

**Harvest Time (stage) and
Postharvest Storage Condition
Effects on Pomegranate Fruit
Quality**

Harwinder S. Sidhu, Juan C. Díaz-
Pérez, Dan MacLean

Pomegranate

- Bushy, dense multi stemmed, 10-12 feet.



Pomegranate

- Edible portion:
Aril.
- Juice: Acidic to
very sweet.
- Deciduous



Uses

- Fresh fruit
- Tea and Juice
blends
- Nut mixes,
Jellies
- Dry seeds



Pomegranates in Georgia

- Little known about Postharvest quality and
storage potential of Local cultivars.
- Increase in production in recent years largely
in response to consumer demand.
- Global production increase: fresh fruit and
juice.

Experiment

- Studying the effects of harvest stage and
storage conditions on the quality of fruit.
- 7 cultivars: 'Afganski', 'Crab', 'Cranberry',
'Entek-habi-saveh', 'Kaj-acik-anor', 'Nikitski
ranni', 'Salavatski'.

Experiment

- Harvest stages: Early (2nd week September) and Late (4th week September)
- Regular air and controlled air storage; 3 months; 5° C, 90-95% R.H.
- Controlled air: 3% O₂, 5% CO₂, 5 °C, 90% to 95% R.H

STORAGE ROOMS



Fruit Evaluation

- Physical
 - Weight
 - Color (Colorimeter)
 - Skin smoothness (1-5)
 - Disease incidence; *Cercospora* (0-3)
 - Sunscald (0-3)
 - Cracks, bruises (0-3)

Cercospora



Cracking



Sunscald



Juice evaluation

- Standard 50 arils:
- Weight
- Juice weight
- % Juice/weight



Physiochemical

- Total soluble solids (TSS) as % Brix with handheld refractometer.



Physiochemical

- Titratable acidity: titrated to pH 8.2 with Mettler Toledo automatic titrator.
- 0.5µl juice+25 ml distilled water
- Expressed as % acidity.



Physiochemical

- High performance liquid chromatography
- Anthocyanins content: HPLC by Agilent technologies



HPLC

- Zorbax Eclipse XDB-C18 column used.
- Measurements taken at 280, 320, 350, 378, 520 nm (nanometers).



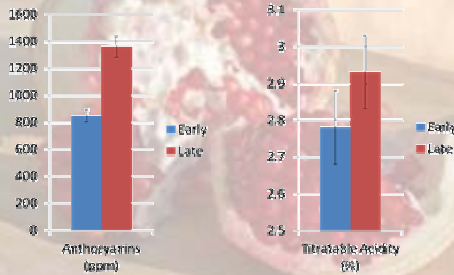
HPLC

- 5% Formic Acid; Acetonitrile
- Injection method: 0.4ml/min @ 74 bar.

Time	% Formic Acid	% Acetonitrile
2:00	95.0	5.0
19:00	85.0	15.0
20:00	80.0	20.0
21:00	0.0	100.0
24:00	0.0	100.0
24:01	95.0	5.0
28:00	95.0	5.0

Results and Discussion

- Harvest time very important



TSS affected by maturity

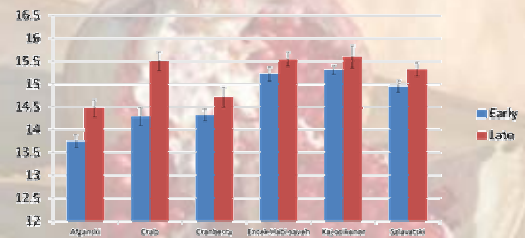
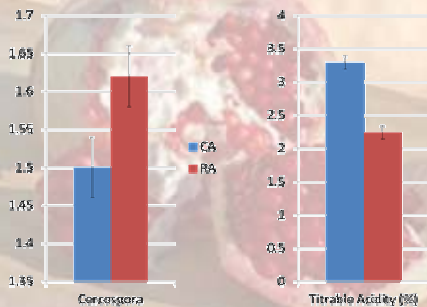


Fig1: Total soluble solids (%) in pomegranate fruit of various cultivars at two maturity stages ($P < 0.05$).

Storage condition effects



Juice/weight affected by storage condition

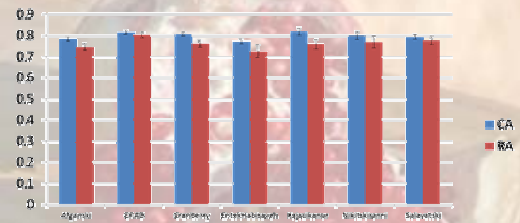


Fig 2: Effect of storage conditions (CA and RA) on pomegranate juice/weight (g/g) of 50 arils ($P < 0.05$).

Take home message

- Controlled atmosphere storage beneficial in maintaining pomegranate fruit quality
- Decreases both fruit decay and the rate of degradation of juice constituents.
- Fruit maturity at harvest played an important role in determining fruit quality.
- Fruit harvested unripe had lesser total soluble solids, less acidity and lower phytonutrient (anthocyanins) concentration.

Thank You!