Expected Outcome 1: Chemical Stability

Students will be able to describe the chemical stability of food.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in FDSC 5430 to assess student learning with respect to food chemical stability. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.

FDSC 5430/6430 Post-test (stability)  Name: ______________
Major: Food Science________  Non-Food Science_______
Level: Undergraduate______  Graduate Student:_______

Circle the correct answer.

1. Which of the following undergoes mutarotation?
   A. glucose  B. stearic acid  C. glycoine  D. citric acid

2. What is the maximum number of degradation products expected from the oxidation of a monounsaturated fatty acid?
   A. 2  B. 4  C. 10  D. 16  E. 20

3. The Maillard reaction is most prevalent in which food?
   A. wheat flour  B. canned milk  C. apple juice  D. olive oil

4. The enzymatic browning of fruit is this type of reaction.
   A. oxidation  B. reduction  C. hydrolysis  D. substitution

5. Aspartic acid carries a charge of ______ at pH 7.
   A. -2  B. -1  C. 0  D. +1  E. +2

6. Sucrose is hydrolyzed by ________.
   A. rennin  B. invertase  C. glucose isomerase  D. bromelain

7. At the beginning of the Maillard reaction, which of the following is produced?
   A. carbon dioxide  B. water  C. color  D. free radical
Findings

Five undergraduate food science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of food chemical stability increased as seen by the doubling of the correct responses from pre-test to post-test. However, two areas showed low levels of improvement, which were questions 5 and 7.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2/5</td>
<td>4/5</td>
</tr>
<tr>
<td>2</td>
<td>0/5</td>
<td>4/5</td>
</tr>
<tr>
<td>3</td>
<td>3/5</td>
<td>3/5</td>
</tr>
<tr>
<td>4</td>
<td>5/5</td>
<td>5/5</td>
</tr>
<tr>
<td>5</td>
<td>1/5</td>
<td>2/5</td>
</tr>
<tr>
<td>6</td>
<td>0/5</td>
<td>3/5</td>
</tr>
<tr>
<td>7</td>
<td>0/5</td>
<td>2/5</td>
</tr>
<tr>
<td>total</td>
<td>11/35</td>
<td>23/35</td>
</tr>
</tbody>
</table>

How did you use findings for improvement?

For the current students, the entire post-test was reviewed and correct answers explained. Reviewing the post-test gave them the opportunity to understand what they missed and why, which is part of their learning process. To improve future classes, the material missed in question 5 is suitable to include in an additional practice worksheet. Thus, the added practice will re-enforce these concepts. Material in question 7 will be reworked in the lecture. An additional observation made is that the pre-test should contain more questions for improved coverage of the material.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food chemical stability). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food chemical stability. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data.

Expected Outcome 2: 2-Food Ingredients

Students will be able to explain the functionality and interactions of food ingredients within a food system.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in FDSC 5430 to assess student learning with respect to food ingredient functionality. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-
test, was administered during the final week of the semester. The evaluation tool is shown below.

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>The HLB value of a substance gives an indication about its properties as a ___________.</td>
<td>A. humectant B. antioxidant C. emulsifier D. thickener</td>
</tr>
<tr>
<td>9.</td>
<td>Which type of starch would give a strong gel?</td>
<td>A. waxy B. acid modified C. phosphorylated D. cross linked</td>
</tr>
<tr>
<td>10.</td>
<td>Which gum would form a gel with calcium ions?</td>
<td>A. alginate B. xanthan C. locust bean D. guar</td>
</tr>
<tr>
<td>11.</td>
<td>An ingredient label contains polysorbate. What is the function of polysorbate?</td>
<td>A. antimicrobial B. emulsifier C. antioxidant D. flavoring</td>
</tr>
<tr>
<td>13.</td>
<td>Identify the antimicrobial.</td>
<td>A. Natamycin B. TBHQ C. Maltodextrin D. Lecithin</td>
</tr>
<tr>
<td>14.</td>
<td>Which sugar has the sweetest taste?</td>
<td>A. Aspartame B. Sucrose C. Sucralose D. Fructose</td>
</tr>
</tbody>
</table>

**Findings**

Five undergraduate food science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of food ingredient functionality increased as seen by the 5-fold increase in number of correct responses from pre-test to post-test. However, three areas showed low levels of improvement, which were questions 9, 11, and 14.
How did you use findings for improvement?

For the current students, the entire post-test was reviewed and correct answers explained. Reviewing the post-test gave them the opportunity to understand what they missed and why, which is part of their learning process. To improve future classes, the concepts missed in these questions will be reworked in the lecture material. In addition, the content associated with question 9 (starch functionality) can be incorporated and observed in the laboratory section. An additional observation made is that the pre-test should contain more questions for improved coverage of the material.

Additional Comments

Another finding identified by observing the students in FDSC 5430 (which is used to assess this SLO) is that certain skills and understanding related to food preparation are lacking. Food science faculty members are discussing how to address this concern and are considering developing a new course.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food ingredient functionality). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument is shown below.
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food ingredient functionality. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data.

Expected Outcome 3: 3-Food Plant Sanitation

Students will be able to explain the fundamental principles of food plant sanitation as applied to the food industry.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in FDSC 5770 to assess student learning with respect to food plant sanitation. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.
Findings

Five undergraduate food science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of food plant sanitation increased as seen by the 23% increase in number of correct responses from pre-test to post-test. However, three areas showed low levels of improvement, which were questions 3, 7, and 10.
How did you use findings for improvement?

To improve teaching and student learning, the following were noted by the course instructor. This is the first time of giving pre- and post-tests; some questions are too hard and some are too easy, so the test questions may need to be reformulated. In some topics, worksheets will be prepared for students to complete. This will enhance students’ learning in focusing on class lectures and finding information from the literature. Frequency of giving pop quizzes will be increased to encourage students to study more regularly. Currently, there are two pop quizzes and two exams (mid- and final exams) in this course.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food plant sanitation). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument is shown below.
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food plant sanitation. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data.

Expected Outcome 4: 4-Food Product Development

Students will be able to demonstrate an understanding of the food product development process.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in FDSC 5640 to assess student learning with respect to food product development. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.
Findings

Five undergraduate food science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of food product development increased as seen by the 18% increase in number of correct responses from pre-test to post-test. However, several areas showed low levels of improvement, which were questions 2, 5, 7, and 9.
How did you use findings for improvement?

With respect to food product development, this course primarily involves students developing new food product concepts and then using hands-on techniques for preparing them. Thus, the multiple choice test formats may not appropriate for the pre- and post-tests to assess student learning improvement. Short answer questions will be used for this course in the future to better assess student learning improvement. In addition, some topics related to new food product development will be presented for group discussion, which will enhance learning through more active engagement of the students.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food product development). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument is shown below.
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food product development. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data.

Expected Outcome 5: 5-Food Safety

Students will recognize food safety risks associated with food.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in FDSC 1000 to assess student learning with respect to food safety. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.
Findings

Seven undergraduate food science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of food safety increased as seen by the 19% increase in number of correct responses from pre-test to post-test. However, two areas showed low levels of improvement, which were questions 11 and 13.
How did you use findings for improvement?

Fall 2013 was the first semester that used a pre-test in FDSC 1000. As seen by the pre-test scores, some questions (e.g., 8, 12, and 14) were too easy and need to be strengthened in the future to better assess student learning. With respect to questions 11 and 13, lecture content will be modified to better emphasize these shortcomings. In addition, the post-test was returned to the current class so they could better understand the material they missed. In the future, we will also assess this SLO in a second course, POUL 5160. This second course was not offered during the 2013-14 academic year. The department is currently searching to hire a new faculty member to teach this course.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food safety). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument is shown below.

<table>
<thead>
<tr>
<th>Question #</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>6/7</td>
<td>7/7</td>
</tr>
<tr>
<td>9</td>
<td>4/7</td>
<td>6/7</td>
</tr>
<tr>
<td>10</td>
<td>5/7</td>
<td>7/7</td>
</tr>
<tr>
<td>11</td>
<td>0/7</td>
<td>2/7</td>
</tr>
<tr>
<td>12</td>
<td>7/7</td>
<td>7/7</td>
</tr>
<tr>
<td>13</td>
<td>2/7</td>
<td>1/7</td>
</tr>
<tr>
<td>14</td>
<td>7/7</td>
<td>7/7</td>
</tr>
<tr>
<td>total</td>
<td>31/49</td>
<td>37/49</td>
</tr>
</tbody>
</table>
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food safety hazards. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data.

Expected Outcome 6: 6-Food Sources

Students will know the sources of food-related substances.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test was administered in FDSC 1000 to assess student learning with respect to the sources of food ingredients. The pre-test was administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, was administered during the final week of the semester. The evaluation tool is shown below.
Findings

Seven undergraduate food science students completed the pre-test and post-test. The results are shown in the data table below. Overall student learning in the area of food ingredient sources increased as seen by the 44% increase in number of correct responses from pre-test to post-test. However, one area showed low level of improvement, which was question 5.
How did you use findings for improvement?

Fall 2013 was the first semester that used a pre-test in FDSC 1000. Question 1 was too easy and will be strengthened in the future to better assess student learning. With respect to question 5, lecture content will be modified to better emphasize this particular course material. In addition, the post-test was returned to the current class so they could better understand the material they missed.

**Assessment Method 2:** Graduate surveys

**Assessment Method Description**

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food sources). Scores range from 1 (little ability) to 4 (advanced ability). The assessment instrument is shown below.
Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food sources. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

**How did you use findings for improvement?**

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data.

**Expected Outcome 7: Communication**

Students will demonstrate effective oral and written communication skills.

**Assessment Method 1: Course assignments**

**Assessment Method Description**

Many food science courses contain assignments related to communication. Starting in freshman year (FDSC 1000), students are exposed to writing. In Fall 2013, students were to write a paper on food safety and preventing food-borne illnesses. The rubric of this report is included.
Other courses that had written assignments included FDSC 5430 (food chemistry), FDSC 5640 (food product development), FDSC 5770 (food plant sanitation), and BSEN 5660 (food engineering). These assignments were either a small research paper or a laboratory report. The rubric for food engineering appears below.
The ability to communicate via oral presentations is very important to students’ future careers. Thus, oral presentations were also required in several courses (FDSC 4290, 5430, 5640). The rubrics used for professional development and food chemistry presentations are shown subsequently.

In professional development (FDSC 4290), students were asked to choose a food science related topic and find information from professional journals to present. Students were trained how to locate, organize, and present information. There were 9 criteria identified for evaluating the oral presentation (rubric shown), each of which was graded from 1 (poor) to 5 (excellent). Each student had three presentations of 5, 15 and 30 minutes in length. Four senior students were evaluated.

In food chemistry, students were to prepare a 6-8 minute oral report on the flavor chemistry of a food using appropriate visual aids. Five students were evaluated. Thirteen criteria were used to evaluate the presentations, as shown in the rubric.
Evaluation of Oral Presentation
FDSC 4290 Professional Development in Food Science

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearly stated problem &amp; justification at beginning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presented adequate information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Showed clear, concise visual aids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoke confidently, audibly without distracting mannerisms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used appropriate vocabulary, pronunciation, grammar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gave a clear summary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate knowledge of subject to answer most questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequately handled difficult situations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintained leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Food Chemistry
Speaker Evaluation Rubric

Date_________________________ Speaker_________________________
Title_________________________

<table>
<thead>
<tr>
<th>Item:</th>
<th>Score</th>
<th>Specific Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presentation Style</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word choice and phraseology</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Audience interest maintained</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Eye contact</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Absence of distracting mannerisms</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Audibility and Clarity</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td><strong>Visual Aids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriateness; enhance understanding of subject</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Technical quality, amount of detail</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Follows logical order</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Legibility</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td>Layout, organization</td>
<td>0 1 2</td>
<td></td>
</tr>
<tr>
<td><strong>Content</strong></td>
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<td></td>
</tr>
<tr>
<td>Subject thoroughly covered</td>
<td>10 15</td>
<td></td>
</tr>
<tr>
<td>Information correct</td>
<td>4 8 1</td>
<td></td>
</tr>
<tr>
<td>Ability to answer questions</td>
<td>2 4 6</td>
<td></td>
</tr>
<tr>
<td>Total out of 100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Poster presentations are another important communication avenue at meetings. Students in POUL 4290 were given a lecture on poster presentations, which explained how to prepare a good poster. Students chose a food science related title and found appropriate information to make a poster for presentation. There were 6 criteria set for the evaluation of the poster presentation, each of which was graded from 1 (poor) to 5 (excellent). The rubric is shown below.

<table>
<thead>
<tr>
<th>Evaluation of Poster Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDSC 4290 Professional Development in Food Science</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria for Evaluation</th>
<th>Poor</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student's Name: __________________ Date: ________</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria for Evaluation</td>
<td>Poor</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Poster visibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poster design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response to questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall poster quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Grades:** _____ A _____ B _____ C _____ D _____ F

**Other Comments:**

**Findings**

For the food safety written reports in FDSC 1000, quantitative data were not collected. Qualitative data indicated the areas that needed improving included organization, incorporating sufficient details, and grammatical correctness. In food chemistry, students had difficulty locating information and need help with grammatical correctness. For the food engineering written reports, students had the greatest difficulty with writing in technical manner.

For the 5-minute presentation in professional development, two students did not manage their presentation times within the expected time frame. All students were nervous; the quality and organization of their content were not well developed. The grades were between 3 and 4 (3.2, 3.4, 3.7, and 3.8). After each presentation, feedback was given to students for improvement. The grades for the 15-minute presentation improved, being between 3.5 and 4.5 (3.8, 4.2, 4.5 and 4.5). All students had excellent presentations during their final 30-minute presentation. The quality and organization of the presentation content were much improved, and presentation times were all controlled within the
allotted time frame. The grades were all above 4.5 (4.5, 4.6, 4.6, and 4.8). Thus, students’ performance improved during the semester.

With respect to the food chemistry oral reports, 5 food science students were, on average, able to develop a presentation that was legible and logical. One major weakness was the delivery style: use of placeholder words (um, uh, you know) or reading directly off the slides. The other major weakness was the ability to answer questions at the presentation’s conclusion.

For the poster presentations in FDSC 4290, the weakest parts were the poster visibility and response to questions. The size of the words was too small. Because the content was not the student’s research, they did not give good answers for many questions raised from the presentation. Overall, grades were between 3.2 and 4.1 (3.2, 3.6, 3.7, and 4.1).

How did you use findings for improvement?

The current student population in FDSC 1000 had to re-write their report as part of their grade. Re-writing forces students to review and correct their papers so they learn from their errors. Food chemistry students received detailed comments about their writing. In food engineering, students received comments on the earlier lab reports so they could improve on later lab reports. In future years, expectations will be defined more clearly as will the campus resources available to the student. The department is attempting to incorporate some type of writing into each course. Students improve by being forced to write more often.

With respect to oral presentations, current students received the rubric back which contained their strengths and weaknesses. Feedback provided in FDSC 4290 was used by the student to improve their performance later in the semester, as noted previously. Again, by incorporating oral presentations into multiple courses, the repeated practice improves this skill.

After the poster presentation in FDSC 4290, comments from the poster presentation were given back students for their improvement in the future. Future students will be informed of past students’ errors in an attempt to improve performance.

Assessment Method 2: Internship Evaluation

Assessment Method Description

Food science students complete an internship as part of their degree program. The internship supervisor ranks a number of attributes about the intern’s job performance on a scale from 1-10. One category is “communication skills”, as shown in the supervisor evaluation form below.
Findings

Three food science students completed an internship in 2013. Their mean score in the “communication skills” category was 9.3 out of 10. The category of “knowledge” scored lower at 9.0/10. “Thoroughness” received the highest ranking of 10/10.

How did you use findings for improvement?

Although the sample size is small (n=3), it appears our students are practicing their communication skills successfully during their internships. The importance of these skills will continue to be emphasized during advising sessions with the students as well as within formal classroom situations.

Expected Outcome 8: Problem Solving

Students will be able to solve food science-related questions/problems.

Assessment Method 1: Class work

Assessment Method Description

Depending upon the course, problem sets and/or specific questions on exams were used to assess student’s ability to solve food science problems. It is expected that this student learning outcome will eventually involve multiple courses that will vary annually depending upon the course offerings.

Examples of questions from two food chemistry exams that involve problem solving are shown below.
Findings

Out of 5 undergraduate food science students, 3 students demonstrated acceptable problem solving ability with respect to question 9 above. Similarly, 3 out of 5 students were able to solve problem 10 above. However, 2 students showed great difficulty on each question (but not the same students).
How did you use findings for improvement?

For the current class, exam questions were reviewed so students would understand how to approach the problems in the future. Additional practice problems have been added for some topics; an example of these appears below. More practice problems appear to be needed for some students. Extra examples during lecture will be included.

Food Chemistry Practice Math Problems

Molecular Weight Data: fructose, 180; sucrose, 342; water, 18; glycerol, 92; glucose, 180

1. Calculate the molality of 50 g fructose in 250 g water.

2. If the boiling point of jelly is 104.5°C, what is the mass ratio of sucrose to water? Assume other jelly ingredients are negligible.

3. Calculate the boiling point and freezing point of Coca-Cola (10% sucrose in water).

4. Calculate the water activity of a 2.5 molal solution of glycerol.

5. A glucose solution has a water activity of 0.97. What is its freezing point?

6. A syrup contains 36 g fructose and 45 g sucrose in 80 g water. What is the water activity of this syrup?

7. For question 6, how much glycerol would need to be added to obtain a water activity of 0.91?

Assessment Method 2: Internship Supervisor

Assessment Method Description

Food science students complete an internship as part of their degree program. The internship supervisor ranks a number of attributes about the intern’s job performance on a scale from 1-10. One category related to problem solving is “creativity”, as shown in the supervisor evaluation form below.
Findings

Three food science students completed an internship in 2013. Their mean score in the “creativity” category was 9.7 out of 10. The category of “knowledge” scored lower at 9.0/10. “Thoroughness” received the highest ranking of 10/10.

How did you use findings for improvement?

Although the sample size is small (n=3), it appears our students are demonstrating creativity during their internships. Starting in the Summer 2014 semester, the additional category of “problem solving ability” will be added to more directly assess this attribute during the internship.

Expected Outcome 9: 9-Professionalism

Students will demonstrate the ability to interact and communicate professionally with people in the food science industry.

Assessment Method 1: Internship evaluation

Assessment Method Description

Food science students are evaluated by their industrial internship supervisor using the rubric below. Supervisors indicate various attributes of the intern using a rank from 1-10 (poor to exceptional). These attributes include appearance punctuality, attitude, and interpersonal skills.
Findings

Three students completed their internships during the 2013-14 academic year. The average scores for each category (appearance, punctuality, attitude, and interpersonal skills were 9.7 out of 10.

How did you use findings for improvement?

Students appear to be modeling good professional behavior. During the internship, a mid-semester evaluation is conducted. Potential concerns are shared with the intern so that they may improve their performance during the internship. Although scores are currently good, students are constantly reminded about the importance of professional behaviors.

Expected Outcome 10: 10-Food Analysis

Students will be able to describe methodologies for food chemical analysis.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test will be developed Fall 2014, which is the next time FDSC 5450 (food analysis) will be taught. The pre-test will be administered on the first class day and not returned nor discussed with the students. The post-test, identical to the pre-test, will be administered during the final week of the semester.
Findings

No data exist as of yet. Data will be collected Fall 2014 for this outcome.

How did you use findings for improvement?

Data are unavailable upon which to make improvement suggestions.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food analysis). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.

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Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.33) with respect to understanding food analysis. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?
Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data collected during the next academic year.

Expected Outcome 11: 11-HACCP

Students will be able to design a hazard analysis critical control point (HACCP) plan.

Assessment Method 1: Class project

Assessment Method Description

POUL 5160 involves creating a HACCP plan as a class project. This graded assignment will be used to assess this learning outcome. At the successful completion of this course, students receive a HACCP certification.

This course was not taught during the 2013-14 academic year because the faculty member left Auburn University. A new faculty hire will be responsible for developing the rubric for this project.

Findings

Although the rubric has not yet been developed allowing for a detailed evaluation of this learning outcome, the 2 food science students who completed the course in the Spring 2013 semester did receive their HACCP certification.

How did you use findings for improvement?

Data are unavailable upon which to make recommendations.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (HACCP design). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.
Findings

Three food science students graduated during the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an advanced ability (score of 4.0) with respect to their ability to design a HACCP plan. This item was the highest ranked on the survey.

How did you use findings for improvement?

Although the sample size was small (n=3), food science students appear to be doing very well and feeling confident in regards to this learning outcome.

Expected Outcome 12: Microbial Food Stability

Students will be able to describe microbial stability of food.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test will be used in food microbiology (BIOL 5560) to assess this student learning outcome. The instructor of this course retired and the course was not taught during the 2013-14 academic year. It is unclear when this course will be offered again.

Findings

No data is available on this learning outcome.
**How did you use findings for improvement?**

Data are unavailable upon which to make improvement suggestions.

**Assessment Method 2:** Graduate surveys

**Assessment Method Description**

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (microbial stability). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.

![Survey Instrument](image)

**Findings**

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food stability. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

**How did you use findings for improvement?**

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data collected at some point in the future.
Expected Outcome 13: 13-Microbiological Analysis

Students will be able to perform microbiological analyses of foods.

**Assessment Method 1:** Class assignments

**Assessment Method Description**

This learning outcome will be assessed by evaluating students’ performance in the food microbiology laboratory. The exact mechanism for evaluating this performance (i.e., rubric) is yet to be determined. The instructor of this course retired and the course was not taught during the 2013-14 academic year. It is unclear when this course will be offered again.

**Findings**

No data is available on this learning outcome.

**How did you use findings for improvement?**

Data are unavailable upon which to make improvement suggestions.

**Assessment Method 2:** Graduate surveys

**Assessment Method Description**

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (microbiological analysis). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding food stability. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the performance data collected at some point in the future.

Expected Outcome 14: 14-Sensory Science

Students will be able to explain sensory science’s role within food product development and methods associated with sensory evaluation.

Assessment Method 1: Pre/post-testing

Assessment Method Description

A pre-test/post-test will be used in FDSC 5730 (sensory evaluation) to assess this learning outcome. FDSC 5730 was not taught during the 2013-14 academic year. The
pre-test/post-test will be developed Spring 2015, which is the next time FDSC 5730 will be taught.

Findings

None as of yet. Data will be collected Spring 2015 for this outcome.

How did you use findings for improvement?

Data are unavailable upon which to make improvement suggestions.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food analysis). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.

Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had an intermediate ability (score of 3.0) with respect to understanding sensory evaluation. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4) while the lowest ranking items were being able to describe food processing methods and food engineering concepts of food processing (score of 2.67).
How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the pre-test/post-test data collected during the next academic year.

**Expected Outcome 15: 15-Food Processing**

Students will demonstrate an understanding of food processing methods.

**Assessment Method 1: Pre/post-test**

**Assessment Method Description**

A pre-test and post-test are to be designed in one of the processing-related courses. Due to faculty turnover, data was not collected this past year.

**Findings**

No data is available on this learning outcome.

**How did you use findings for improvement?**

Data are unavailable upon which to make improvement suggestions.

**Assessment Method 2: Graduate surveys**

**Assessment Method Description**

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food processing). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.
Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had a basic to intermediate ability (score of 2.67) with respect to understanding food processing. The score of 2.67 is the lowest in this survey. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4).

How did you use findings for improvement?

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the performance data collected at some point in the future. However, being the lowest scoring item, food processing is an area that needs attention.

Expected Outcome 16: 16-Food Engineering

Students will demonstrate a knowledge of the engineering concepts and principles associated with food processing.

Assessment Method 1: Class assignments or Pre-test/post-test

Assessment Method Description

Assignments and/or a pre-test/post-test in BSEN 5660 will be used to assess how the students are grasping the food engineering concepts. Conversations are underway with the course instructor to determine the appropriate assessment tool.
Findings

None as of yet. Food science students will enroll in BSEN 5660 next during the Fall 2015 semester. Data will be collected at that time for this outcome.

How did you use findings for improvement?

Data are unavailable upon which to make improvement suggestions.

Additional Comments

Although quantitative data were not collected the last time this course was taught, observations made by the instructor indicated the two areas that need improving are (1) technical writing and (2) basic calculations.

Assessment Method 2: Graduate surveys

Assessment Method Description

A question on the OIRA graduating student survey asks the student’s perception of how much they learned with respect to this learning outcome (food engineering). Scores range from 1 (little ability) to 4 (advanced ability). The survey instrument is shown below.

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Findings

Three food science students graduated in the 2013-14 academic year and completed the OIRA survey. Their mean score indicated they felt that they had a basic to intermediate ability (score of 2.67) with respect to understanding food engineering. The score of 2.67
is the lowest in this survey. The highest ranking item on this survey was being able to design a hazard analysis critical control point plan (score of 4).

**How did you use findings for improvement?**

Considering the small sample size (n=3), definitive steps for improvement cannot be ascertained. Improvements will be based primarily on the performance data collected at some point in the future. However, being one of the lowest scoring items, food engineering is an area that needs attention.