

Instrumental Analysis GC×GC Activity

Read through all instruction below and complete the activity before entering the quiz.

You have been provided with four bags of jelly beans. On the left side of the image, you have two bags of yellow jelly beans. On the right side of the image, you have two bags of blue jelly beans. For the sake of simplicity, we will refer to these as JB-A (top left yellow bag), JB-B (bottom left yellow bag), JB-C (top right blue bag), and JB-D (bottom right blue bag).



The jelly beans have been prepared and analyzed by GC×GC-TOFMS analysis.

Possible flavors of the jelly beans include **toothpaste**, **buttered popcorn**, **rotten egg**, or **berry blue**.

The aim of this assignment is to determine the flavor of each bag of jelly beans and to support your answer based on evidence from the GC×GC-TOFMS analysis.

STEP 1: Download the contour plots file and open in Google Slides or MS Powerpoint. Investigate the appearance of each of the four plots.

[Contour Plots.pptx](#)

Do you notice any differences between the 4 contour plots? If so, what are these differences?

You can use the “insert shape” tool to draw circles or boxes around regions that are particularly different between your contour plots.

STEP 2: Download the peak table. Open it in Google Sheet or MS Excel.

[Jelly Bean Peak Table AssignmentCH430L.xlsx](#)

This peak table was generated from the GC×GC-TOFMS analysis. The peak table is a list of compounds that were identified in the sample (listed in the first column). The Area/Height of the compound indicates its intensity. The Quant S/N column represents the signal to noise ratio and is also a good indicator of the most abundant peaks. Therefore, peaks with higher area/height/SN in this table represent stronger peaks in the corresponding contour plots.

Can you identify the location of the biggest peaks in the sample? You will not be able to pinpoint the compound name specifically to the location on the chromatogram without the data processing software, but you could hypothesize some logical explanations for which peak is which.

STEP 3: Using the contour plots and peak tables, try to determine the flavor of each sample (JB-A, JB-B, JB-C, JB-D). The aroma description for the compounds identified in each sample should assist you in matching the flavor to the sample. Make sure that you are taking notes on why you have assigned the flavor to the sample, as this is the aim of the activity and you will be required to justify your choices.

STEP 4: When you have completed the above, enter the quiz to answer the questions related to this assignment. You will only have 1 hour to complete the assignment quiz questions once you begin, so complete steps 1-3 prior to entering the quiz.

Quiz (50 points)

Which flavor did you assign to JB-A? (2 points)

- Berry blue
- Toothpaste
- Rotten Egg

- Buttered Popcorn

Why did you assign this flavor to JB-A? (8 points)

Which flavor did you assign to JB-B? (2 points)

- Berry blue
- Toothpaste
- Rotten Egg

- Buttered Popcorn

Why did you assign this flavor to JB-B? (8 points)

Which flavor did you assign to JB-C? (2 points)

- Berry blue
- Toothpaste
- Rotten Egg

- Buttered Popcorn

Why did you assign this flavor to JB-C? (8 points)

Which flavor did you assign to JB-D? (2 points)

- Berry blue
- Toothpaste
- Rotten Egg

- Buttered Popcorn

Why did you assign this flavor to JB-D? (8 points)

Which information helped you to feel the most confident about your answers? (5 points)

This question is not graded but you will receive points for answering it. (5 points)

On the following scale, how different do you think the four **contour plots** looked for this assignment? Do not take into account information from the peak table when answering this question.

0 = They all looked exactly the same and there were no differences.

1 = They were almost identical with one or two small differences.

2 = They were mostly the same, however there were some regions that varied between the samples.

3 = There were a few compounds in common, but the samples were very different otherwise.

4 = There is nothing in common between the four samples.