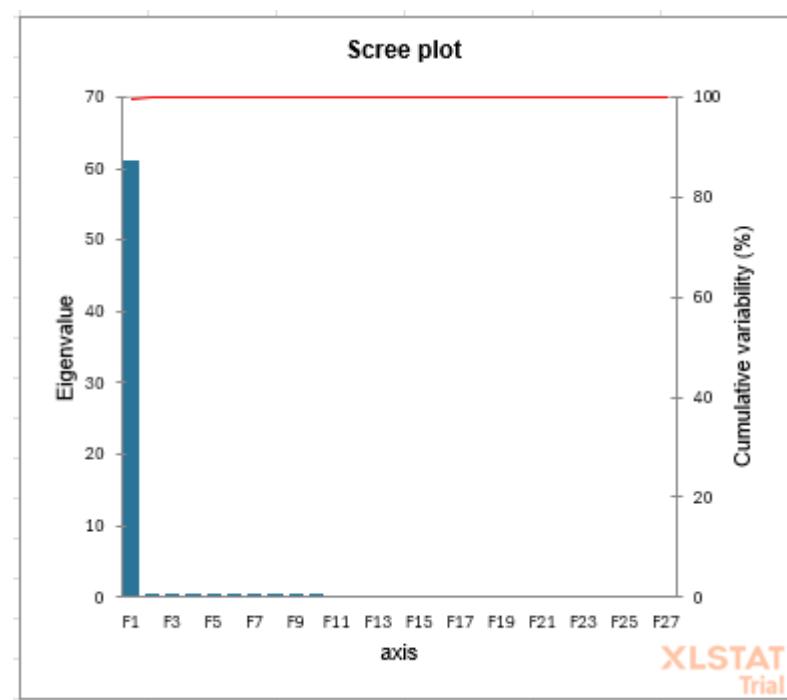


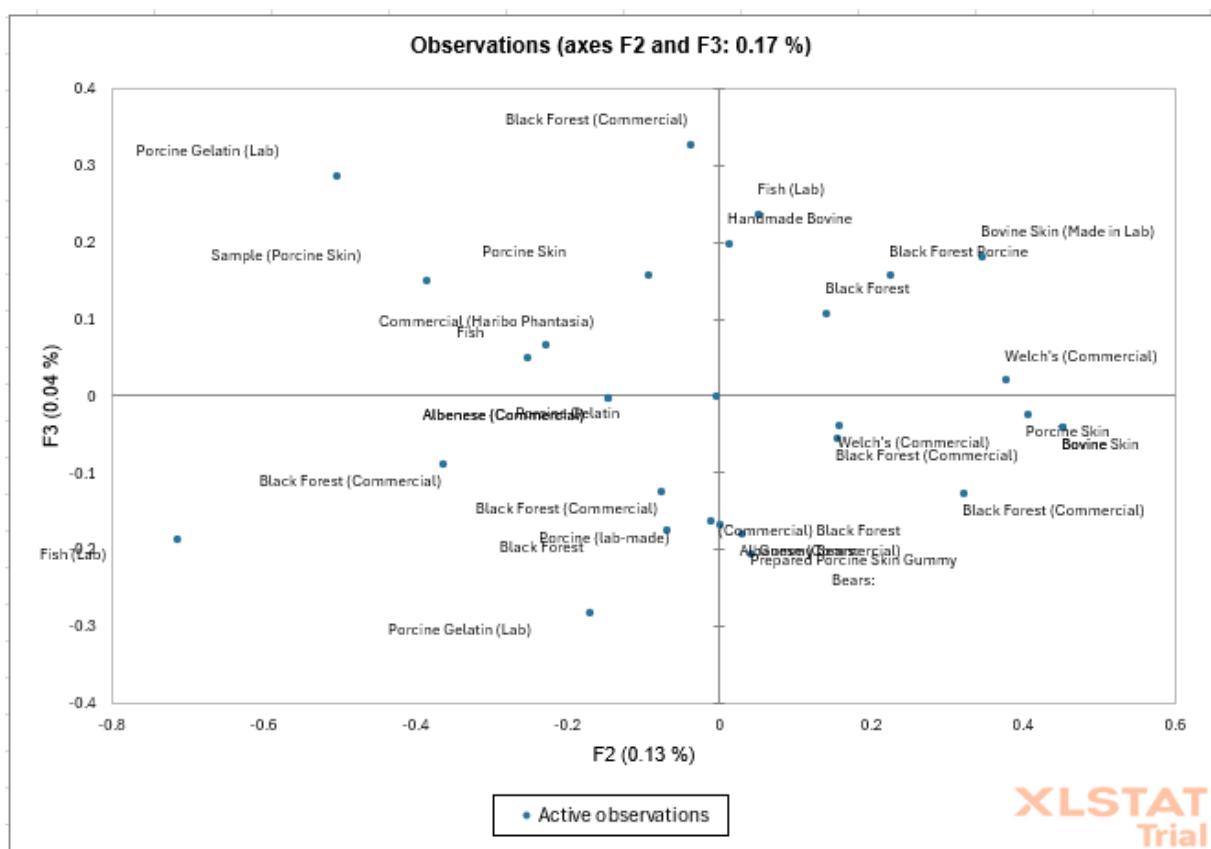
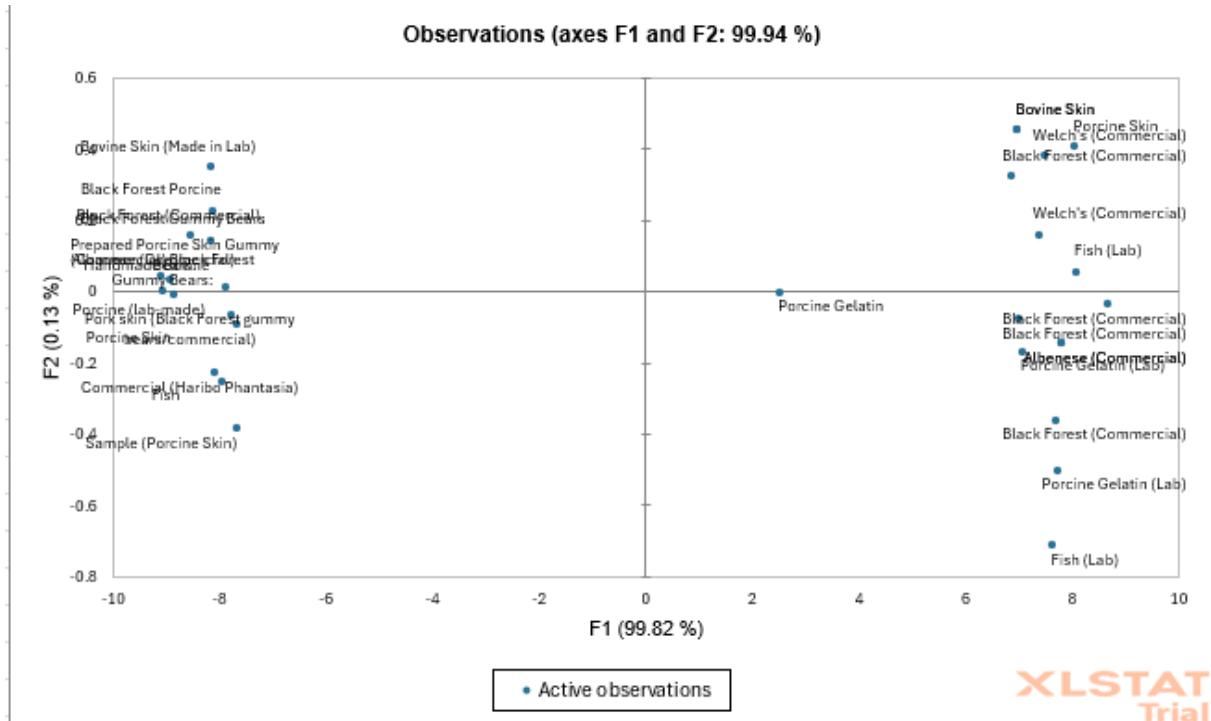
Lab 5: FTIR and PCA Analysis of Gelatin in Gummy Bears

Questions

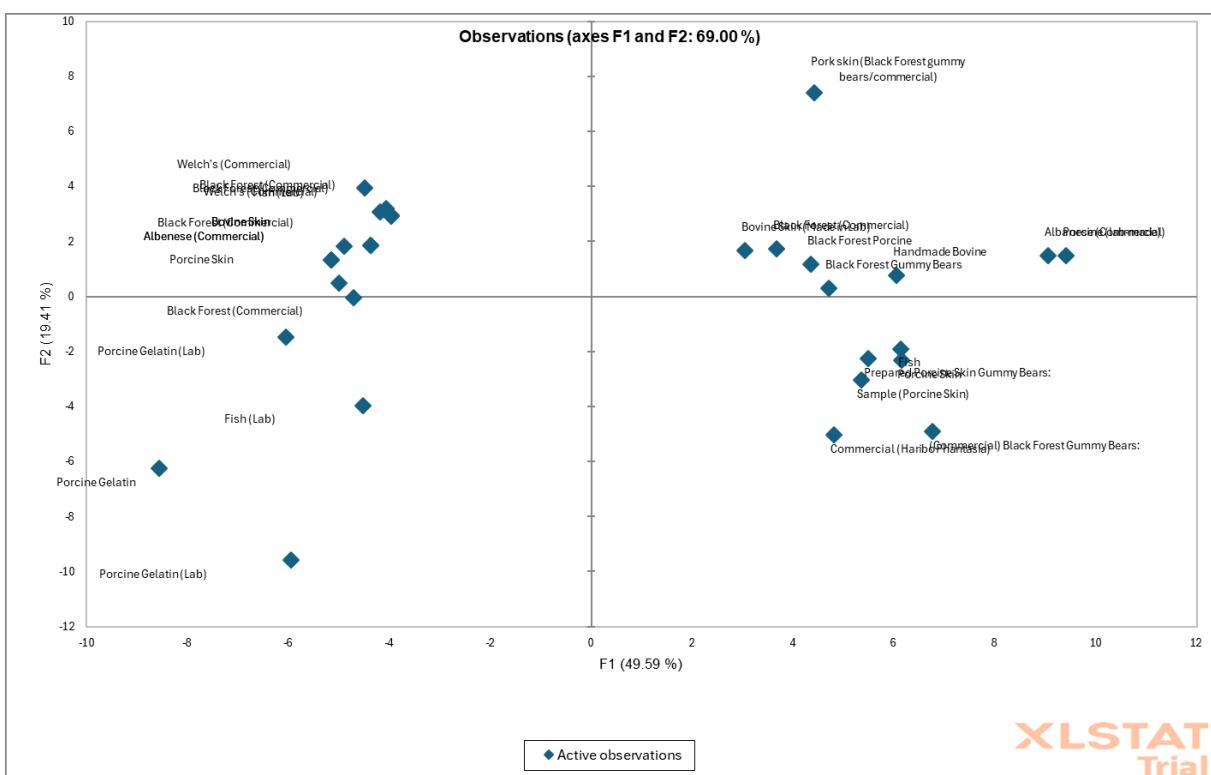
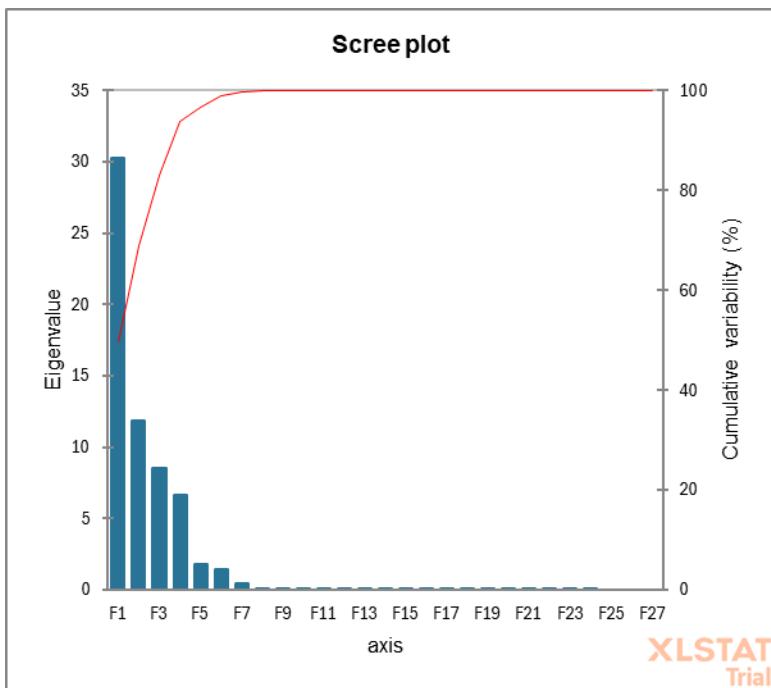
PCA was inconclusive as none of the three principal components resulted in clustering for samples taken from the same source or prepared from the same standard, even after normalizing the data to display z-scores for each variable of a particular observation. There was a strong clustering into two groups of the observations by order of magnitude of the absorbance, but those groups did not correspond to bovine vs porcine. PCA of those groups separately also did not yield components that corresponded to porcine vs bovine.

Without normalization





With normalization (Performed by taking each observation row and mapping each value to the quotient of the variable measurement subtracted by the median measurement of the row, and the sample standard deviation)



Lab Notebook

Exp. No.	4	Experiment/Subject	Mohr Titration for Analysis of Sodium in Pickles	Date	2/13/25
Name	Nathaniel White	Lab Partner	Lukas Rosenthal	Locker/Desk No.	Course & Section No. 2322

Objective: Determine concentration of Sodium in pickle, compare with listed nutrition facts.

Procedure:

- A/ Blend a pickle into a liquid, having blotted it dry with a paper towel beforehand. Dilute liquid to 100mL with water.
- B/ Weigh three 0.1g samples. Place 0.1000g NaCl into 125mL Erlenmeyer flasks three times. For each:
 - Add 50mL DI & stir; mix
 - Add sodium bicarbonate slowly until no fizzing.
 - Add 2mL of 5% K₂CrO₄
 - Fill buret with 0.1000M silver nitrate and titrate until red
- C/ Take three 20mL aliquots of the pickle water from A/ and put them into 125mL Erlenmeyer flasks. Follow steps in B for each.

Pickle nutritional label
Mt Olive bottle 280mg Na

Mass pickle: 32.5753 g

w/ preservatives	NaCl Samples:	Vol. DI	Vol K ₂ CrO ₄
	Std A: 0.1034	50.00mL	2.01mL
	Std B: 0.0992	49.71mL	2.03mL
	Std C: 0.0982	49.21mL	1.90mL

Volumes

$$\begin{aligned} \text{Titration A: } & 24.30\text{mL} - 42.24\text{mL} \\ & 42.42\text{mL} \\ \text{B: } & 9.18\text{mL} \sim 26.15\text{mL} \\ \text{C: } & 26.39\text{mL} - 43.52\text{mL} \end{aligned}$$

Pickle samples

	Vol DI	Vol K ₂ CrO ₄
1	50.0mL	1.91 mL
2	49.2mL	2.00 mL
3	49.0mL	2.00mL

Pickle titrations

$$\begin{aligned} 1: & 11.20\text{mL} - 30.37\text{mL} \\ 2: & 30.68\text{mL} - 49.00 \\ & \text{added to } 19.30 \\ & \quad - 20.58 \\ 3: & 20.84 \sim 40.27 \end{aligned}$$

Signature	Nathaniel White	Date	Witness/TA	Date
THE HAYDEN-MCNEIL STUDENT LAB NOTEBOOK		2/15/25		

Note: Place fold-over back cover under copy sheet before writing