

WIU CENTENNIAL HONORS COLLEGE
Thomas E. Helm Undergraduate Research Day 2022

Abstract

Poster

Major Forensic Chemistry

Faculty Mentor: Brian Bellott

Antioxidants in Hot-Brewed and Cold-Brewed Teas (FRAP Method)

Olivia Brinker

Free radicals are dangerous and reactive entities that can cause a variety of health problems for individuals, including cancer, hypertension, and Alzheimer's. They can enter the body through sources such as fast food, air pollutants, alcohol, and pesticides. The reactivity of free radicals is due to the fact that they lack an electron, thus making them steal electrons from healthy cells in the human body. To combat the negative effects of free radicals, antioxidants can be introduced into the diet through fruits, vegetables, whole wheat products, and black and green teas. The antioxidants are stable molecules that have the ability to donate electrons to the free radicals so healthy cells are less likely to be damaged. The purpose of this study is to determine whether hot-brewed teas or cold-brewed teas produce more antioxidants, and both green and black teas will be tested. To measure the antioxidant activity, a method called the ferric reducing antioxidant power (FRAP) assay is used. An $\text{Fe}(\text{TPTZ})_3^+$ complex was prepared with $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ and tripyridyltriazine (TPTZ). Upon the addition of the antioxidant-containing teas, the $\text{Fe}(\text{TPTZ})_3^+$ complex is reduced to an $\text{Fe}(\text{TPTZ})_2^+$ complex. This reduction of the $\text{Fe}(\text{TPTZ})_3^+$ complex to an $\text{Fe}(\text{TPTZ})_2^+$ complex is accompanied by a violet-blue color change that can be monitored with a UV-Vis spectrophotometer at a wavelength of 593 nm. A standard curve using ascorbic acid has been generated, however the testing of the hot-brewed and cold-brewed teas is still in progress.