Process Development for Antioxidant Extraction from Wet Pomegranate Peel

Xingzhu Wu\(^1\), Chandrasekar Venkitasamy\(^1\), Zhongli Pan\(^{1,2}\)

Department of Biological and Agricultural Engineering, University of California, Davis
Healthy Processed Foods Research Unit, Western Regional Research Center, USDA-ARS

### Background
- Pomegranate cultivation in California is increasing every year.
- About 283,000 tons of pomegranate was produced in US valued at 115 million dollars.
- The by-products of Pomegranate juice industry (peel and seed) are used as animal feeds or discarded.
- Pomegranate peel is rich in antioxidants beneficial for anti-inflammation, anti-aging and anti-cancer.

### Objectives
The objective of this study was to develop a process for extraction of water-soluble antioxidants from wet pomegranate peel.

### Methodology
Production of pomegranate fine peel particles using slicing and grinding. Comparison with the peels dried by hot air and infrared radiation.

### Results
- **Extraction Time Effect**
  (2/3/4/5/6 mins; 8* water; 20 °C)
- **Water-to-Peel Ratio Effect**
  (6 mins; 1/2/4/6/8*water; 20 °C)
- **Temperature Effect**
  (6 mins; 8* water; 20/30/40/50/60 °C)

### Results (Cond.)
- **Comparison with Hot Air/ Infrared Dried Peel**
  - 10% > extract yield
  - 2.5% > phenolic yield
  - Similar DPPH scavenging activity

### Discussion
The new process could be used for extraction of phenolic compounds from wet peels with:
- High antioxidant activity suitable for the preparation of fortified food products.
- Reduced pre-processing time and energy for drying, increasing the process efficiency.
- Eliminated organic solvent usage, but moderate water usage for food safety concern.

### Expected Yield Calculation
Optimal condition (6 mins; 20 °C; 4* water)

1 ton wet peel → 155.73 kgs dried peel → 82.72 kgs dried extract → 16.04 kgs dried phenolics

### Acknowledgement
Project number: SCB16014
Project manager: Sheila Morco