CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
J0403

Project Title
Antioxidants from Natural Sources

Abstract

Objectives/Goals
To extract antioxidants from natural sources and to compare their polyphenolic content by Folin Ciocalteau Assay, and activity by DPPH Assay, and also to determine their antibacterial properties

Methods/Materials
Pomegranate Fruit
Gallic Acid, Folin-Ciocalteau and DPPH Reagent, Ethanol, Water, Methanol and Acetonitrile
Round Bottom Flask, Reflux Condenser, Oil Bath, Stirrer, Falcon and Test Tubes
Rotary Evaporator, Water Heater, Analytical, Preparative HPLC, UV and Mass Spectrometry
96 Well Plates, Pipettes, Weighing Balance, Safety Goggles, Gloves and Lab Coat
LB Media, LB Agar Plate, Garlic, E.coli cultures, Glass Beads, Incubator

Results
The rind of the pomegranate showed higher polyphenol content than the seed and juice. Also, the DPPH Scavenging Activity in the rind was 5 times more than the seeds. The polyphenols from the rind showed excellent inhibition of the E.coli growth.

Conclusions/Discussion
I extracted active ingredients from the juice, rind and seeds from the Pomegranate. The extracts were analyzed and characterized by Analytical HPLC coupled with the Mass Spectrometry to determine the nature of polyphenols. The total polyphenolic content was determined by Folin-Ciocalteau Assay using Gallic Acid as a standard. The rind had more polyphenols than the seeds, which in turn had more than the juice. The antioxidant activity was determined by the DPPH assay. The DPPH scavenging activity in rind was 5 times more than that of seeds. The polyphenols from the juice and rind were purified using Preparative HPLC, and their structures were determined by comparing them with those reported in the scientific journals. 5 major components obtained from the juice extract belong to the Flavonoid family of polyphenols. The rind extract had many polyphenols that were difficult to separate into individual pure components, but were from the Ellagic acid family. All the samples were tested for their antibacterial property in E.coli. The rind and some of its components showed excellent inhibition of E.coli growth on the agar plates. The seeds and juice did not show a clear inhibition. Due to my time constriction I was unable to test many other fruits, which I had originally planned to test and so I would like to continue this project next year. Based on my results, I conclude that the rind of the pomegranate is rich in antioxidants, and has great medicinal value.

Summary Statement
I isolated antioxidants from the pomegranate's juice, rind, and seed and compared their polyphenolic content and activity.

Help Received
Dr. Lawrence D'Souza trained me in using the HPLC instruments and handled all the solvents. Used all lab equipments at Amylin Pharmaceuticals under the supervision of Dr. Lawrence D'Souza.