Fruit extracts of *garcinia cambogia* have been in the news recently for their weight management benefits especially when combined with a healthy diet and exercise. Emerging research suggests that multiple phytochemicals present in this fruit may have health and beauty benefits that go well beyond simply managing an appealing appearance.

The most studied component of *garcinia cambogia* is hydroxycitric acid (HCA). The earliest recognized weight management benefit of HCA dates back to 1977 (Panksepp 1977). In experiments with rats, a short term (1 hour) aversion to food was demonstrated with ingestion of HCA. This short term satiety was demonstrated in numerous subsequent studies in both animals and humans (Astell 2013, Gatta 2009, Leonhardt 2001).

Another recognized benefit of HCA is its inhibition of lipogenesis. Lipogenesis is an important step in the conversion of simple sugars, such as glucose, to fatty acids. HCA competitively inhibits the enzyme, ATP: citrate lyase by competing with citrate. This slows the conversion of sugars to fatty acids. Fewer fatty acids results in less excess energy being stored as fat in adipose tissue (Kovacs 2006, Lim 2005, Leonhardt 2004). In addition, several studies have demonstrated increased oxidation of lipids for energy metabolism (Tomita, 2003, Lim 2002, Kovacs 2001). The combined effect results in less conversion of sugars to lipids and more rapid metabolism of lipids for energy, having a potentially healthful impact on lipid profiles (Shara 2004, Koshy 2001).

Decreased conversion of glucose has the potential to result in increased blood glucose levels. When this was investigated in animal and human studies, the opposite was found. Glucose tolerances improved, with either positive or no effect on insulin responses, especially with exercise (Cheng 2012, Wielinga 2005, Leonhardt 2004, Hayamizu 2003). The mechanisms investigated suggest that a combination of slowed glucose absorption, increased glucose metabolism to glycogen, and accelerated storage by muscle cells as glycogen all contribute to healthy glucose management and accelerated metabolism. Another concern with excess glucose is excessive protein glycolation which is being increasingly associated with the pathogenesis of aging and diabetes. One researcher found that HCA actually inhibits protein glycolation, alleviating this concern, and possibly providing an avenue for future research into additional benefits of HCA beyond weight management (Bousova 2009).

The combined effect of accelerated glucose conversion to glycogen and increased lipid oxidation metabolism has interesting consequences for endurance athletes. By storing more glycogen and increasing the utilization of lipids, it delays the use of the enhanced stores of glycogen in muscles, resulting in improved exercise endurance and increased time to exhaustion with HCA (Lim 2003, 2002).

Intense exercise results in increased cellular metabolism that often results in increased oxidative stress. Because *garcinia cambogia* accelerates cellular metabolism, the effects on oxidative stress were investigated. The opposite seems to be the case with *Garcinia cambogia* extract supplementation, especially in association with a high fat, high sugar diet. Both animal and human studies show lower levels of oxidative stress markers, decreased damage from oxidative stress and significant antioxidant properties associated with garcinia cambogia and its component phytochemicals (Amin 2011, Figueredo 2011, Yamaguchi 2000).

*Garcinia cambogia* and its component phytochemicals have also been investigated for both psychological and neurological benefits. Researchers have found that HCA enhances serotonin release and availability in the brain cortex (Shara 2004) which may be of some cognitive benefit. In addition, neuronal protective action has been demonstrated for the extract component guttiferone A in in vitro cellular studies (Nunez-Figueroa 2012, Figueredo 2011,). Another component, garcinol, has been investigated in rodents for its usefulness in the treatment of fear responses resulting from traumatic memories.

Like most effective herbal supplements, *garcinia cambogia* has positive, healthful benefits on the structure and function of many components and systems of the body beyond its most recognized application. This paper represents only a sampling of the research and potential healthful applications possible with the fruit extract and its components, making *garcinia cambogia* an emerging part of an overall healthful lifestyle, rather than just a tool to reach an arbitrary weight management or appearance goal.
References:


