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### **GWU Scholar's Research Provides Opportunity to Use Latest Chemical Instrumentation**

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UNDERGRADUATE RESEARCH

GWU Scholar’s Research Provides Opportunity to Use Latest Chemical Instrumentation

BY OFFICE OF UNIVERSITY COMMUNICATIONS ON OCTOBER 13, 2020



Anna Crowell, ’20, Studies How to Extract Curcumin to Synthesize Vanillin

The chance to perform actual research and use advanced lab equipment motivated Anna Crowell’s decision to apply for an Undergraduate Research Grant from Gardner-Webb University. The December 2020 graduate from Indian Trail, N.C., chose to study how to extract curcumin from turmeric to synthesize vanillin.

“Vanillin is the compound largely responsible for the smell and taste of vanilla and is the main component in synthetic vanilla, which is among the most prominent flavoring agents in the world,” Crowell explained. “This topic initially interested me because it provided me with an opportunity to put techniques and concepts I’ve learned into practice, as well as the opportunity to use Infrared Spectroscopy (IR), Nuclear Magnetic Resonance Spectroscopy (NMR), Soxhlet Extractor, and Rotary Evaporator.”



A biology major, Crowell was one of 11 students who participated in the Undergraduate Research Scholars Program. With assistance from a faculty mentor, the students spent 40 hours a week for five weeks researching their topics. Crowell’s mentor was Dr. Ben Brooks, professor of chemistry.

The research intrigued Crowell, because she would be taking a natural product through a series of reactions and converting it into something entirely new. “This process of synthesizing vanillin from curcumin helps to provide a solution to the limited supply of natural vanilla,” she noted. “According to wide spread research, approximately 1 percent of the more than 12,000 tons of vanilla produced each year is natural vanilla (directly from vanilla bean pods). The rest is synthetic, which is more time and cost effective to produce, with vanillin comprising the majority of this.”

She spent two to three days in the lab each week conducting the experiments and the rest of the time reading articles, researching concepts and reviewing important materials. Her hours in the lab taught her to learn from the mistakes. “We’ve had experiments not exactly work, the wrong or contaminated products produced, had to re-do reactions, and things of that nature,” she described. “However, another part of scientific research is learning from these things, thinking of new solutions, and simply trying again. A few times I have been surprised by how much small changes make a big difference in the overall reaction.”

Brooks helped her outline the steps of the research process. He offered guidance and advice, but allowed her to work independently. “He gave me the freedom to make decisions and provided me with an opportunity to learn for myself,” Crowell affirmed. “I was able to experience increased responsibility and independence within the lab, as well as collaborate directly with faculty. This helped to transition my role as an undergraduate student into more advanced professional opportunities. Regardless of the path I pursue, I hope I am where God desires for me to be and using my profession to help other people.”

Learn more about the Undergraduate Research Scholars Program. >

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We welcome your suggestions and feedback, contact:

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