

New accessible methods
to facilitate honey bee collection & preservation
for selective breeding programs based on proteomic markers

Alexandra SÉBASTIEN
Post-doctoral fellow - Foster Lab

Apimondia
September 11th, 2019

Current situation



Breeding programs



Gold standards

Field work



Laboratory

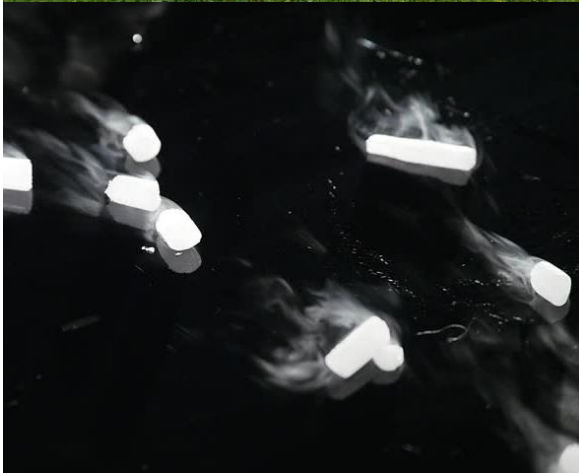


~~Gold standards~~ ➡ Reality

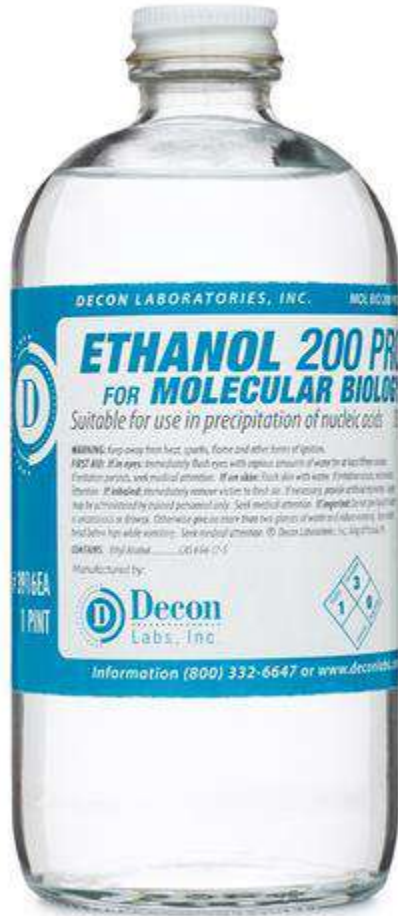
Field work



Laboratory



Alternatives

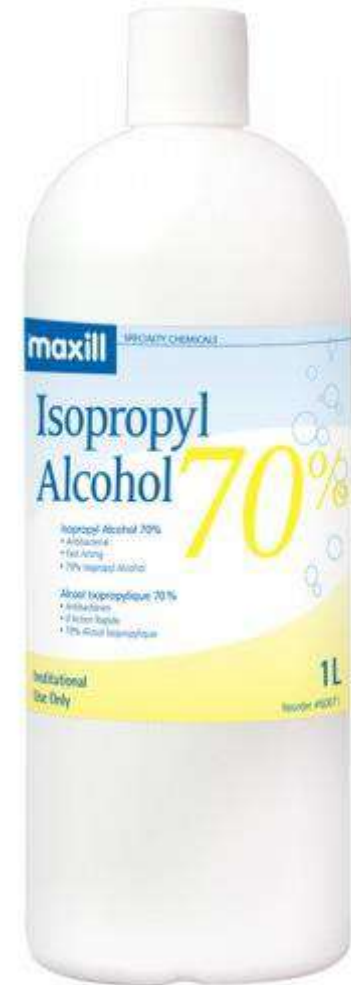


70% ethanol

Found in any laboratory

Additional benefits

- Easily transportable
- Easily shipped
- Lower time constrain



70% isopropanol

Bought in any drug store



Aim

Identify an alternative preservation method to facilitate collection in the field and future collaborations

Sample collection overview



9 treatments

1 treatment =
1 preservation method +
1 preservation time

27 antenna samples

3 biological replicates per treatment

Mass spectrometry - LFQ



Protein extraction
and digestion



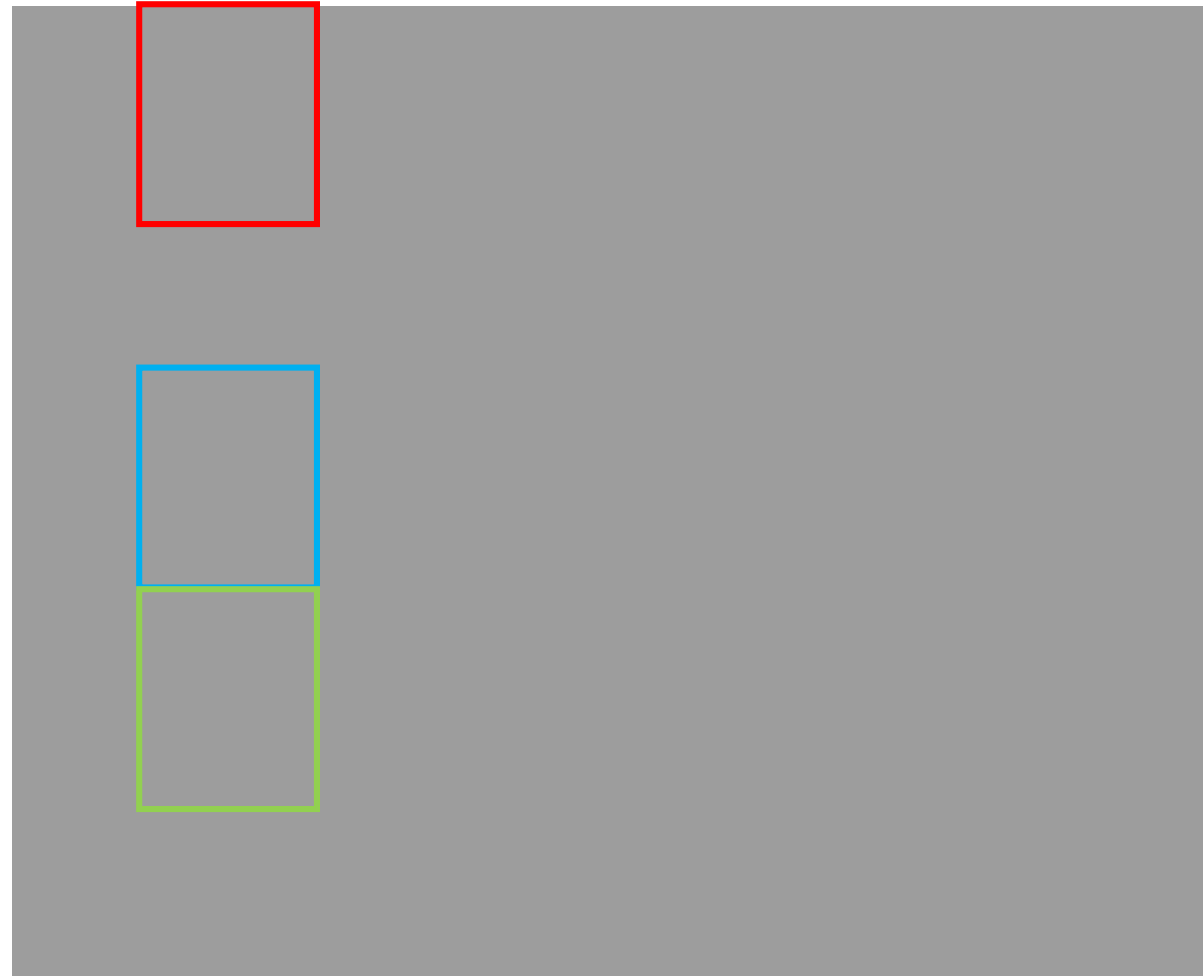
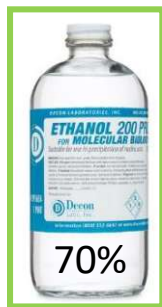
Data analysis
(MaxQuant and Perseus)



Mass spectrometer
(Bruker QTOF Impact II)



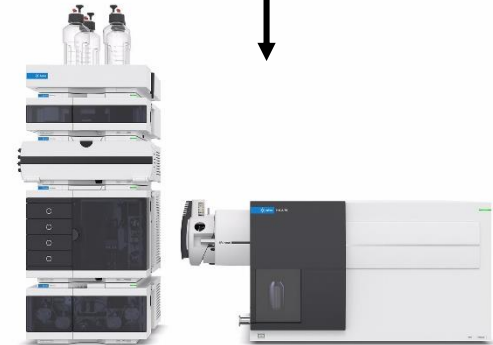
Whole proteome



Mass spectrometry - targeted



Protein extraction
and digestion



Mass spectrometer
(Agilent QQQ)



Data analysis



Biomarker presence

22 peptide markers targeted (Guarna et al, 2015 and 2017)

- 5 x control
- 17 x behavioural traits associated with hygiene

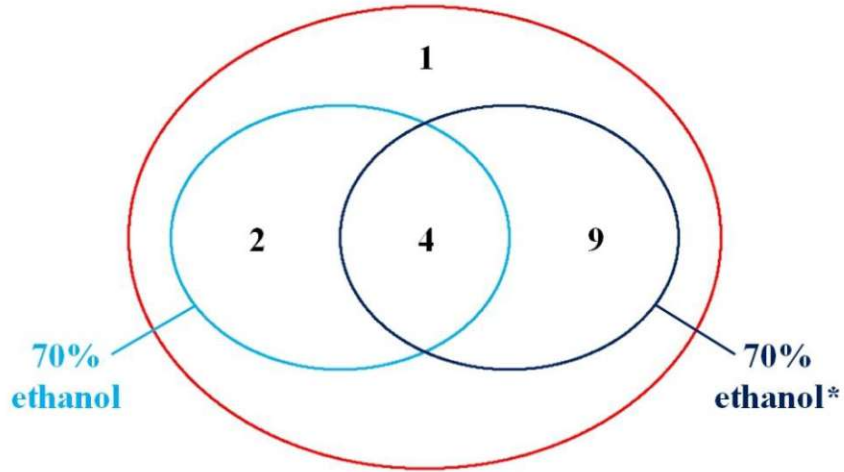
→ **18 peptides detected** (pick area to background ratio ≥ 3)

- 4 x control
- 14 x behavioural traits associated with hygiene

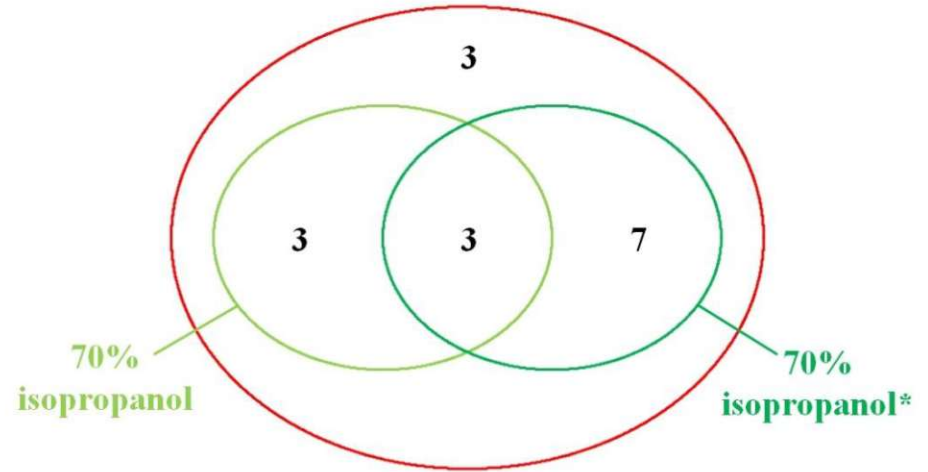


Biomarker presence

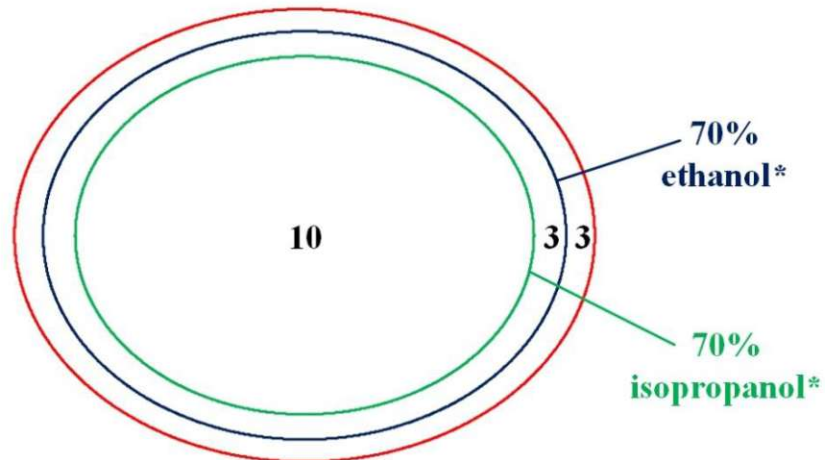
Snap frozen



Snap frozen



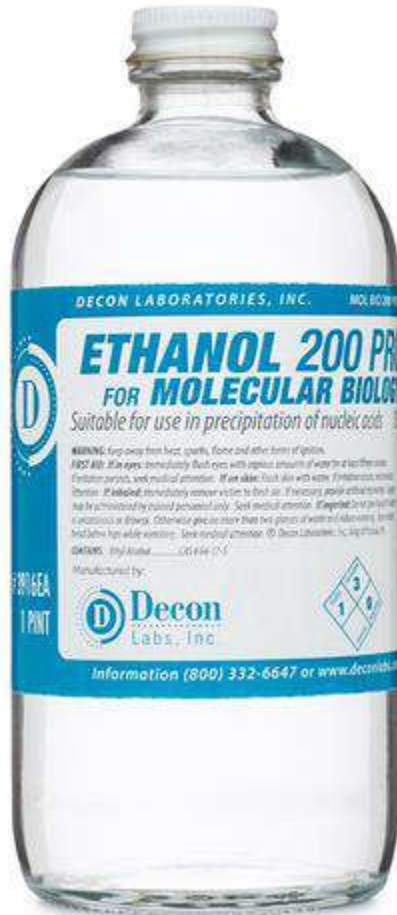
Snap frozen



Conclusions

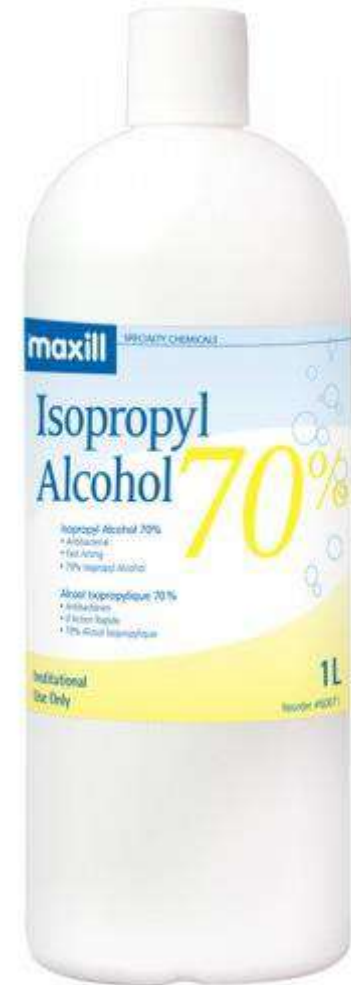


- Potential alternatives
- 70% isopropanol - successfully used during a breeding project



70% ethanol

Found in any laboratory



70% isopropanol

Bought in any drug store



THANK YOU

Leonard Foster
Nonno Hasegawa
Nik Stoykov
Karina Nielsen
Corie Rooyackers
Bradford Vinson
Heather Higo
Jenny Moon



THE UNIVERSITY
OF BRITISH COLUMBIA