Pomegranate: Composition of a Super Fruit

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INTRODUCTION

Pomegranate fruit (Punica granatum) has become a high value crop for the production of pomegranate juice (PJ). Part of the perceived consumer value of PJ is its potential health benefits, based on a significant body of scientific research conducted on authentic PJ. Because of the meteoric rise in the popularity of PJ, supplies have been limited and prices have increased so there is significant pressure on suppliers to provide more PJ. Since domestic production is limited, this has meant turning to foreign sources to meet supply constraints. At issue is the authenticity of samples and the possibility that they are extended or adulterated to meet demand. What was unknown prior to this study was whether different varieties of pomegranate grown in different regions had similar profiles. Adulteration with other, cheaper fruit or sugar sources is a common method of extending limited supplies of PJ to unwary customers and some foreign suppliers claim that their local varieties have distinctive profiles that are not the same as published profiles of US domestic varieties.

Samples of whole pomegranate fruit were collected from domestic and international sources over three separate crop years 2006, 2007, 2008 totaling 115 unique samples. In addition, commercial PJ samples were collected from domestic and international sources, some of which were collected under our supervision and assumed to be authentic (16 samples) and others of unknown history but all labeled as 100% PJ (120 samples) to monitor differences due to processing techniques and the extent of adulteration currently in the marketplace.

Pomegranate fruit was obtained from a number of orchards in Southern California (the only domestic region where there are significant plantings) and from the USDA Germ Plasm Repository at Davis, CA. Foreign samples were obtained from Turkey, Azerbaijan, Syria, India, Iran and China. These are the primary international growing regions (some with significant plantings) and from the USDA Germ Plasm Repository at Davis, CA. Foreign samples were obtained from Turkey, Azerbaijan, Syria, India, Iran and China. These are the primary international growing regions extending limited supplies of PJ on unwary customers and some foreign suppliers claim that their local varieties have distinctive profiles that are not the same as published profiles of US domestic varieties.

Some of the distinctive characteristics of PJ are its dark red color and tart taste. The red color is due to anthocyanins which have high antioxidant properties and other purported health benefits. The tart taste is generally attributed to the unique phenolic compounds, punicalins and ellagitannins, present in PJ. Anthocyanins are present in most all red/blue/black fruits and berries, but each commodity has a distinct 'fingerprint' which can be useful for identifying a particular fruit. The unique phenolics present in pomegranate are generally recognized as the contributors to the health benefits of PJ.

Authentic fruit samples were processed in the Oregon State University Food Science Dept. under standardized conditions and all samples were subjected to a suite of analyses to determine the range of values that one finds from natural variations due to variety, growing region, and crop year. The data base values of authentic product was then obtained from Turkey, Azerbaijan, Syria, India, Iran and China. These are the primary international growing regions extending limited supplies of PJ on unwary customers and some foreign suppliers claim that their local varieties have distinctive profiles that are not the same as published profiles of US domestic varieties.

Additional Analyses

These useful indices of productivity as well as authenticity

SUMMARY

A data base of the chemical composition of authentic pomegranate fruit has been developed.

A step-wise or tiered approach to determining the authenticity of commercial pomegranate juice has been developed (IMAS)*.

Additional compositional parameters which may be useful for quality parameter, but not authenticity determination have been assayed.

Numerous commercial samples were found to contain a variety of adulterants. Some of these had other fruit juices added. Some had sugar or other sweeteners added. Some included added colorants.

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