cultures. All-purpose flour is the most common flour that most people have in their household, while bread and cookie flour are less common. They all vary in distinct aspects of their makeup: types of wheat such as winter or spring, protein, color of the wheat kernels, and hard or soft wheat. All these aspects will change how the flour will perform in baking, but it is not well known how they impact cookies. Different flours will perform differently in the same product, and it is important to know which is the best one for the purpose of the products, such as for a softer consumer good or just generic cooking. The cookies focused on for this experiment were simple sugar cookies, and how changing the flour would impact the baking was tested. There were three different

flours used: all-purpose, bread, and cookie flour. Even though these types of flour contribute to the structure and texture of the cookie, each flour affects mouthfeel differently.

Whether the cookie is chewy, crunchy, or cakey will depend on the flour because they contain different amounts of protein. The proteins come from gluten; a group of storage proteins found in wheat kernels.

Gluten is made of many similar proteins, but the two most dominant are glutenin and gliadin (Biesiekierski). These are referred to as prolamins because they are insoluble in water, soluble in alcohol and contain elevated levels of glutamine and proline. When water is added to flour, a dough forms because the proteins form a gluten matrix. The viscoelasticity of the dough depends upon how packed the gluten matrices are. The more protein content in the flour, the more gluten formation.

As for the types of flour used in this experiment. Each has different protein content and type of wheat used. All-purpose flour has 10% to 12% protein content and is made from a mixture of hard and soft wheat (Fox). Bread flour is highly glutenous with 14% to 16% protein and is mostly made of hard wheat. Cookie flour, also known as cake flour, is low in protein with about 7% to 9% protein. Since each type of flour has a different protein content it will impact the cookies in a unique way.

Appendix 7 Instructions and rubrics for materials and methods writing assignment

Due date: 5-April before class

Upload your homework to Canvas, if you cannot access Canvas, e-mail it to rvillarojas2@unl.edu

You will work with your lab team (2 people) on the report, only one report should be uploaded per team.

Format:

5 space, sans serif font (Arial or Calibri)

Title centered font size 14 and bold

Subtitles for sections aligned to the left 12 size font

Body, font size 12 aligned to the left

Instructions and sections

Name of all team members (student ID) example Rossana Villa (XXXXX)

Class code (FDST 132)

Date

Materials and Methods

Instructions:

Use the instructions of the lab manual to write a material and methods section for this laboratory. You only need to write about one of the experiments, choose between moisture content or pH and titratable acidity.

Your assignment should be less than one page.

No references are necessary for this exercise.

FDST 132 Materials and Methods

You've already rated students with this rubric. Any major changes could affect their assessment results.

FDST 132 Materials and Methods

Criteria	Ratings		Pts
Included: Student name	2 pts Full Marks	0 pts No Marks	2 pts
Included: Student ID	1 pts Full Marks	0 pts No Marks	1 pts

FDST 132 Materials and Methods

Criteria	Ratings			Pts
Included: Class code	1 pts Full Marks		0 pts No Marks	1 pts
Included: Date	1 pts Full Marks		0 pts No Marks	1 pts
Homework elements: General format	<p>15 pts Advanced Presents the material and methodology in a simple and direct manner. The section answers how, and when, data was obtained. This section provides all the information needed to allow another researcher to judge the study or actually repeat the experiment. No unnecessary details are present.</p>	<p>12.6 pts Intermediate Presents the material and methodology mostly in a simple and direct manner. The section mostly answers how, and when, data was obtained. This section provides most of the information needed to allow another researcher to judge the study or actually repeat the experiment. Some unnecessary details are present.</p>	<p>7.5 pts Novice There somewhat a mention of the plants or animals involved, but little specific details are given. The section also indicates few of the materials used, and may include technical specifications and quantities (in SI units). Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned. Several details are missing.</p>	15 pts

FDST 132 Materials and Methods

Criteria	Ratings			Pts
<p>Homework elements: Materials</p>	<p>15 pts Advanced There is a clear description of the plants or animals involved, with exact descriptions (genus, species, strain, cultivar, line, etc.); include Latin names in italics, even for common plants, upon first mention in text (e.g., maize or corn, <i>Zea mays</i> L.). The section also indicates materials used, with exact technical specifications and quantities and their source or method of preparation. Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned</p>	<p>12.6 pts Intermediate There somewhat a description of the plants or animals involved, with descriptions (genus, species, strain, cultivar, line, etc.); and may include Latin names in italics, even for common plants, upon first mention in text (e.g., maize or corn, <i>Zea mays</i> L.). The section also indicates some materials used, and may include technical specifications and quantities (in SI units) and their source or method of preparation. Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned. Some details might be missing.</p>	<p>7.5 pts Novice There little description of the plants or animals involved, with descriptions (genus, species, strain, cultivar, line, etc.); and may include Latin names in italics, even for common plants, upon first mention in text (e.g., maize or corn, <i>Zea mays</i> L.). The section also indicates few materials used, and may include few technical specifications and quantities (in SI units) and their source or method of preparation. Generic or chemical names are used to mention any reactants and company's name is included in parentheses after the material is mentioned. Most details might be missing.</p>	<p>15 pts</p>

FDST 132 Materials and Methods

Criteria	Ratings			Pts
Homework elements: Methodology	15 pts Advanced Standard methods, modifications to published methods and/or new methods followed were described in chronological order with the necessary detail and precision but without excessive description of common procedures.	13.2 pts Intermediate Standard methods, modifications to published methods and/or new methods followed were described in somewhat chronological order with most of the detail and precision but some excessive description of common procedures is present.	7.5 pts Novice Standard methods, modifications to published methods and/or new methods followed were described in with some chronological order with some of the detail and precision but various excessive details of common procedures are present.	15 pts
Homework elements: Sentence structure	10 pts Advanced The Materials and Methods section was presented in past tense and passive form.	8.8 pts Intermediate The Materials and Methods section was presented mostly in past tense and passive form.	5 pts Novice The Materials and Methods section was presented sometimes in past tense and passive form.	10 pts
Total Points: 60				

Appendix 8 Writing samples for laboratory reports

Writing sample for introduction and materials and methodology section

Group 1

First laboratory report on emulsions

Introduction

An emulsion is the mixing of two compounds that are otherwise unable to be mixed, or immiscible. The most common pair of immiscible compounds is oil and water.

In most circumstances, oil and water will completely segregate from one another and there will be a stark and obvious divide between the two substances. While in this setting it will be applied to food through mayonnaise, emulsions can be used in all sorts of industries and applications. Two of these bigger industries are cosmetics and constrictions as they can use emulsification to combine certain products that are usually unable to be combined (Costa et al., 2019).

In this experiment, the goal was to use emulsification to mix generally immiscible substances and create mayonnaise. Different ingredients, such as egg yolks, can act as emulsifiers and bind immiscible products. These are the most important ingredients regarding the stability of whatever substance is trying to be formed (Costa et al., 2019).

In construction, the most common form of an emulsion that is used is bitumen that is used much like tar and for other projects such as roofing. The purpose of this experiment is to demonstrate the effects of ingredients and methodology on emulsions (Villa Rojas 2022).

Materials and Methods

There were four groups: one using a classic recipe, one excluding dried mustard, one using egg whites rather than egg yolks, and one using butter and lemon juice. The traditional recipe consisted of egg yolks, vinegar, salt, sugar, dried mustard, and oil. To make the mayonnaise, having separated three eggs, we mixed together 7.5 g of salt, 7.5 g of sugar, 2.5 g of dried mustard and 25 g of vinegar. Then we added in the egg yokes. In order to make the emulsion, we added 375 g of oil in a very thin stream. It took about 10 minutes to incorporate all of the oil on speed 3. Finally, we added the remaining vinegar, 45 g, before blending it for another minute.

Second laboratory report on inactivation of enzymatic activity

Introduction

Controlling enzymes is critical for the preservation of foods. If certain enzymes remain active in foods they can very easily spoil the foods and cause them to become inedible. These enzymes can be controlled through a variety of different

methods, but one of the most frequently used methods in the industry is thermal treatment (Severini, Baiano, De Pilli, Romaniello, Derossi, 2003). Thermal treatment can mean blanching or other methods that expose food products to heat. These treatments can deactivate enzymes that shorten the shelf life of foods. The method of blanching is incredibly important in the production and sale of raw fruits and vegetables because it is one of the easiest ways to also kill microorganisms while denaturing the enzymes (Xiao, Pan, Deng, El-Mashad, Yang, Mujumdar, Gao, Zhang, 2017).

As the science stands now, there are few simplistic experiments that demonstrate the concepts of thermal treatments for inactivating enzymes. This sort of experiment would be ideal for the purposes of teaching students new to the concepts of food science. An experiment of the sort described below would fill the gap by providing a simple procedure that is accessible for students at the beginning of their collegiate career. The objective of this experiment is to assess the effectiveness of thermal methods used by food processors to inactivate enzymes.

Materials and Methods

Shiitake mushrooms were cut into slices approximately five millimeters wide. A single piece was placed in a weigh boat and ten drops of 3% hydrogen peroxide were dropped on the sample. Catalase activity was determined by the presence of small bubbles. Another piece was placed in boiling water for five seconds, before being placed in ice water and patted dry with a paper towel. Then 3% hydrogen peroxide was dropped on the blanched piece of mushroom to observe whether it bubbled, indicating catalase. This process was repeated adding five seconds to the blanching time each time until two consecutive trials showed no catalase activity. This was recorded as the endpoint.

Group 3

First laboratory report on emulsions

Introduction

An emulsion is a at least minimally stable system of immiscible liquids (Factors Influencing the Quality of Mayonnaise: A Review). This stability is maintained and/or increased through the use of emulsifiers, or compounds that bond with both of the immiscible liquids. In the case of mayonnaise, the emulsifier has a hydrophobic, nonpolar end to bond with the oil and a hydrophilic, polar end to bond with the water.

This prevents the dispersed micelles of oil and water from separating out and keeps the mixture emulsified.

Mayonnaise is a mixture of oil, egg yolk, an acidic liquid, mustard, and any other flavoring ingredients desired (salt, sugar, spices, etc.). Fresh egg yolk serves as the emulsifier that stabilizes the oil and the other liquids present, which is also

responsible for the thick, creamy texture. Mustard can also serve as an emulsifier, although to a much lesser extent than the yolks. The purpose of this laboratory experiment is to assess how changing an ingredient in the typical mayo recipe affects the final product.

Materials and Methods

The recipe that our group used was the “Almost Hollandaise” recipe. This recipe was slightly different from the other recipes in that it substituted lemon juice for vinegar and butter for oil. We also had to melt the butter prior to adding it to the egg yolks. We started by separating the egg yolks from the whites, while another person added the dry ingredients together into a bowl. After that, we combined the yolks and the dry ingredients and mixed with a hand mixer for 2 minutes. We then started to add the melted butter to the mixture in a thin stream to create the emulsion, mixing while we added the butter. It took us about 4-6 minutes to add all of the melted butter. Once all the butter was added, the remaining lemon juice was added and we mixed the mayonnaise for about 3 more minutes.

Second laboratory report on inactivation of enzymatic activity

Introduction

Enzymes are proteins that speed up the rate of chemical reactions within the body and other living organisms. Enzymes help with many functions within the body, like building muscle, destroying toxins, and breaking down food particles during digestion (Roland 2022). Enzymes also play an important role in food quality. Fresh fruits and vegetables (like apples) often have a short lifespan post-harvest due to the high metabolic activity. The browning of apples is caused by the enzyme polyphenol oxidase, PPO (Lv, Zhao, and Ning 2017). When an apple is cut and exposed to oxygen, the PPO enzymes will oxidize the phenolic compounds in the apple’s tissues to o-quinones, which also changes the chemical and physical properties of the apple. The o-quinones are responsible for the brown color that is produced (Chandrasekhar 2021). The inhibition or reduction of PPO activity can be beneficial to extending the amount of time apples have before browning.

Chemical blocking agents, like lemon juice or citric acid, can be used to reduce the PPO activity in apple slices. The PPO activity is reduced by these chemical blocking agents because they reduce the pH level. Enzymes can be inactivated if the pH of the environment they are in becomes too acidic or basic. PPO enzymes can be inactivated if the environment is too acidic, which the chemical blocking agents provide (Purdue Extension 2015). Experiments have been done to determine the effectiveness of lemon juice at slowing/reducing the amount of browning occurring (Santarelli et al. 2020), but there are other chemical blocking agents that have not been used in experiments of this manner. In addition to lemon juice and citric acid, sucrose, NaCl, ascorbic acid, sodium citrate, and NaHSO₃ are other chemical blocking agents that can be tested for reducing the browning of apples. The objective of this experiment is to determine the best chemical blocking agent for PPO inactivation in apples.

Materials and Methods

To observe enzymatic browning, an apple was sliced into thin pieces of approximately equal thickness and size. Paper plates were labeled with the names of 9 solutions: 1% NaCl in H₂O, 10% Sucrose in H₂O, 0.2% Ascorbic acid in H₂O, 1% Citric acid in H₂O, 1% Sodium citrate in H₂O, 33% Lemon juice in H₂O, 0.1% NaHSO₃ in H₂O, and 100% H₂O. The apple slices were then placed into the solutions and were soaked for 30 seconds. The slices were then placed on the corresponding labeled plate and left to sit for 5 minutes. After 5 minutes, the slices were observed to check for color: no brown (0), yellow (1), light brown (2), or extremely brown (3), and the data was recorded. After 25 minutes, the slices were observed again for color and the data was recorded.