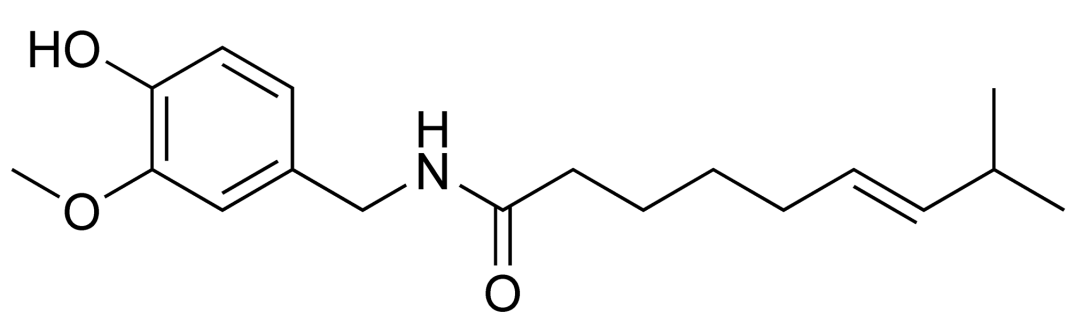


Quantitative Analysis of Capsaicin Levels in Hot Peppers to Understand Heat Inheritability

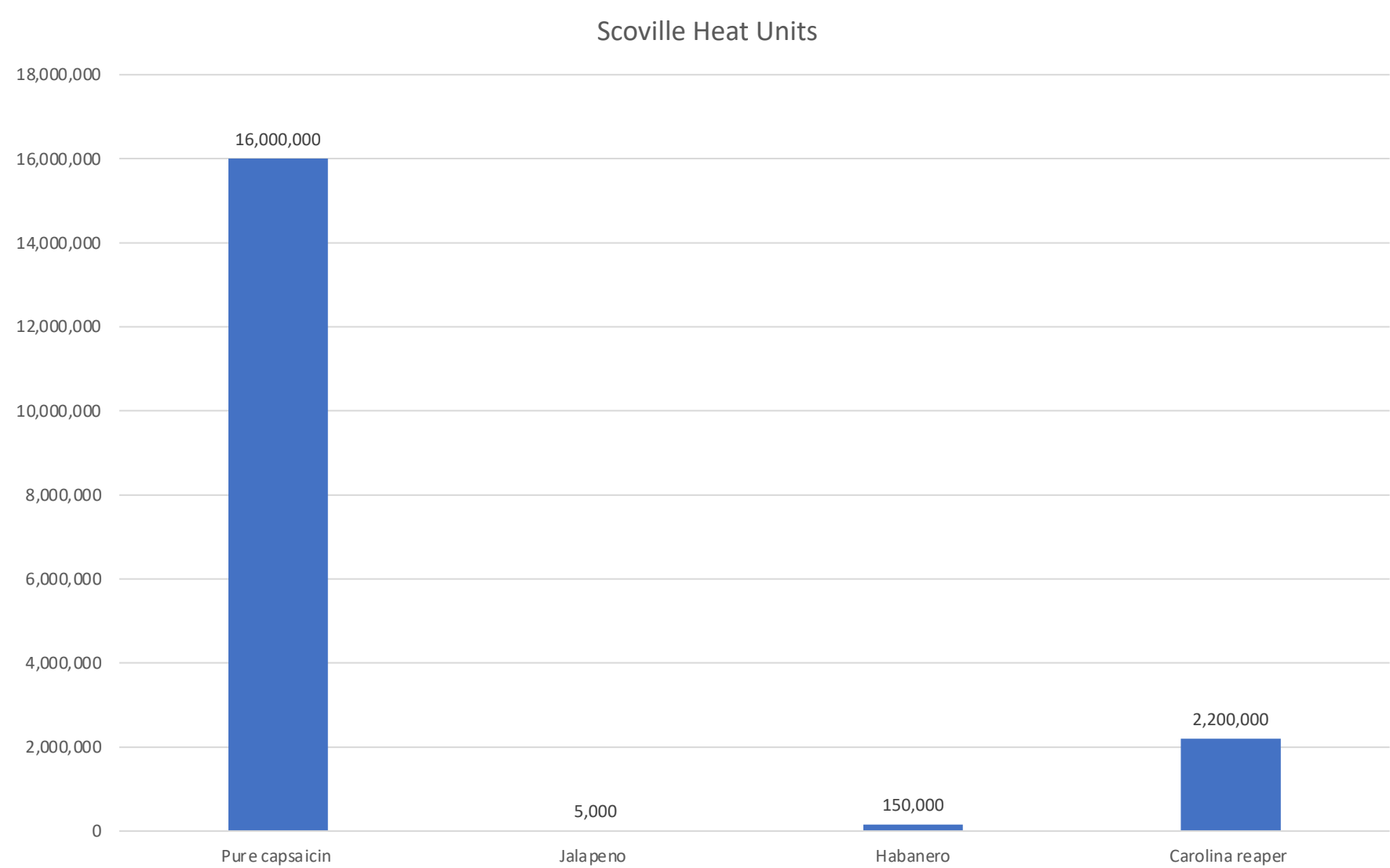
Jacquelyn Dudley, Dr. Melissa Langston

Introduction

- Capsaicin, the organic compound made up of smaller compounds known as capsaicinoids, is the well-known principle of hot peppers.



- There are a plethora of medicinal uses for capsaicin, including certain cancer treatments and arthritis creams
- Naturally occurring in chili peppers, but synthetically derived for pharmaceutical use
- Scoville Heat Units (SHU)- the measurement of the pungency of chili peppers based on the concentration of capsaicinoids

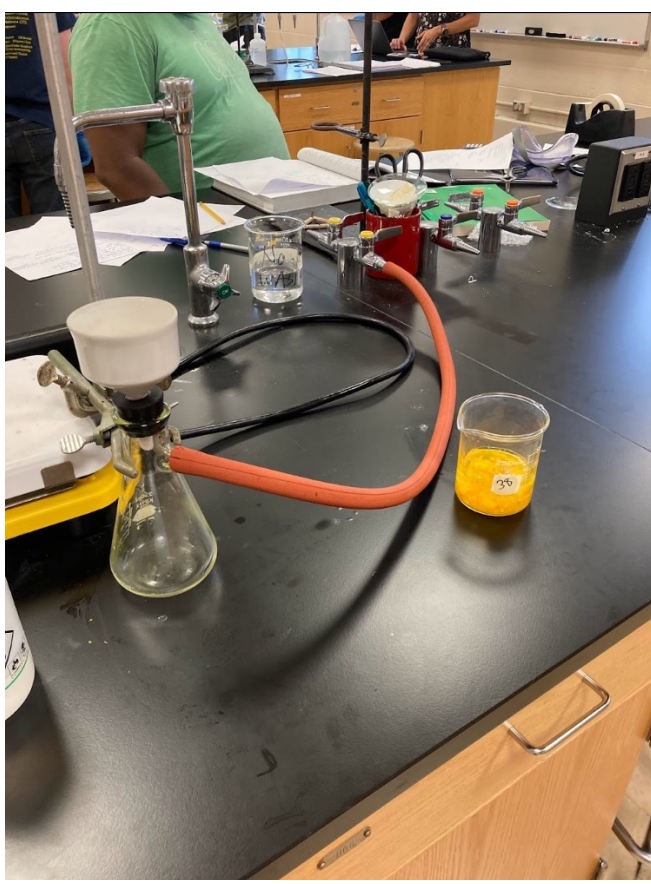
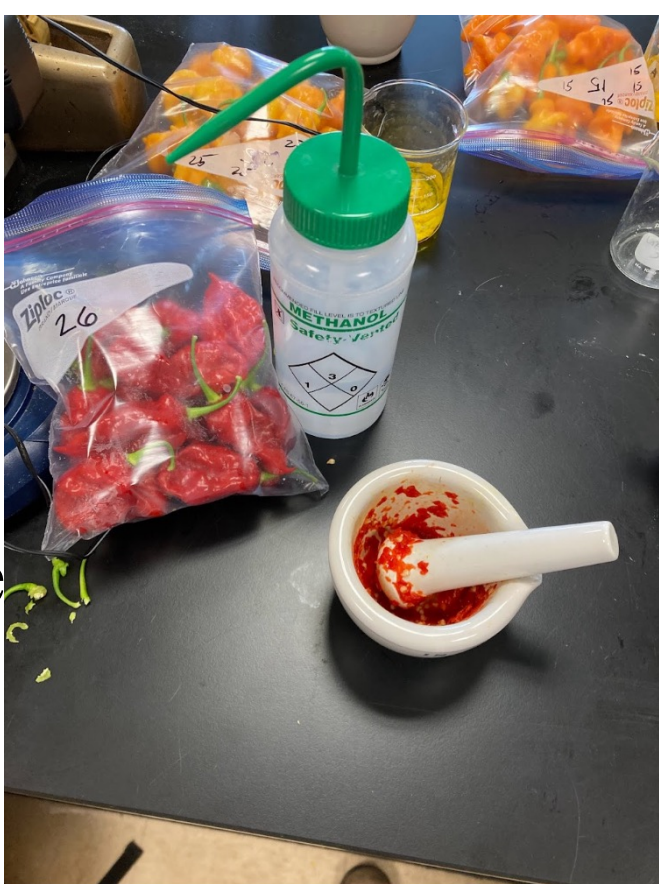


Plant Breeding

- Recent project studying chili pepper genome followed much of the same principles as tomato genetics,
- The pepper genome was 3.5-fold larger than that of a tomato
- Plant breeders are attempting to better identify how heat is passed from parent plant to its progeny
- Different traits are inherited depending on which variety is the mother and which is the father
- Understanding heat transfer will help breeders in making selections to create even hotter peppers, as well as heatless chilis

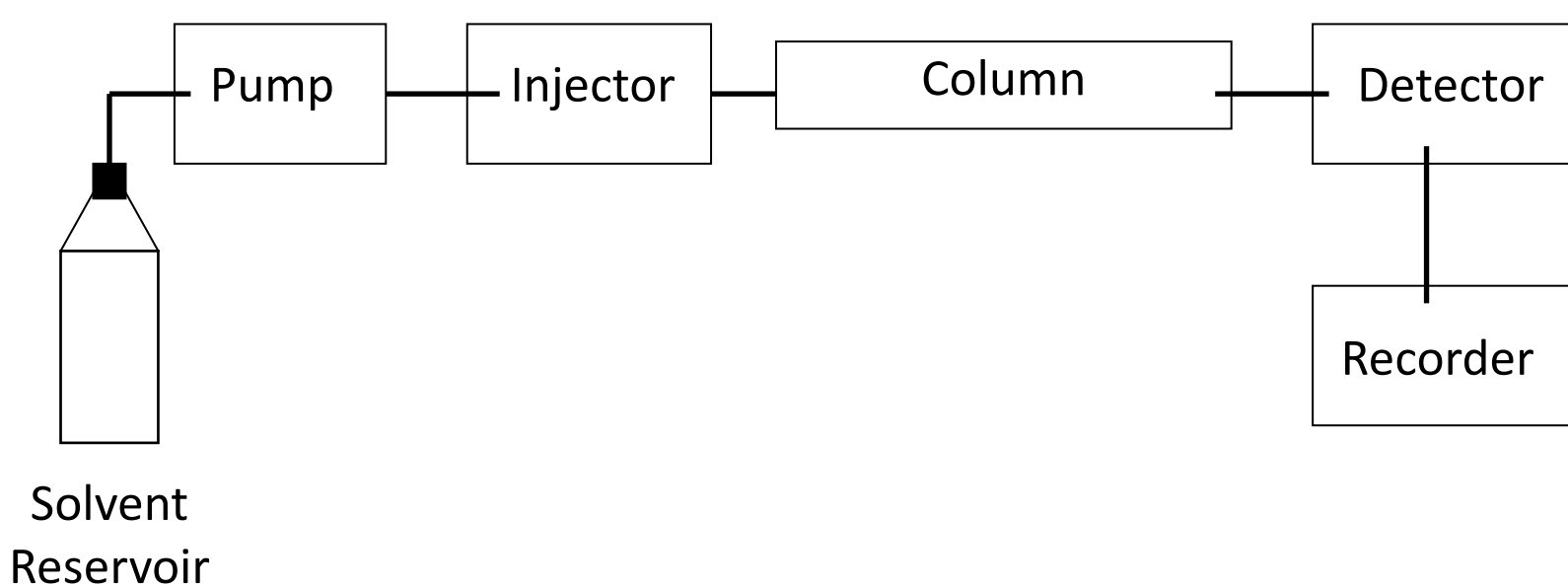
Sample Prep

1. Crush pepper using mortar and pestle
2. Use methanol to wash pulp and seeds into beaker
3. Heat beaker for one hour
4. Vacuum filter and save mixture in large tubes
5. Syringe filter in 1.5mL HPLC vials

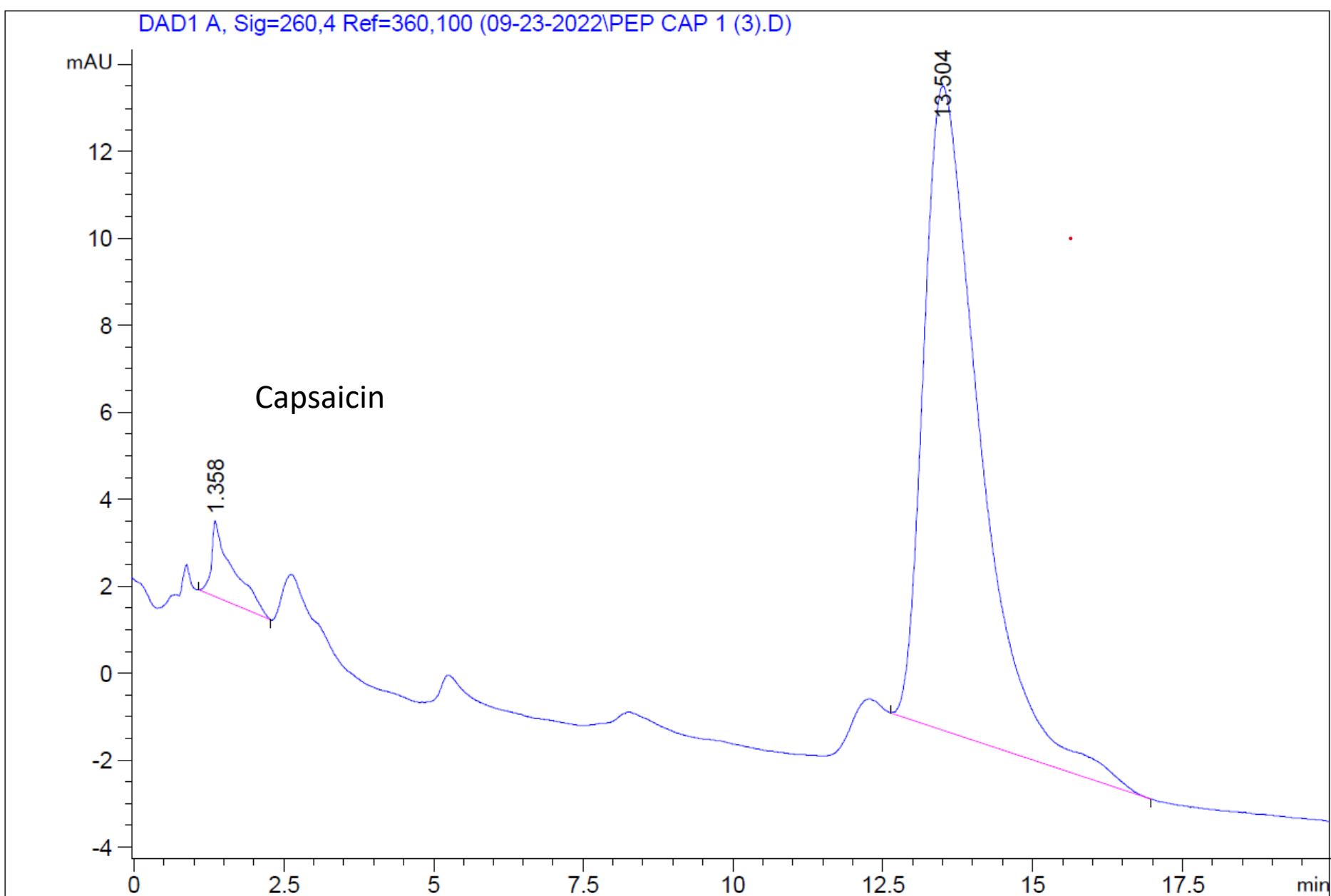


HPLC

- High Performance Liquid Chromatography
- Separate, identify, and quantify components
- Methanol and water utilized
- Nucleosil C18 column

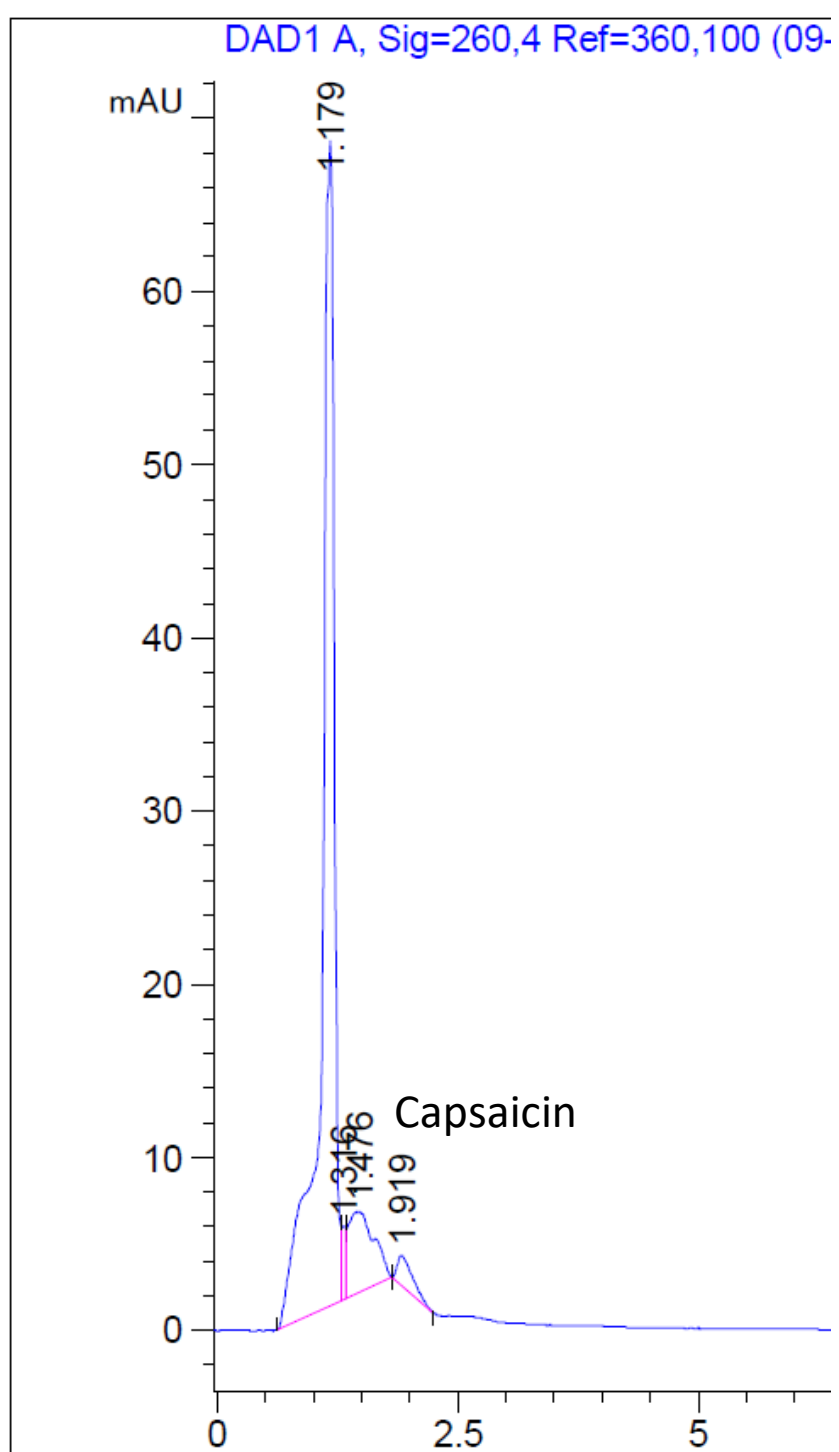


Standard Capsaicin Chromatogram



- The X-Axis represents the time
- The peak 1.358 minutes indicates the presence of capsaicin

Chromatogram of Sample Pepper 77(2)



The retention times of the samples sent through the HPLC that match that of the pure capsaicin indicate the pepper contains capsaicin

Results

Plant ID #	Parents
Plant 4(2)	Trinidad Perfume x Habanada
Plant 25(2)	Trinidad Perfume x Habanada
Plant 44(2)	Trinidad Perfume x Habanada
Plant 77(2)	Sante Fe Grande Hot x Violet Sparkle
Plant 79	Sante Fe Grande Hot x Violet Sparkle
Plant 79(2)	Sante Fe Grande Hot x Violet Sparkle
Plant 80(2)	Sante Fe Grande Hot x Violet Sparkle
Plant 82	Sante Fe Grande Hot x Violet Sparkle
Plant 86(2)	Violent Sparkle x Sante Fe Grande Hot
Plant 91(2)	Sante Fe Grande Hot x Violet Sparkle
Plant 93(2)	Sante Fe Grande Hot x Violet Sparkle
Plant 93	Sante Fe Grande Hot x Violet Sparkle

- 12 plants grew peppers with detectable concentrations of capsaicin
- 43 plants grew peppers with no detectable concentrations of capsaicin
- A majority of plants from Sante Fe x Violet Sparkle breeding grew hot peppers

Future Work

- Accurately determine capsaicin concentrations
- Preconcentrate samples prior to analysis
- Continue to monitor heat transfer between generations

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