The Chemical Profiling and Antibacterial Evaluation of Extracts from Garcinia xanthochymus

Sun, Alanna (School: Waiakea High School)

Garcinia xanthochymus is a species of mangosteen that has exhibited medicinal properties. There are many beneficial phytochemicals found in the bark, leaves, seeds, and fruit of the plant. Most notably, it is used in medicine to treat diarrhea, nausea, and vomiting. Nine samples were extracted and analyzed using high performance liquid chromatography (HPLC) to identify the chemical basis. Three parts of the plant were used: the fruit, leaves, and seeds. Three different solvents were used: hexanes, ethyl acetate, and methanol, all of which range in polarity. The nine samples were extracted in 2-day periods and repeated 3 times for each solvent. The samples were tested using 2 antibacterial assays: a Disk Diffusion test and a MIC (minimum inhibitory concentration) test. Overall, HPLC results showed that non-polar compounds with longer retention time came out when extracted using non-polar hexanes and more-polar compounds with shorter retention time came out when extracted using MeOH. Two HPLC peaks at 6.0 min and 8.3 min are the major components of these leaves, fruits, and seeds extracts. The fruit extracts from hexanes and ethyl acetate showed antibacterial activity against E. coli and S. aureus. The fruit extract showed the most potent antibacterial activity (MIC 16-32 ug/mL) against S. aureus; this sample has the most abundant HPLC peak at 8.3 min. When purified through a flash column chromatography system with a normal phase column, three column fractions showed correlations with clear peaks shown in the HPLC chromatograms. These column fractions were then tested in a disk diffusion test. All had promising antibacterial effects but column 25 had the most promising with an inhibition zone of 10 mm.

Awards Won: