

Title – Inhibition of Liver Cytochrome P450 Isoforms 1A1 and 1A2 by Brazilian Acai Berry Extracts

Program of Study – Biomedical Sciences; Cell and Molecular Biology

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Category – Basic

Abstract:

The human liver cytochrome P450 enzyme family constitutes a primary pathway in the body for drug metabolism. Indeed, most medications are acknowledged to be metabolized through the P450 isoforms. The rise in the use of unregulated natural products for self-treatment poses a concern for this metabolic system because although use of these products appears to have a favorable outcome, various chemicals within these products have been shown to cause adverse effects by inhibiting or activating P450 enzymes. This relationship is important to consider for both medicine production and as part of a wider view of overall drug interactions within the body. The Brazilian Acai berry (*Euterpia oleracea*) is a popular natural product used for several health benefits including weight loss, antioxidant properties, lower cholesterol, and healthier skin. However, there is currently a lack of research available for the Acai berry's influence of the cytochrome P450 metabolism pathway and resulting potential drug interactions. This research will study the inhibitory effects of the Acai berry on P450 isoforms using *in vitro* enzyme assays, specifically with 1A1 and 1A2 isoforms. Unpublished results using a non-standard probe for these enzymes suggest that 1A1 and 1A2 may be inhibited by crude Acai extracts. The current research project aims to establish uninhibited enzyme kinetics using an HPLC-based analysis with 7-ethoxycoumarin, a known substrate of 1A1 and 1A2 enzymes. Once established, this assay will allow evaluation of the crude Acai berry fractions on activity of these enzymes. As the chloroform fraction has demonstrated the most potent effects of inhibiting other P450 enzymes; this research will focus on the

chloroform fraction in the hopes of eventually isolating the specific chemicals within the Acai berry that interact with 1A1 and 1A2.

Christian Worldview Integration:

Then God said, "I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food..." God saw all that he had made, and it was very good. -Genesis 1:29, 31(NIV)

How many are your works, Lord! In wisdom you made them all; the earth is full of your creatures. -Psalm 104:24 (NIV)

The Bible speaks freely of the wonders of God as they are revealed in the world around us. It tells us of God's power as He created the world from nothing, from the biggest star to the smallest atom, putting an unimaginably complex universe together in an ordered form. It also tells us of how God provided for all creatures by creating a food chain that sustains each level of life with whatever it needs. Every step mankind takes to understand in further detail how the food we eat interacts with and sustains our bodies merely opens our eyes more to the wonders of God's creation, showing us another small piece of the mind of God. As this project seeks to determine the influence of the acai berry on human metabolic systems, it will give mankind yet another way to sing the praises of our Creator as we marvel at His providence in giving one small berry the ability to affect the human body in such powerful ways. Finally, this experiment will either prove or disprove its hypothesis, but as with any experiment, it will lead to more questions than it answers, reminding us that no matter how much we know, the entirety of mankind's knowledge will never compare with the knowledge and power of God our Creator.