



“Understanding raw materials and their impact on finished product”

by Brad Rush

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Theory

- Lemon peel would show a variation in flavor from the beginning of the growing/harvest season compared to the end of the season

What we knew

- Lemon peel contains over 600 compounds
- Supply is from two different regions of the world
- Noticeable difference between the two regions
- At times, lemon peel delivered an artificial flavor in the finished product, which we deemed negative

What we didn't know

- Why a difference between the 2 regions?
- What causes the artificial lemon flavor?
- How do we deliver a consistent finished product with lemon peel?
 - Analytical
 - Shelf life
 - Sensory experience

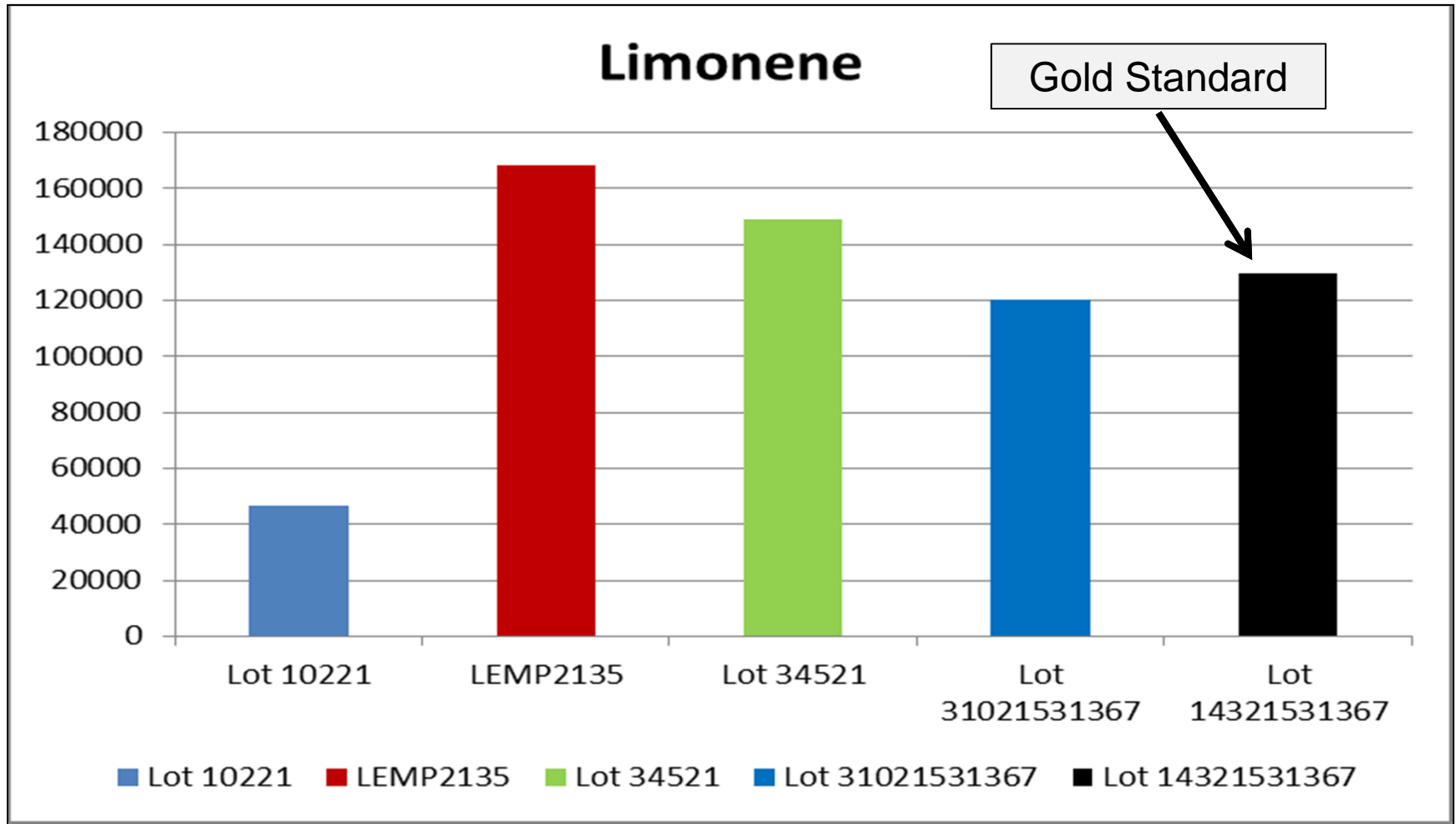
How we approached the research

- Evaluated “lemon tea” samples for sensory descriptors
- Worked with an outside lab to identify
 - Sampling plan
 - Positive compounds
 - Test method on GC

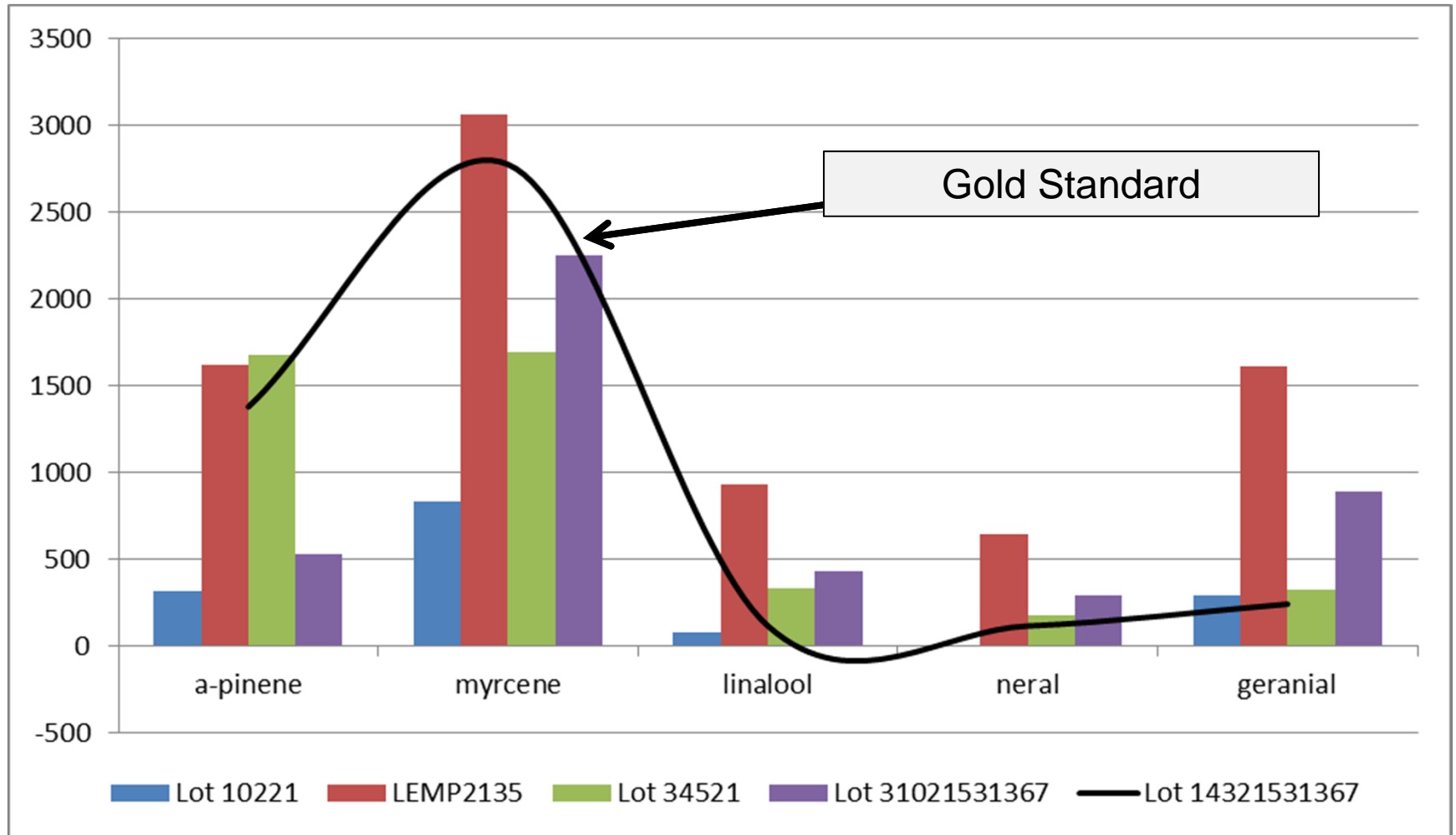
Key Compounds

- α -pinene
- Myrcene
- Linalool
- Neral
- Geranial
- Limonene

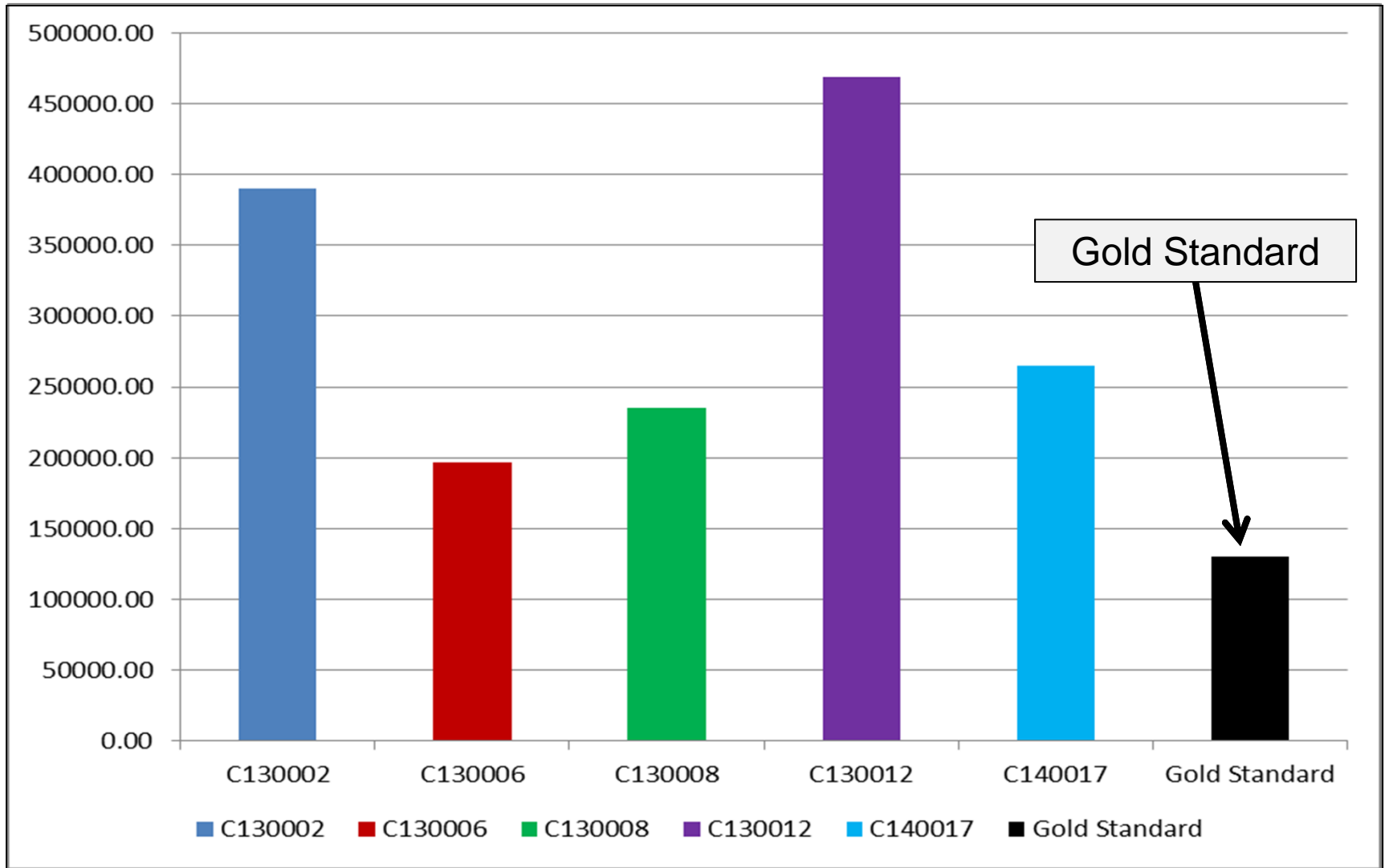
Sensory (Gold Standard) Con't



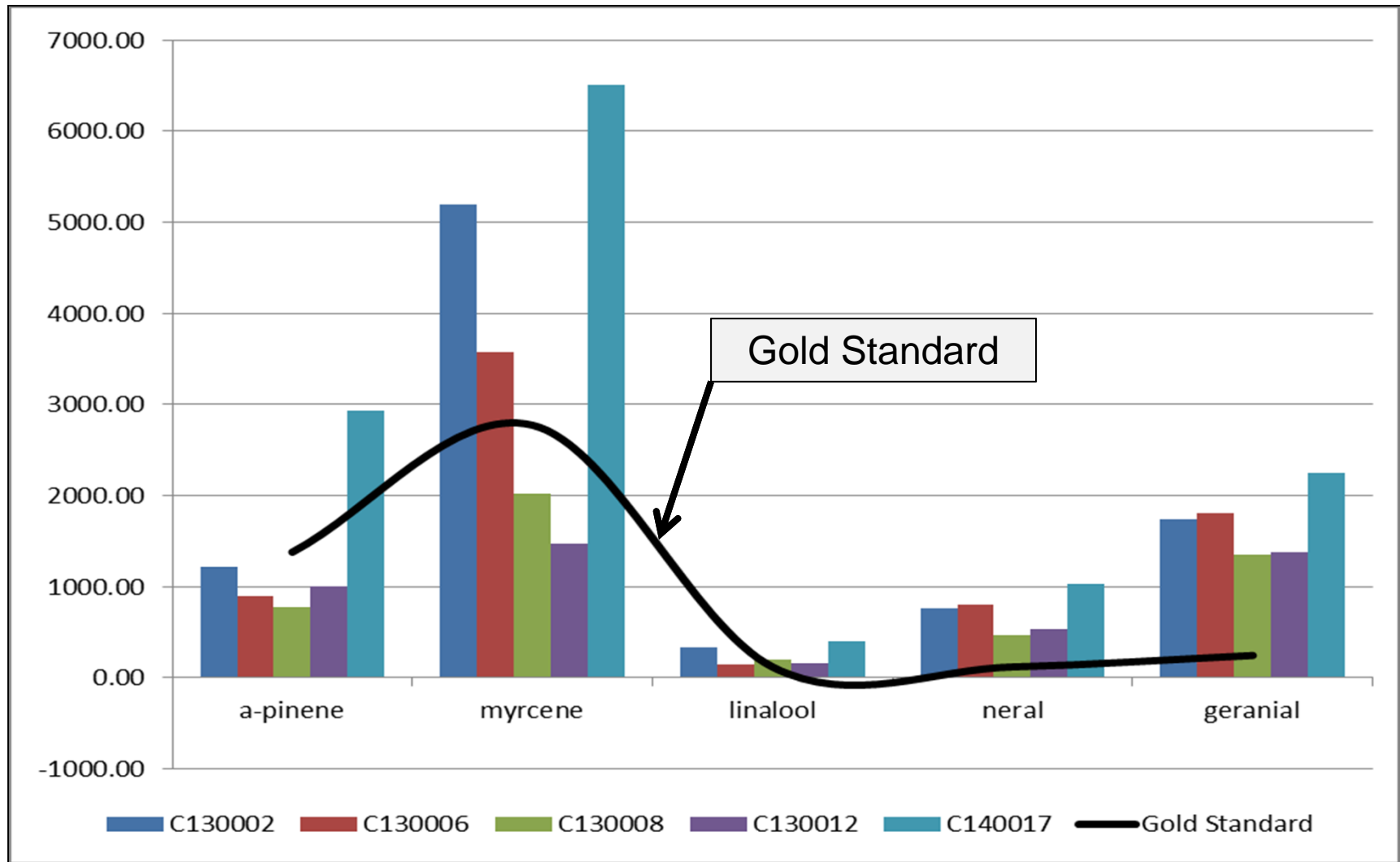
Sensory (Gold Standard)



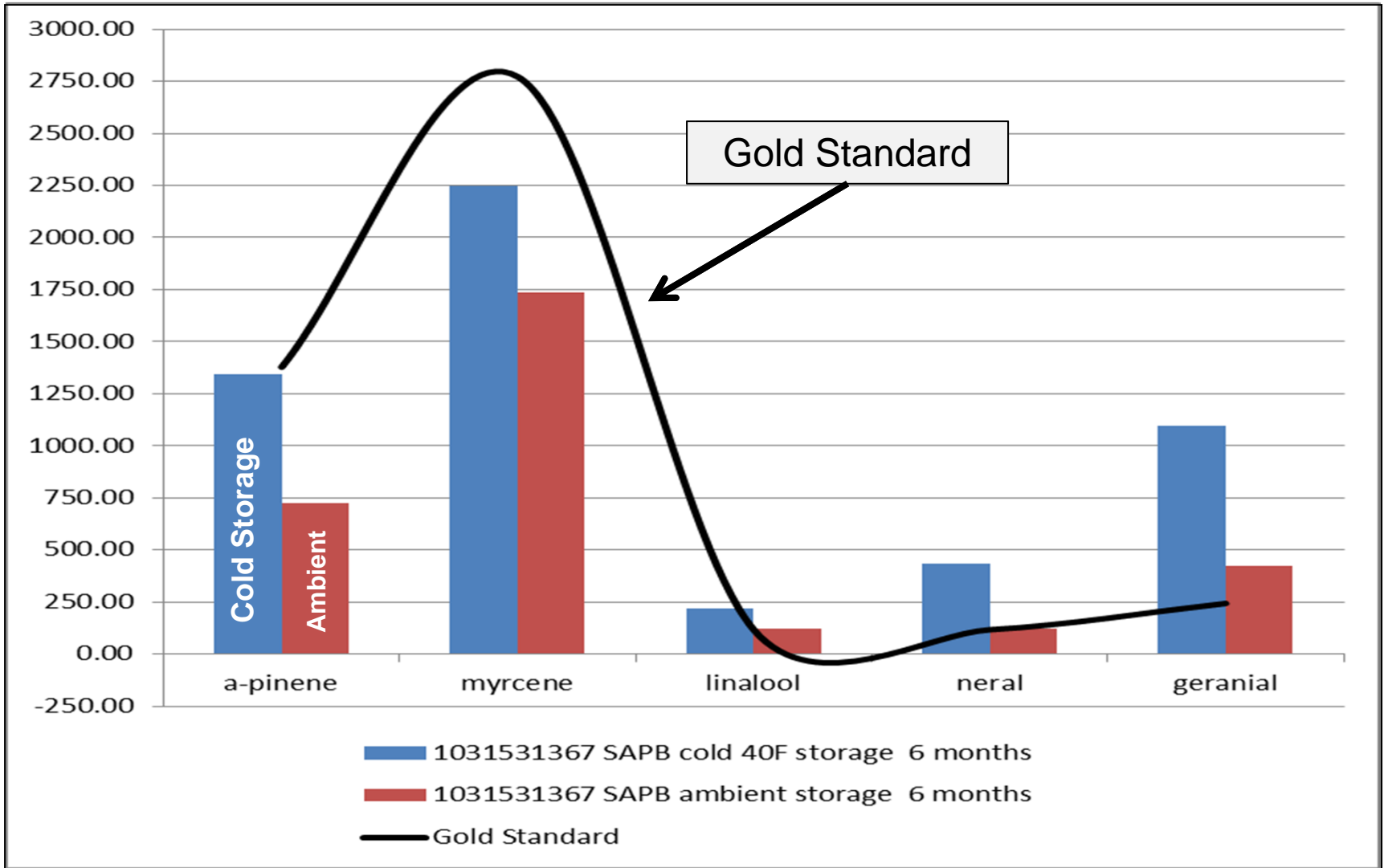
2013 and 2014 Limonene



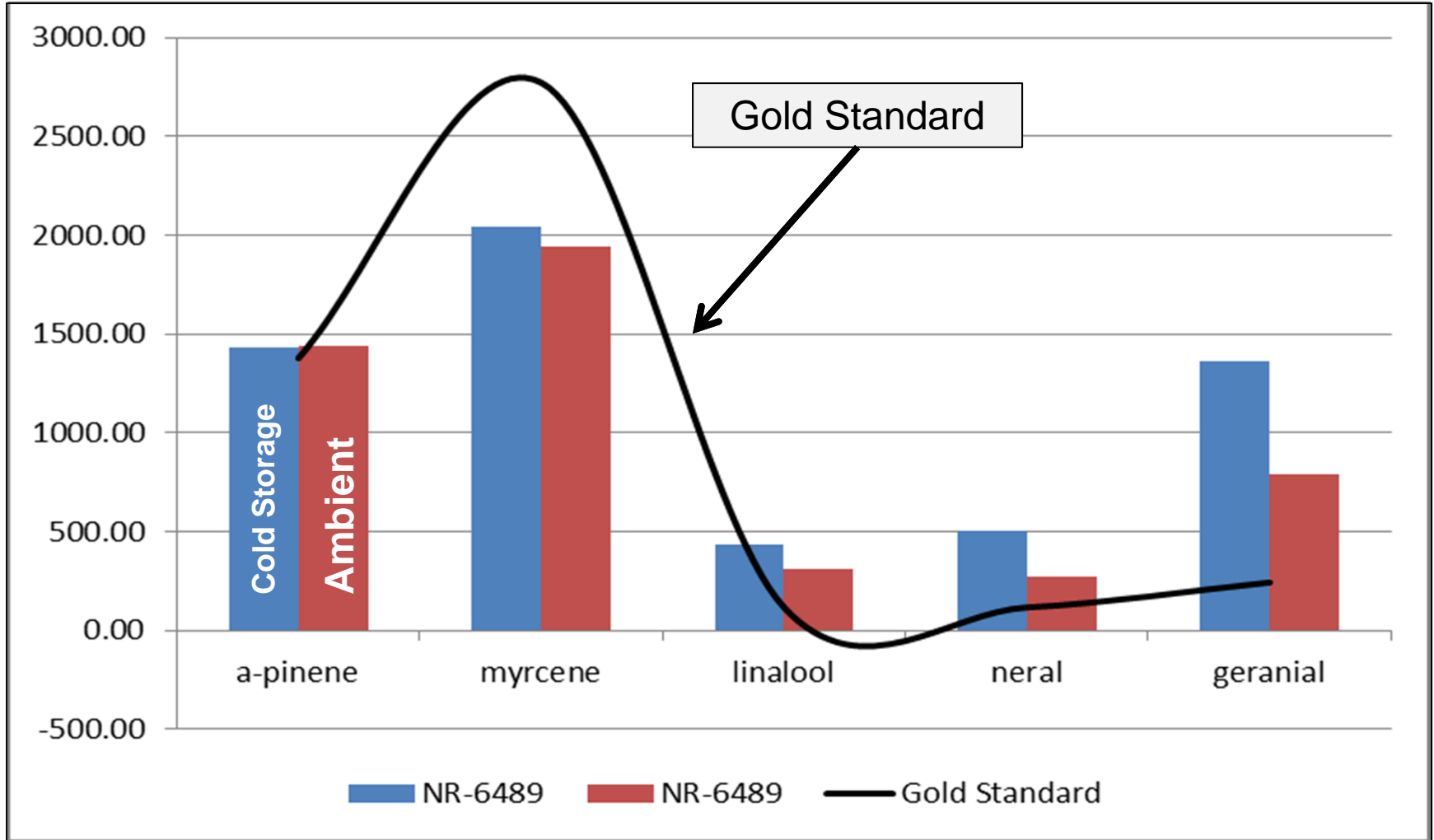
2013 and 2014 Lemon Peel Data



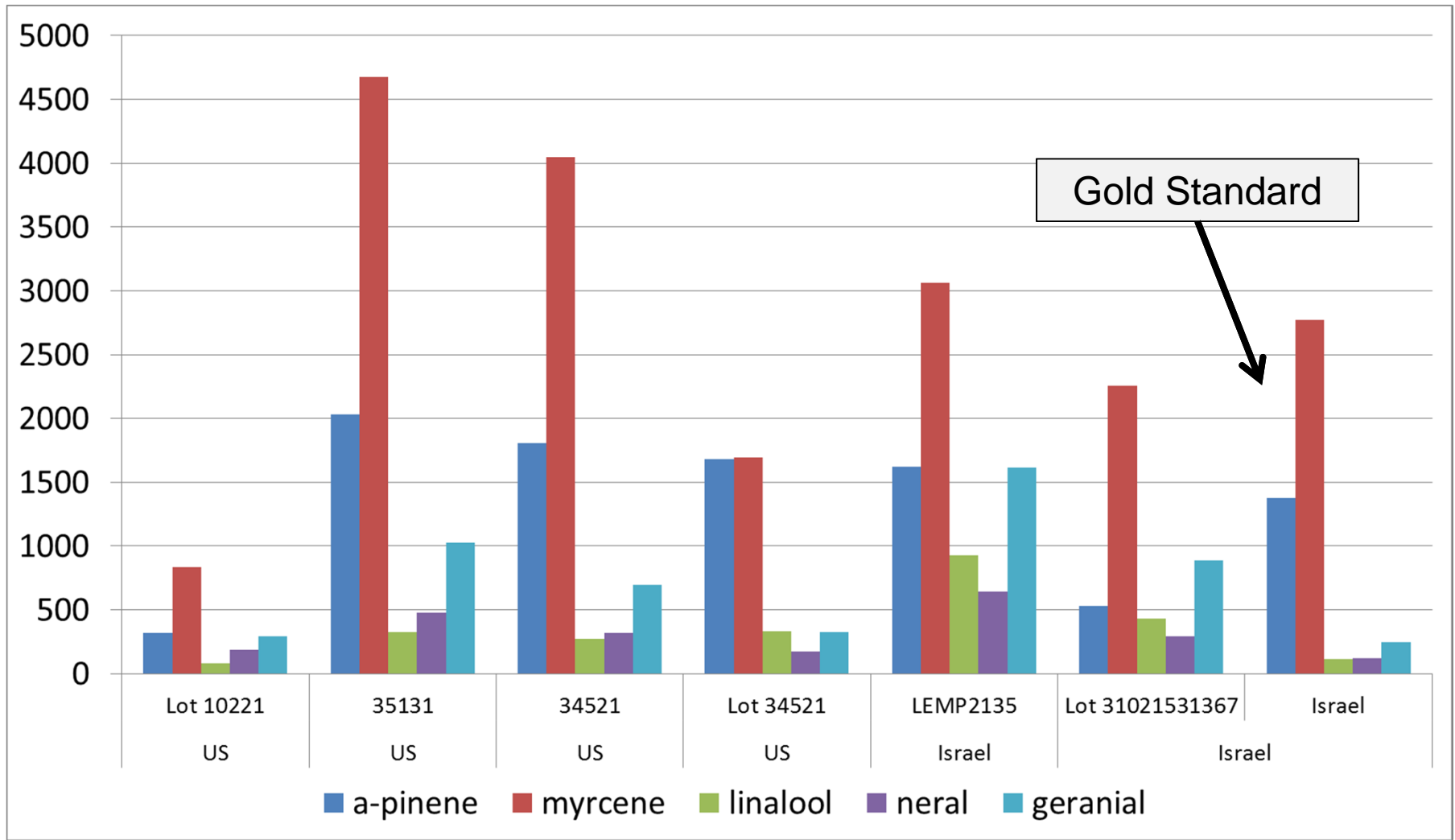
Shelf life study



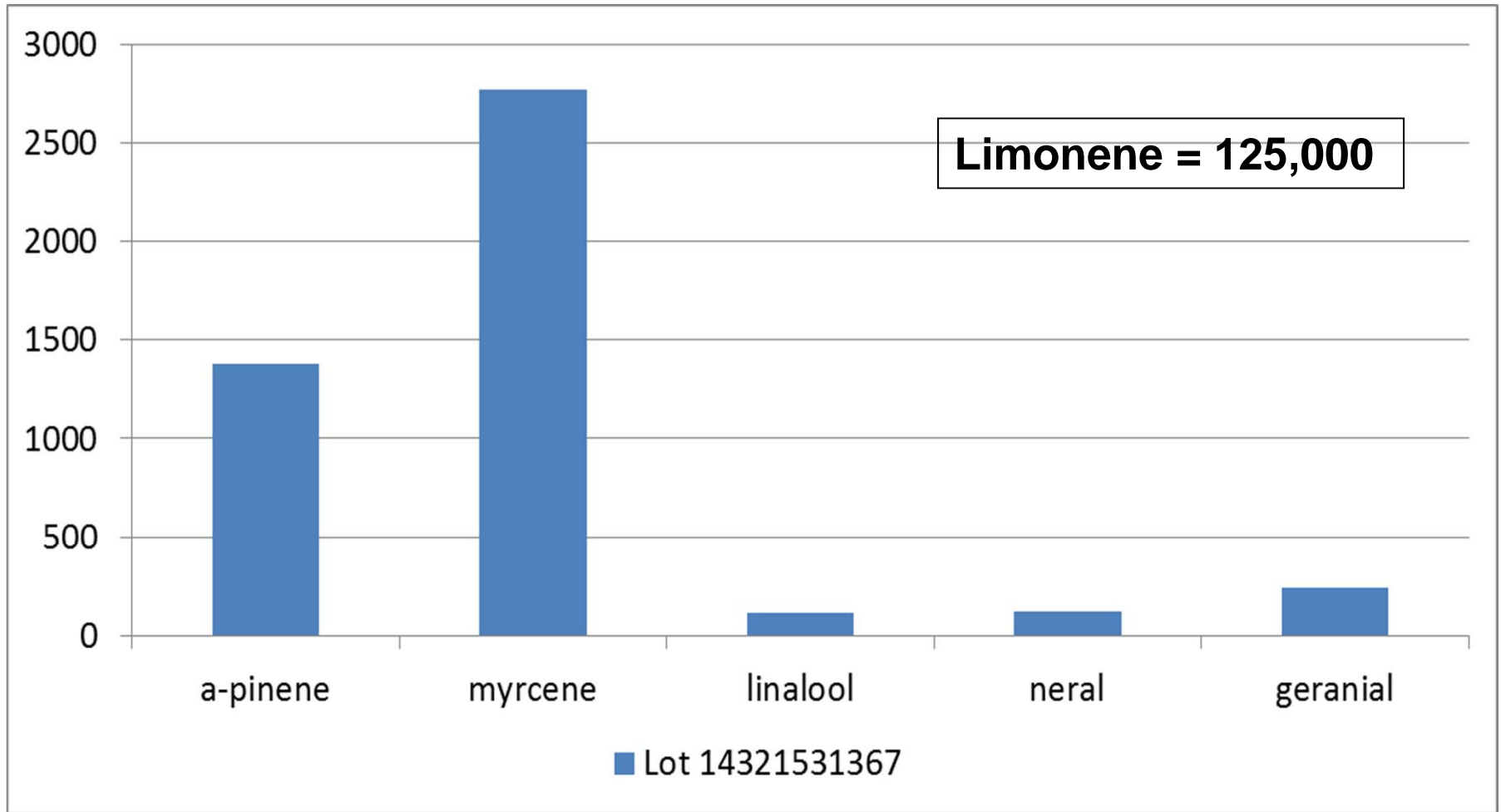
Additional shelf life study



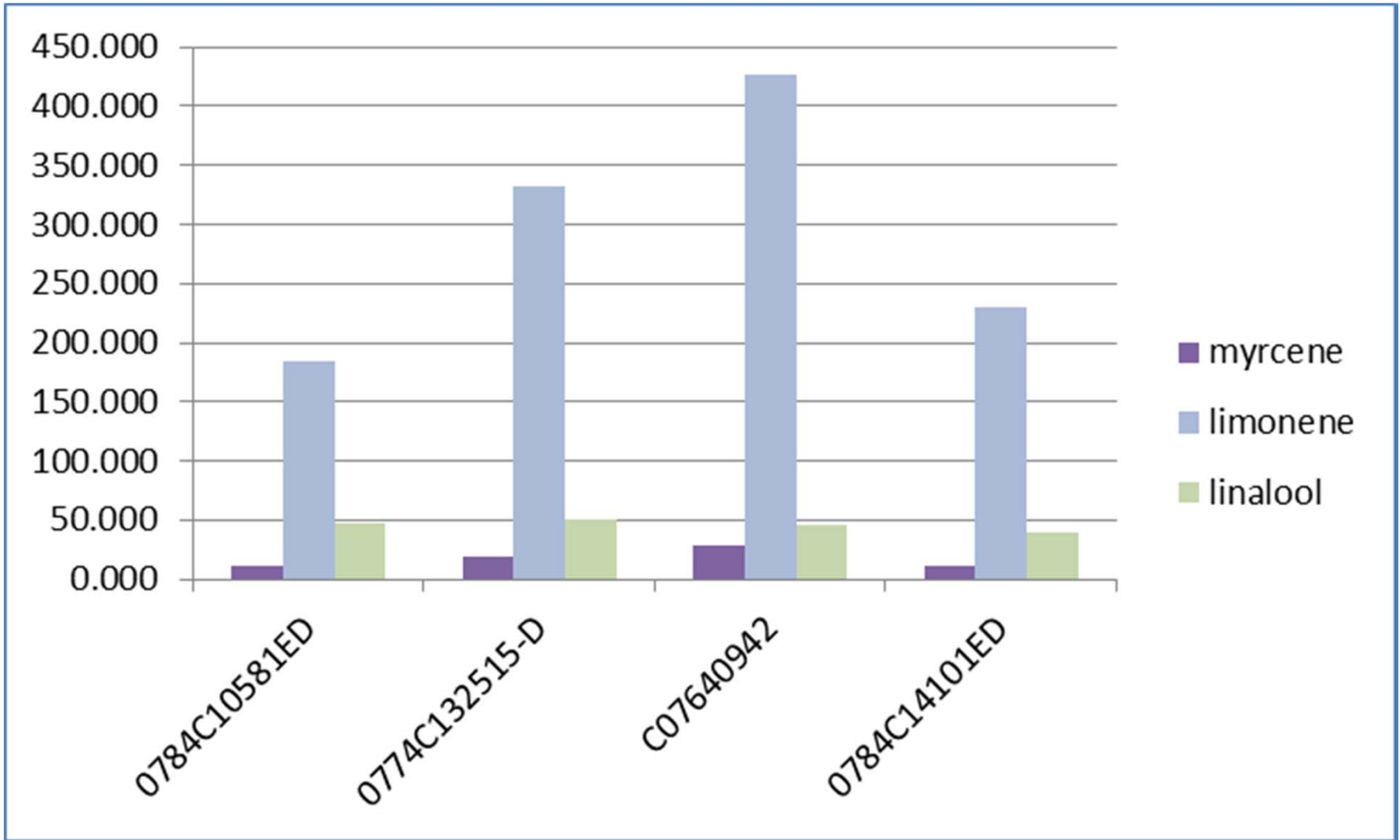
US vs ISRAEL Lemon Peel



“Gold Standard” in lemon peel



Lemon Compounds in Beer



Closing Summary

- We have been able to identify a “gold standard” based on sensory evaluation
- We have been able to illustrate a degradation in the essential compounds
- We have shown that the freshest lemon peel may not be what we are looking for
- There is a difference between US and Israel lemon peel

Additional work

- We need to better understand how climate impacts the finished product
- Need to understand the various levels of essential oils and there sensory attributes

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Presentation Survey

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