UCDAVIS
Olive Center
at the Robert Mondavi Institute

The US Experience on Olive Oil Production and Quality

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WHO WE ARE

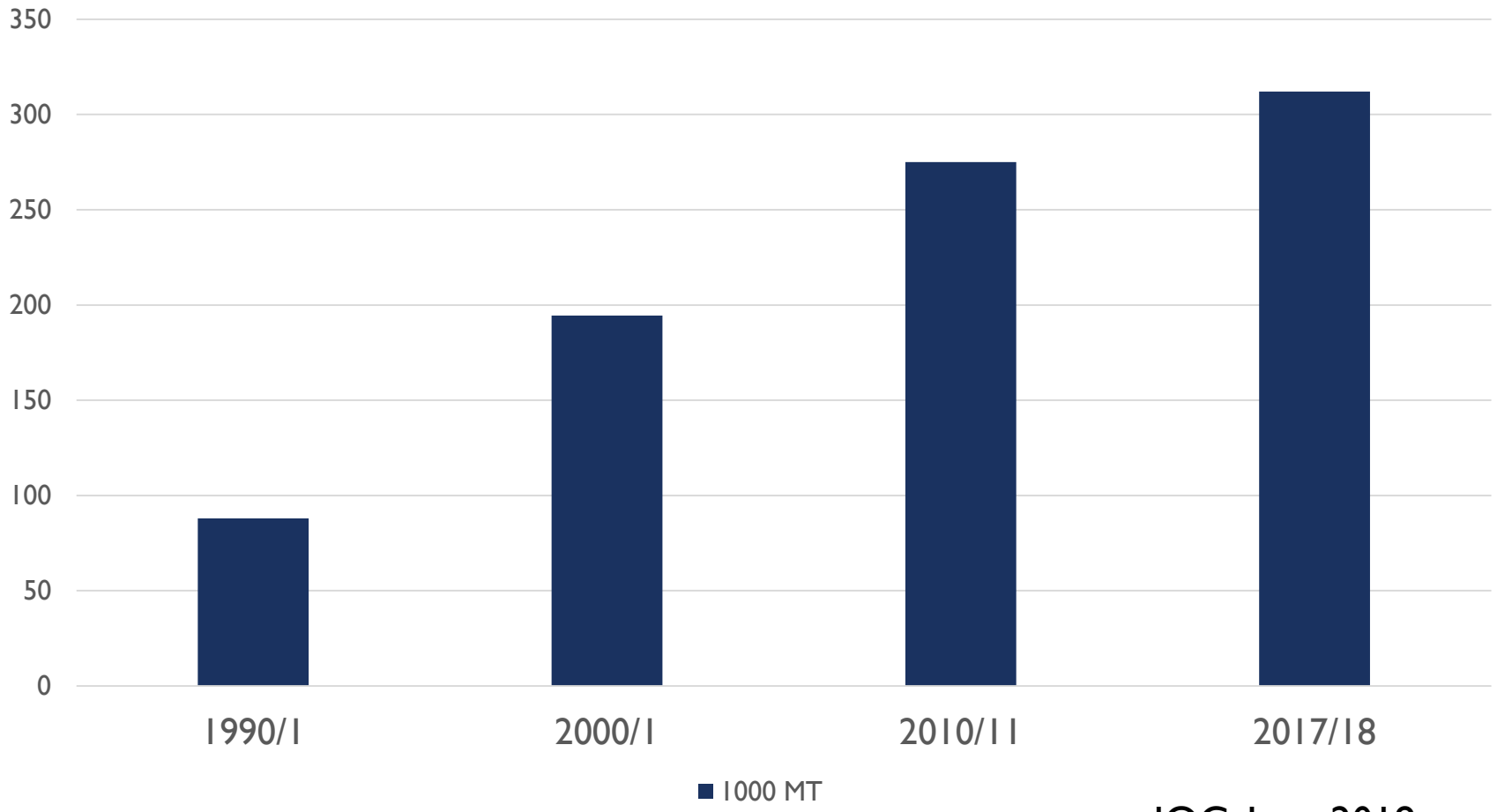
- Self supporting
- Research, education and outreach
- A portal to UC Davis and global resources
- Dedicated to California

RESEARCH SUPPORT

- Olive Oil Commission of CA
- California Olive Committee
- USDA and CDFA
- Olive Center resources
- Philanthropic

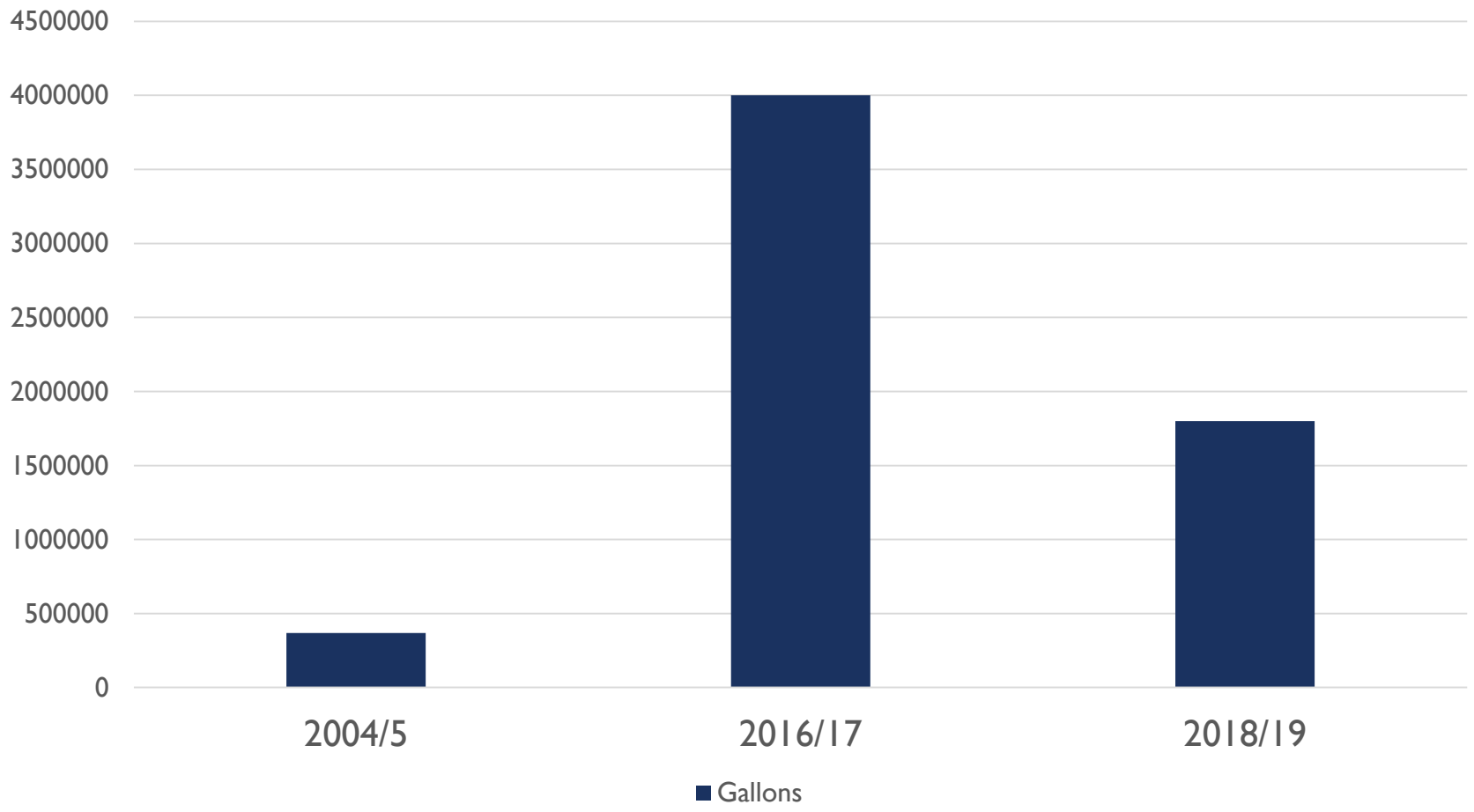
Firmin Berta at UC Davis Wolfskill Ranch

US OLIVE OIL CONSUMPTION



IOC, June 2018

CALIFORNIA OLIVE OIL PRODUCTION



Vossen (2005), IOC (2018), Olive Oil Times (2019)

OLIVE OIL COMMISSION OF CALIFORNIA

- State governmental entity, CDFA
- Recommend CA standards and fund research
- Grower assessment ≤ 25 cents/gal, > 5,000 gal
- Mandatory testing and traceability

STRICTER CALIFORNIA STANDARDS

	IOC	CALIFORNIA
FFA	≤ 0.8	≤ 0.5
PV	≤ 20	≤ 15
K_{232}	≤ 2.50	≤2.40
DAGs	-	≥ 35
PPP	-	≤ 17

RESEARCH ON QUALITY AND PURITY

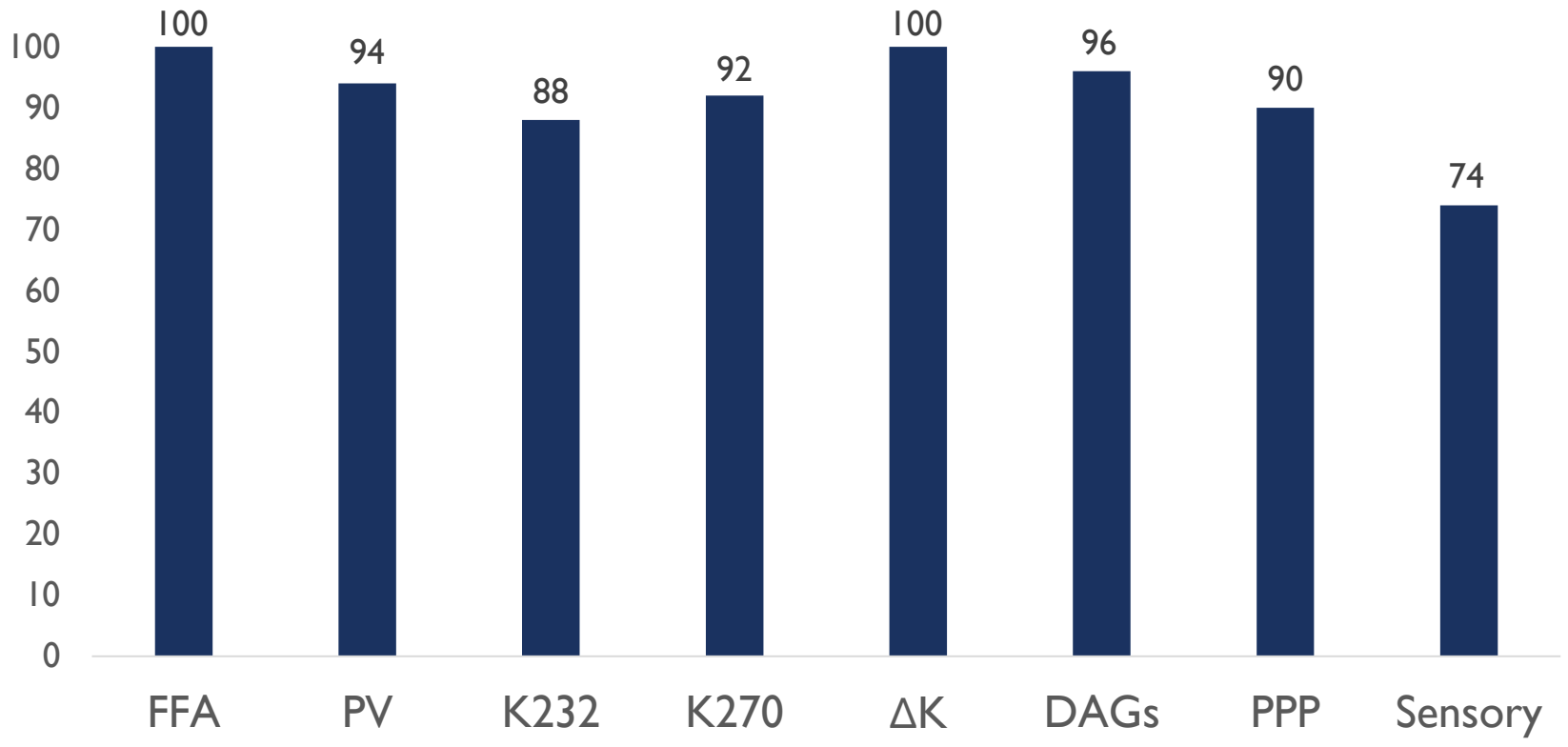
- Analyzed testing data shortly after harvest
- Analyzed CA olive oil > one year after harvest
- Analyzed data on sterols and fatty acids.

MANDATORY TESTING RESULTS

- All 161 samples designated as EXTRA VIRGIN grade prior to testing met those standards.
- 11 of 12 samples designated as VIRGIN or CRUDE grade met those standards.
- 13 of 14 samples UNDESIGNATED met extra virgin standards.

UC Davis Olive Center, "Evaluation of Mandatory Testing California Olive Oil 2017/18 Season," Submitted to the Olive Oil Commission of California, August 2018

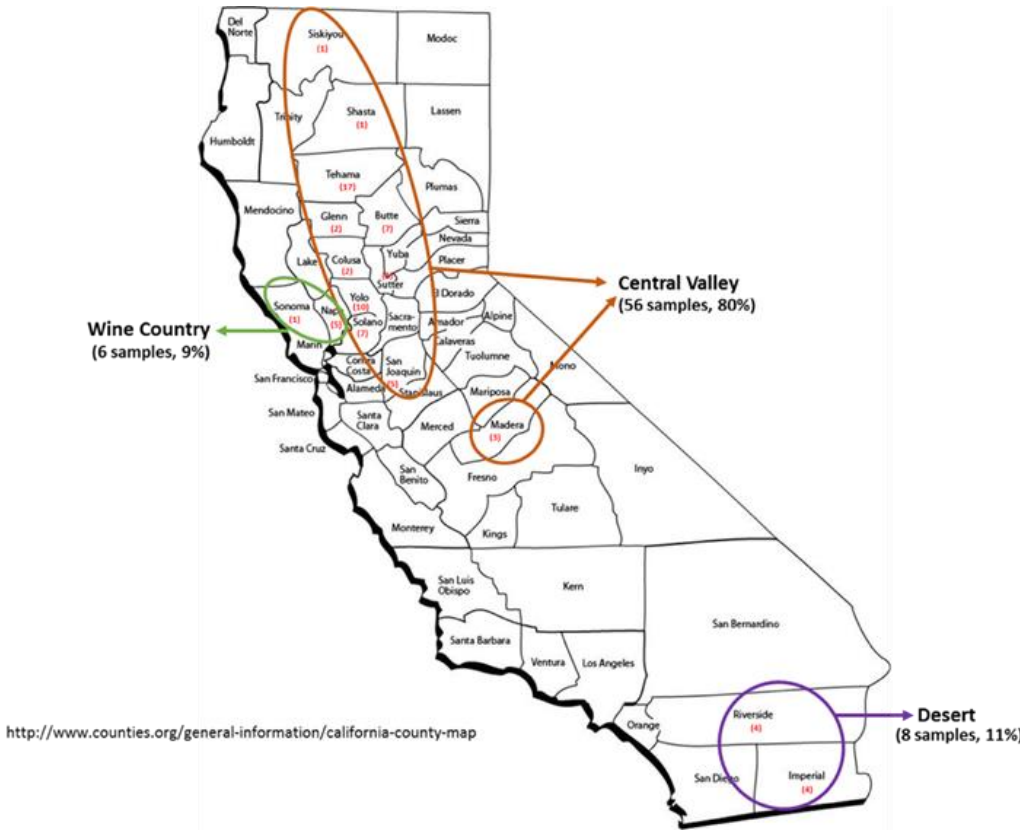
AFTER ONE YEAR: ROOM FOR IMPROVEMENT



UC Davis Olive Center, "Evaluation 50 California Olive Oil Samples at Least One Year After Harvest," Submitted to the Olive Oil Commission of California, August 2018

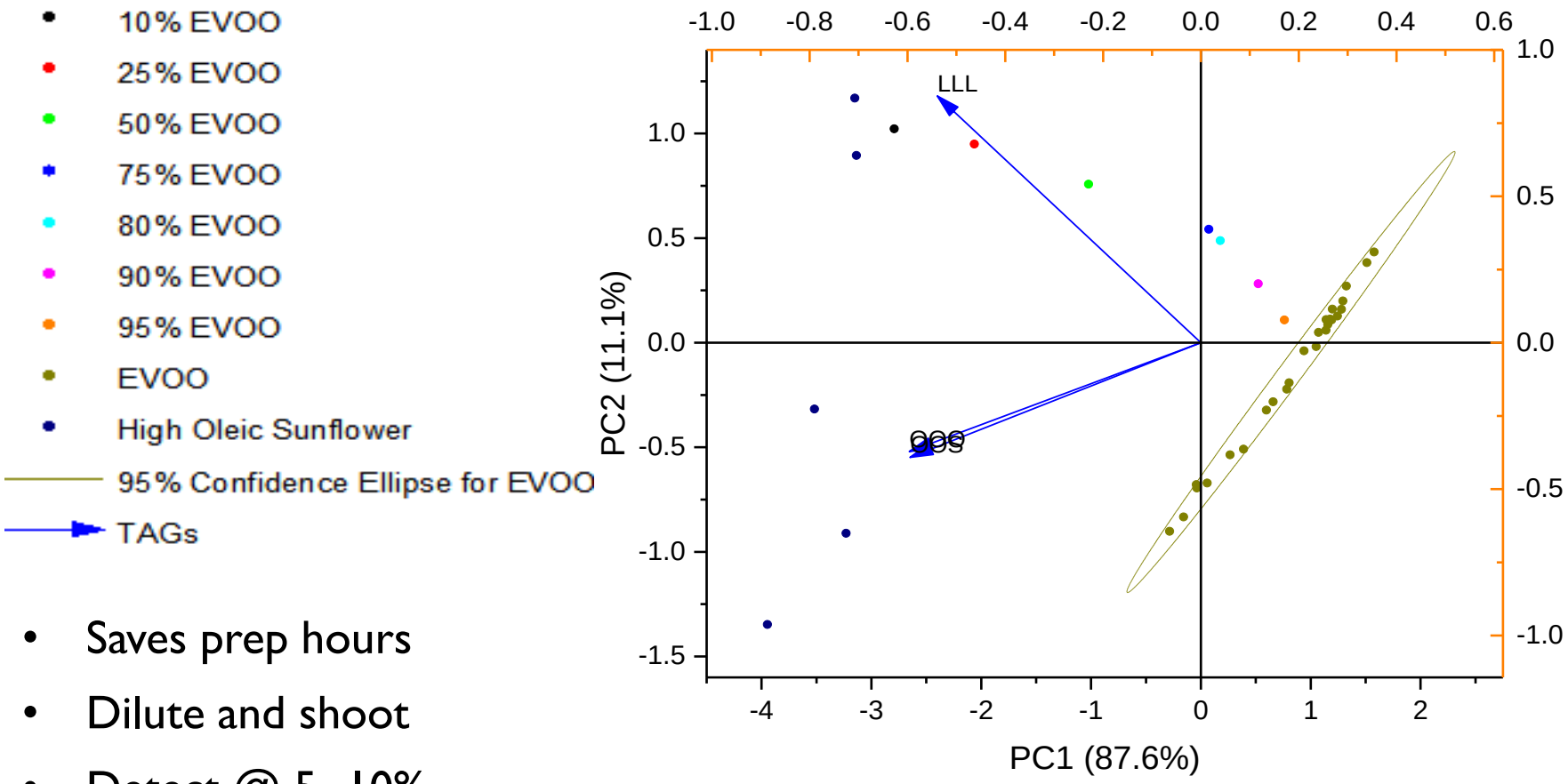
PURITY STANDARDS DON'T FIT CA CHEMISTRY

- 9% (6 of 70 samples) outside USDA limits
  - ½ Koroneiki
  - ½ Central Valley
  - ~½ Desert



UC Davis Olive Center, "Evaluation of Sterol and Fatty Acid Profiles, California Olive Oil 2017/18 Season" Submitted to the Olive Oil Commission of California, August 2018

LOWER-COST PURITY METHOD ON HORIZON



- Saves prep hours
- Dilute and shoot
- Detect @ 5 -10%

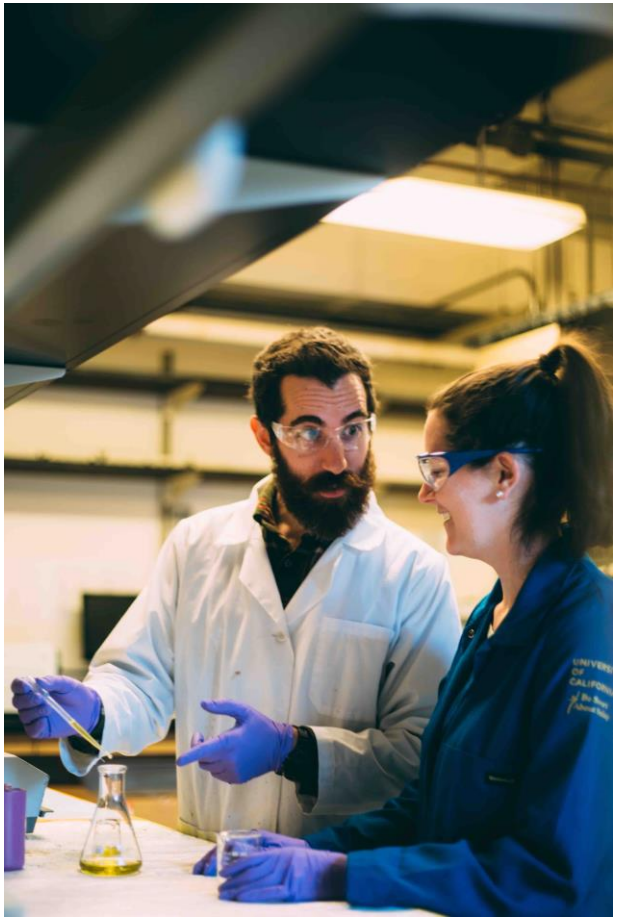
BETTER ACCURACY OF FRUIT PARAMETERS

- NIR for oil/moisture analysis
- Database is key to accuracy
- Options for all production sizes

Lee, C.; Polari, J. J.; Kramer, K. E.; Wang, S. C. *ACS Omega,* **2018**, 3(11), 16081–16088: "Near-Infrared (NIR) Spectrometry as a Fast and Reliable Tool for Fat and Moisture Analyses in Olives"

IMPROVING PROCESSING

- Impact of crushing speed on oil extraction and quality (Arbosana)
- Interaction between crushing variables and malaxation time (Arbequina)



Lauren Crawford

CRUSHING SPEED RESULTS

- Hammer mill rotor speed at 2400, 3000, 3600 rpm. At 3600 rpm:
- Oil extraction +1.2%
- Pungency +29%, other sensory unchanged
- Total phenols +18%
- Chlorophyll increased

Polari, J. J.; Garci-Aguirre, D.; Olmo-Garcia L.; Carrasco-Pancorbo, A. Wang, S. C. *Food Chem.*, **2017**, *242*, 362-368: "Impact of Industrial Hammer Mill Rotor Speed on Extraction Efficiency and Quality of Extra Virgin Olive Oil"

CRUSHING AND MALAXATION RESULTS

- Crushing speed (2400 or 3600 rpm)
- Grid size (5 mm or 7 mm)
- Malaxation time (30 or 75 minutes)

Polari, J. J.; Garci-Aguirre, D.; Olmo-Garcia L.; Carrasco-Pancorbo, A. Wang, S. C**.** *Eur. J. Lipid Sci. Technol.*, **2018**, 180097: "Interactions Between Hammer Mill Crushing Variables and Malaxation Time During Continuous Olive Oil Extraction"

CRUSHING AND MALAXATION RESULTS

- Combination of smaller grid size, lower rotor speed, and longer malaxation time gave the highest yield (89.4%)
- Same variables with shorter malaxation time gave the lowest yield (84.7%)
- FFA, PV, and DAGs adversely affected by longer malaxation time

Polari, J. J.; Garci-Aguirre, D.; Olmo-Garcia L.; Carrasco-Pancorbo, A. Wang, S. C. *Food Chem.*, **2017**, *242*, 362-368: "Impact of Industrial Hammer Mill Rotor Speed on Extraction Efficiency and Quality of Extra Virgin Olive Oil"

FUTURE RESEARCH INTERESTS

- Higher yield in olive production
  - Olive Knot
  - Climate resilience
  - Breeding
  - In states outside of CA
- Improve and understand nutrition of EVOO
- Byproduct

THANK YOU
FOR YOUR ATTENTION