

Mangosteen Research

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Background

The mangosteen (*Garcinia mangostana*) is a tree that is widespread in Southeast Asia. The fruit is renowned in folklore medicine for its medicinal properties, being used for treatment of skin infections, wounds, diarrhea, dysentery, and pathogens (bacteria and fungi). The mangosteen fruit consists of three parts:

- 1) Pericarp (peel)--the half centimeter-thick purple exterior that contains the highest level of xanthone concentration
- 2) Pulp (fruit)--the remarkably delicious inner flesh
- 3) Seeds

Antibacterial Introduction

Some scientists believe that bacteria are one of the most ancient of living things, having been on this planet for nearly 4,000 million years. Some bacteria are helpful, but others are among the many germs that can infect our bodies and make us sick. The damage bacteria inflict upon each of the human body's trillions of cells depends on their ability to adhere to and enter our cells and to deliver toxins.

Antibacterial Research

Scientists from Gifu University in Japan studied the xanthenes from the pericarp of the mangosteen fruit. Their research demonstrated that xanthenes from the mangosteen fruit had an inhibitory effect against "both methicillin-resistant and methicillin-sensitive *Staphylococcus aureus* , a common bacteria that causes severe infections within the human body. The authors even suggest that these xanthenes "might find wide pharmaceutical use."

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Mycobacterium tuberculosis (more commonly known as TB) is relatively unheard of in the United States. However, it is still a common problem in other areas around the world. This bacterium is resistant to many types of medications and many areas of the world can not afford modern medicine. A laboratory in Bangkok, Thailand conducted experiments to ascertain if the prenylated xanthenes would be beneficial against the TB bacterium. Their research states that the xanthenes alpha-mangostin, beta-mangostin and garcinone B "exhibited strong inhibitory effect against *Mycobacterium tuberculosis*" within the concentrations and conditions tested .

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Cholesterol Introduction

Cholesterol is a soft, waxy substance that is present in all parts of the body, including the nervous system, skin, muscle, liver, intestines, and heart. It is made by the body in the liver and obtained from animal products in the diet. Some cholesterol is necessary for normal body functions, including the production of hormones, bile acid, and vitamin D. It is transported in the blood to be used by all parts of the body. Cholesterol cannot dissolve in the blood; it has to be transported to and from cells by carriers called lipoproteins. There are two types of lipoproteins:

High-Density Lipoprotein (HDL) is considered the "good" cholesterol because it helps reduce LDL cholesterol levels and keeps the artery walls clean, preventing heart disease.

Low-Density Lipoprotein (LDL) is the major cholesterol carrier in the blood. When there is too much LDL in the blood slowly builds up within the walls of the arteries that feed the heart and brain. Growing evidence suggests that oxidative damage of LDL leads to atherosclerosis--or the buildup of plaque--on the lining of arteries.

- Typically, the body makes all the cholesterol it needs, so people don't need to consume it. The average man consumes 337 mg of cholesterol per day and the average woman consumes 217 mg.
- Approximately 25% of the adult population has elevated blood cholesterol levels, while more than 50% levels higher than the "desirable" range.
- Beginning at age 50, a greater percentage of women than men tend to have total blood cholesterol levels of 200 or higher.

Excessive cholesterol in the blood contributes to heart disease. In adults, total cholesterol levels of 240 or higher are considered high, and levels of 200-239 are considered borderline high.

Cholesterol Research

Some studies have suggested that atherosclerosis can be inhibited by limiting the oxidation of LDL. *Garcinia mangostana* (mangosteen) contains a xanthone known as mangostin. Under the test conditions and parameters, Mangostin showed a tendency to significantly inhibit the oxidative change in LDL.

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Inflammation Introduction

Inflammation is a process where the body's white blood cells and associated chemical mediators protect our bodies from infection by foreign substances, such as bacteria and viruses. Inflammation is the response of living tissue to damage. Inflammation can occur because of the rapid increase of white blood cells; symptoms of warmth, redness, swelling, and pain may occur as a result of this increase. Some of the most common results of inflammation are arthritis, allergies, and headaches.

Inflammation Research

The mangosteen has been used for centuries by some people of Southeast Asia as an anti-inflammatory agent. More specifically, the pericarp was used to make a tea or poultice. To this day, the mangosteen is still used there as an anti-inflammatory agent.

Studies conducted at the University of Madras in India demonstrated that the xanthone mangostin produced anti-inflammatory activity in rats.

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Cyclooxygenase (COX) is an enzyme partly responsible for initiating the inflammatory response in the body. This response includes the area of inflammation becoming red, hot, swollen, and painful. Tohoku University in Sendai, Japan demonstrated that the gamma-mangostin, a tetraoxygenated diprenylated xanthone contained in mangosteen, inhibits the COX enzyme, thus inhibiting its inflammatory activity in certain cells in rats.

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Histamine is a chemical the body's cell may release when exposed to an allergen, and which may be partly responsible for the swelling, red color, and heat associated with an inflammatory response. Extracts from the mangosteen fruit hull help inhibit histamine release, and therefore may be a useful crude drug for treatment of allergies and/or inflammation.

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