

Introduction

Objective:

- This research investigates the potential ability of a medicinal plant called *Vernonia amygdalina*, to inhibit the formation of Reactive oxygen species (ROS).
- This plant originates from tropical west Africa, specifically Nigeria, and is widely utilized by locals in the treatment of diabetes and hypertension.
- *Vernonia amygdalina* is also well known to possess medicinal properties that act against viral, parasitic, and bacterial infections.
- The goal of this study is to determine the phenolic content and antioxidant capacity of samples of *Vernonia amygdalina*.
- As our bodies perform highly useful and complex biochemical reactions, ROS's are released in the process.
- An imbalance or build-up of these ROS's, coupled with a lack of regulation by our bodies' defense systems, can result in oxidative stress.
- Studies have shown oxidative stress is responsible for a variety of diseases, such as cancers, atherosclerosis, malaria, rheumatoid arthritis, Parkinson's disease, and many more.
- Other studies have found that oxidative stress plays a significant role in protein and DNA damage.

Methods and Materials

Plant Samples:

- Three commercial samples were purchased. "Bulk African" and "Ebay" samples were purchased in the United states, while "Local" was obtained from Nigeria..

Total Phenolic Content (TPC):

- TPC was measured using the Folin-Ciocalteu assay. Phenolic content of *Vernonia amygdalina* was obtained using the standard, Gallic acid . Absorbance was measured at 765nm and results were expressed as milligram Gallic equivalents/mL

Antioxidant Activity:

- Radical scavenging ability was measured using the ABTS assay. This was done by quantifying and comparing the reduction of 2, 2'-Azino-Bis-3-Ethylbenzothiazoline-6-Sulfonic Acid (ABTS) by *Vernonia amygdalina* with Trolox.
- Absorbance was measured at 734nm and results were expressed as milligrams Trolox equivalents/mL of plant extract

Results

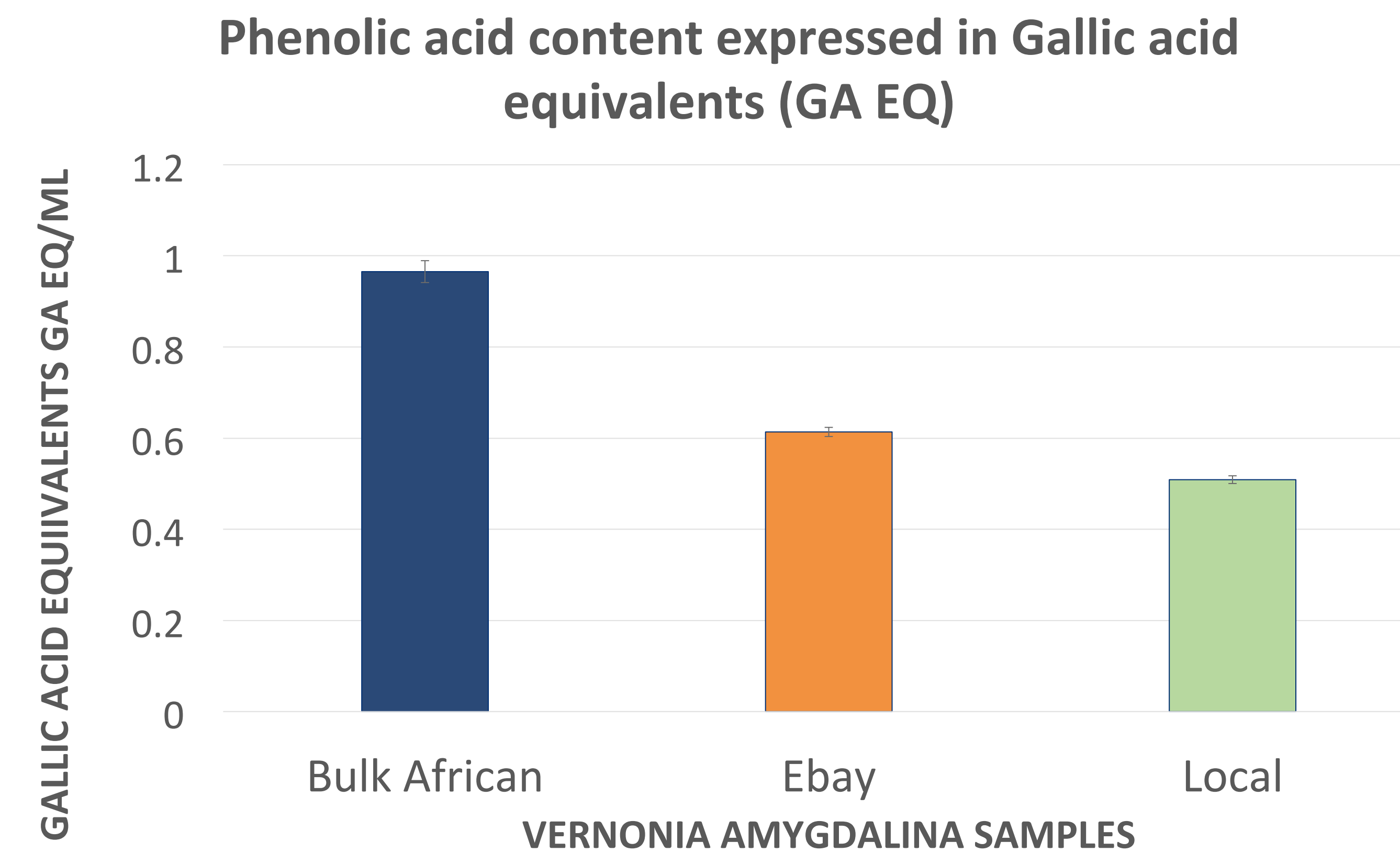


Figure 1: Total phenolic content in samples of *Vernonia amygdalina*. Bars indicate values ± Standard Error

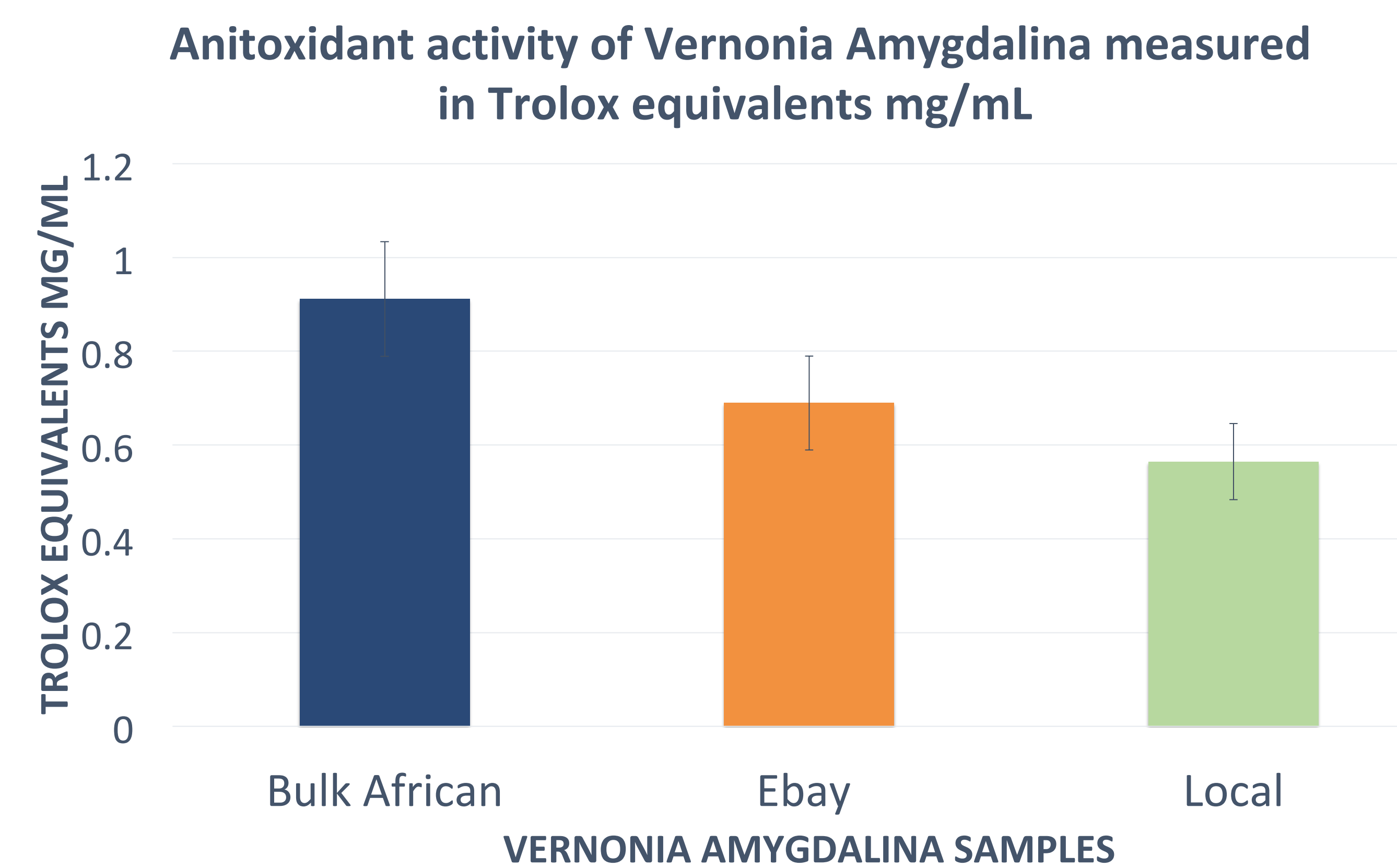


Figure 2: Antioxidant activity in samples of *Vernonia amygdalina*. Bars indicate values ± Standard Error

Correlation between antioxidant activity and phenolic content

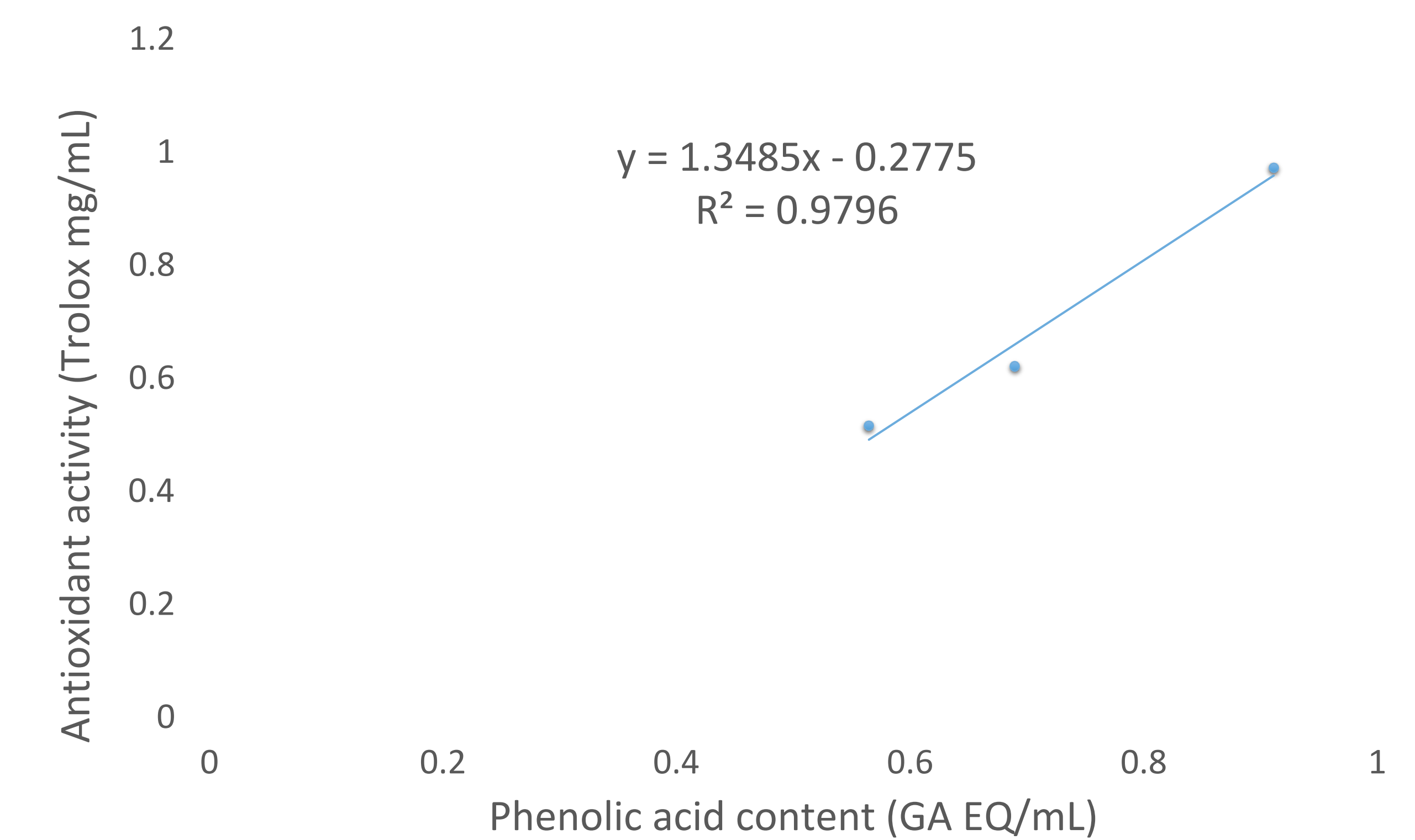


Figure 3: Graph showing the relationship between antioxidant activity and phenolic content

Results

- Bulk African sample, as observed in figure 1, showed highest antioxidant activity (0.91 Trolox EQ/mL) and Phenolic content (0.97 Gallic EQ/mL), followed by Ebay sample, which had 0.69 Trolox EQ/mL and 0.61 Gallic EQ/mL
- Local sample, purchased in Nigeria, showed the lowest antioxidant activity (0.50 Trolox EQ/mL) and Phenolic content (0.60 Gallic Eq/mL)
- Antioxidant activity increases significantly as phenolic acid increases. This is shown in the linear graph in figure 3 (R=0.98)

Discussions and Conclusions

- *Vernonia amygdalina* possesses antioxidant properties. Phenolic acids account for some of those properties, as they have been quantified in three commercial samples.
- The traditional and medicinal uses of *Vernonia amygdalina* in west Africa are attributed to the presence of these properties.
- The quantity of phenolic acids in a sample directly affects antioxidant activity.
- More studies are still needed to understand the glucose-inhibiting property of *Vernonia amygdalina*, and its role in the treatment of diabetes across west Africa.

Acknowledgement

- This project was supported by the CUNY Research Scholars Program (CRSP) at the Borough of Manhattan Community College.
- Special thanks to Dr. Adolfin Koroch for providing guidance throughout this project.

References

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- Zhang H and Tsao R. 2016 *Dietary polyphenols, oxidative stress and antioxidant and anti-inflammatory effects* Current Opinion in Food Science 2016, 8.33-42