The aromatic compounds terpenes have potential benefits to health and medicine. That makes them attractive to researchers like GRA Eminent Scholar Robin Buell at the University of Georgia.

Terpenes come in several forms and can be found in a variety of plants. GRA Student Scholar Audree Garrett, a student at Fort Valley State University, is spending summer 2022 in Buell’s lab to help further exploration of terpenes. Specifically, the lab is using a virus to silence genes inside tomato plants so that they yield more high-value terpenes.

To do that, Garrett performs a series of experiments. Here’s what that experimental process looks like.

**STEP 1: Infiltrate tomato!**
A half-dozen or so different agrobacteria are injected into unripe tomatoes. If tomatoes turn yellow or orange, it’s a sign the targeted gene is being silenced from expression.

**STEP 2: Harvest tissue**
For the tomatoes that turn yellow, tissue is removed for analysis.

**STEP 3: Process tissue**
First, it’s flash-frozen to keep RNA from breaking down; RNAlater, a reagent, is applied to protect the RNA. The lab sends some tissue to other researchers for analysis in their experiments — and saves some for its own analysis.

**STEP 4: Extract RNA**
In a multi-step process, Garrett uses a kit to carefully remove RNA from tissue samples.

**STEP 5: Quantify RNA**
Extracted RNA that is suspended in water is analyzed for optical density — this reveals how much is present. (Knowing how much RNA is present is important for further analysis.)

**STEP 6: Analyze!**
Did it work? Was the gene silenced? A test called qRT-PCR provides the answers. The work will be reiterated in future experiments to move closer to changing the machinery of the tomato to produce terpenes that are desired.