



# Vanilla Bean Volatile Analysis

## Origin & Species

J. Mark Black, Ph.D.

***Spectra*** Flavor & Fragrance Research, LLC

# We Interrupt This Program...

- Topic has changed from the abstract
  - Difficulty of presenting applications.
  - Current topic more in-line with our work.



Vanilla is Important -  
But Has The World Noticed?

# Has The World Noticed?



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# Has The World Noticed?

## ***The History of Vanilla***





# Has The World Noticed?



*The History of Vanilla*





# Vanilla World Is Dynamic



# Production of Vanilla Is Changing

- More plentiful
- Different origins
  - Madagascar, Indonesia, Tahitian, Comoros
  - PNG, Uganda, India, Mexico, Tahiti, Hawaii
- Different species
  - *Vanilla planifolia*
  - *Vanilla tahitensis*
  - PNG Hybrid?

# Objectives

- Identify and compare volatile compounds
  - Beans from different origins
    - Madagascar
    - Indonesia
    - Mexico
    - PNG
    - Tahiti
  - Beans from different species
    - Planifolia vs. Tahitensis vs. PNG
- Identify “flavor-active” compounds

# Volatile Collection

- Beans chopped
  - 9 grams, 2 beans
  - 0.5 cm pieces
- Solid Phase Micro-Extraction - “Twister”
  - 30 minute exposure
  - Binds volatile compounds
  - Releases with heat

# Caveats

- This Is One Set
  - Not a comprehensive study of bean variability
- Bean Handling Was Not Controlled
  - Madagascan, PNG and Indonesian - atmospheric packaging
  - Mexican and Tahitian - vacuum packaging
    - higher moisture
- Twister method 'semi-quantitative'
  - Only headspace volatiles
  - Trapping can be affected by environment - bias

# Volatile Collection

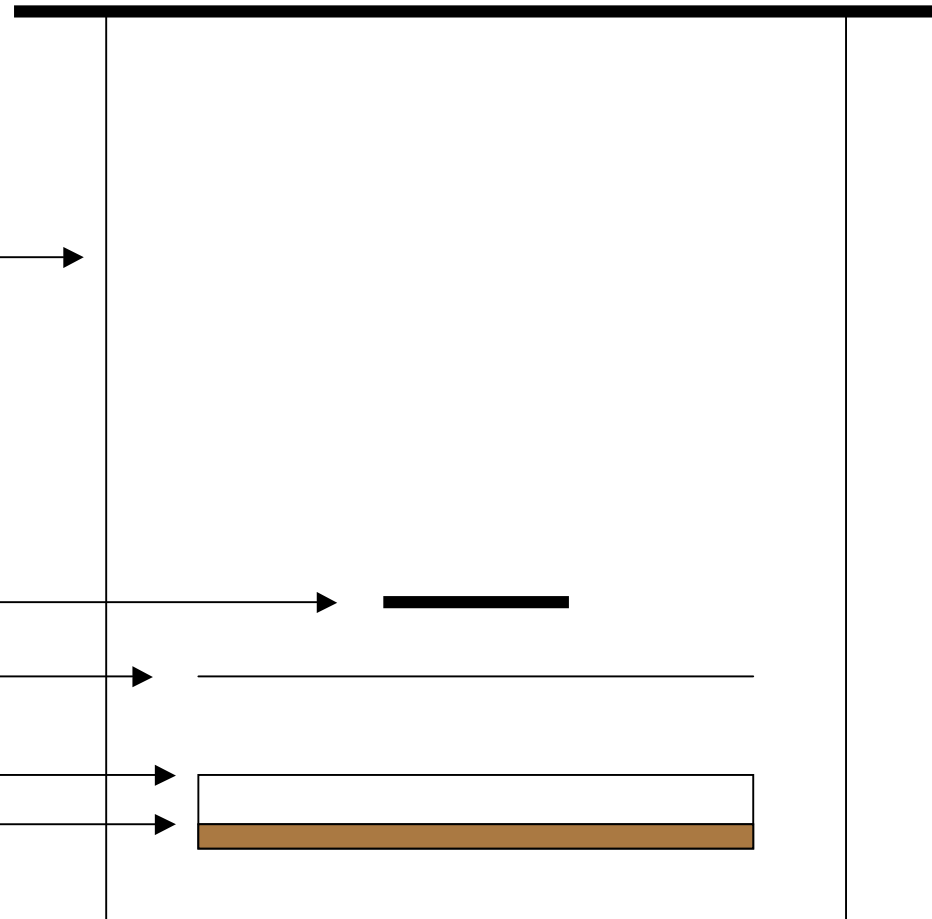
300mL Mason Jar →

Twister →

Teflon Gauze →

Petri Dish →

Vanilla sample →

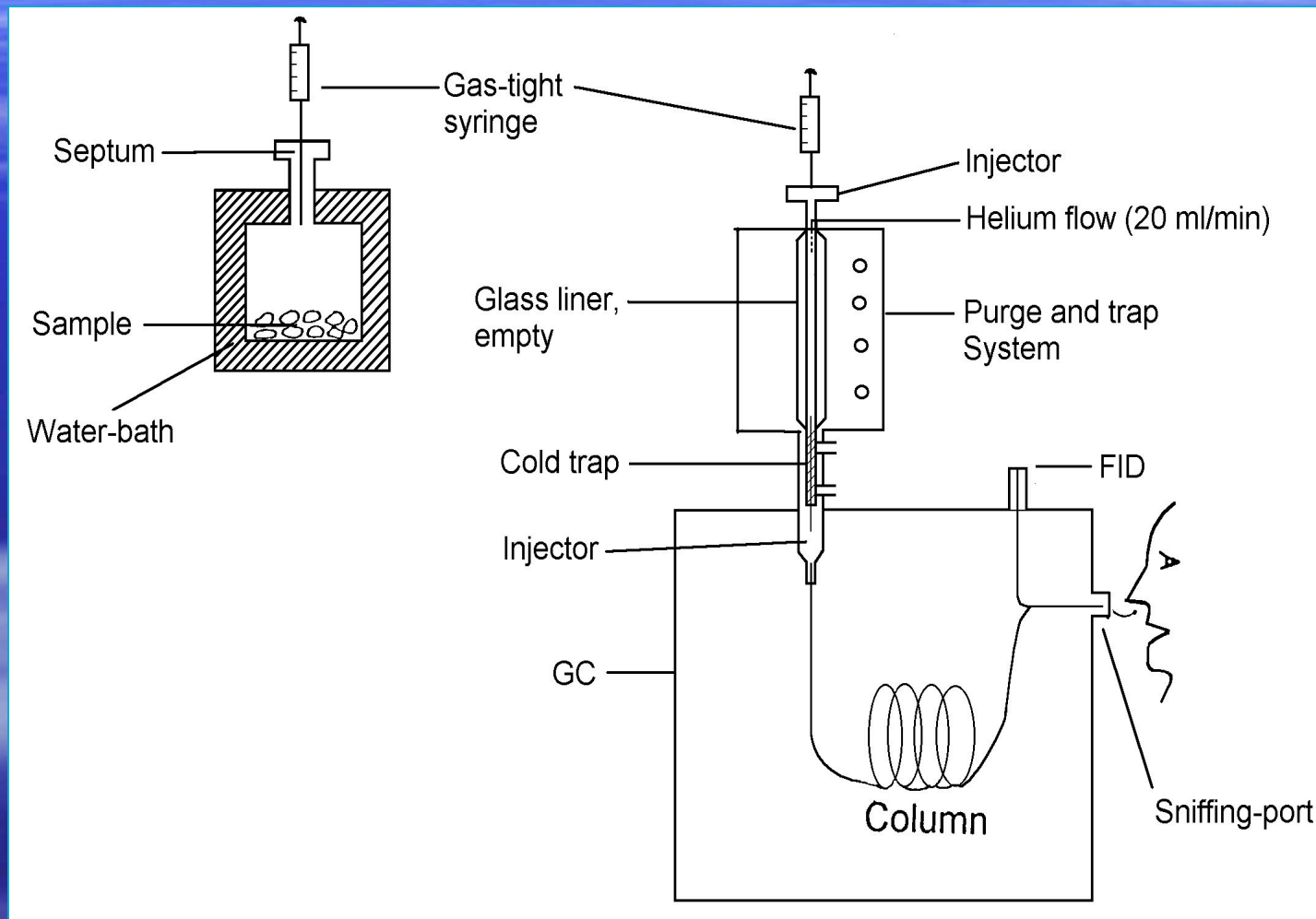




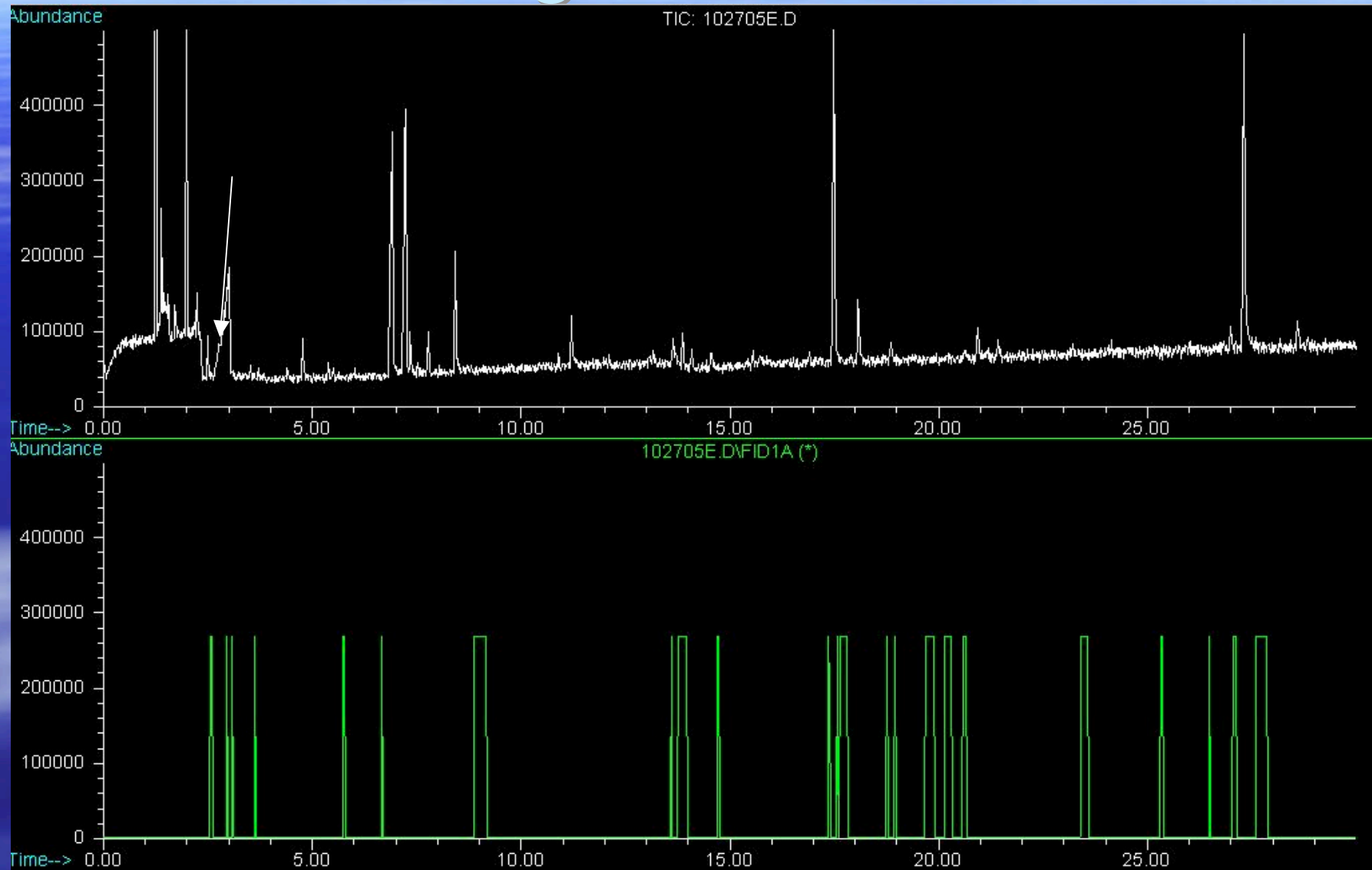
# Volatile Identification

- Gas-Chromatography/Mass Spectrometry
  - Compound separation & identification
- Gas-Chromatography/Olfactometry
  - Flavor-active compounds

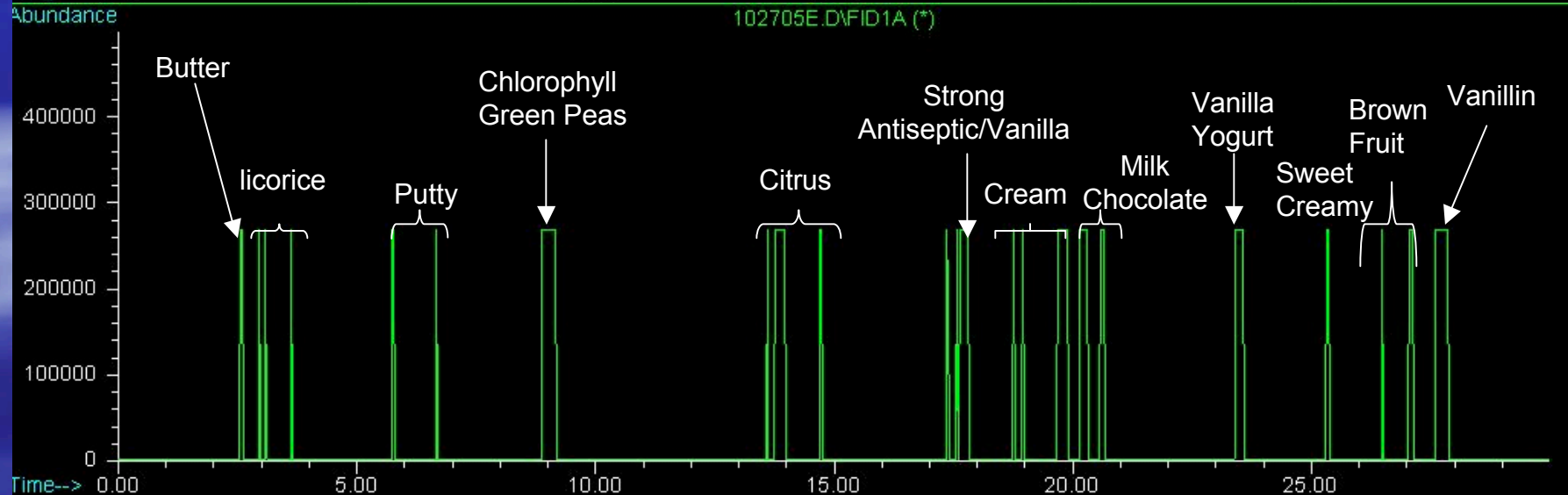
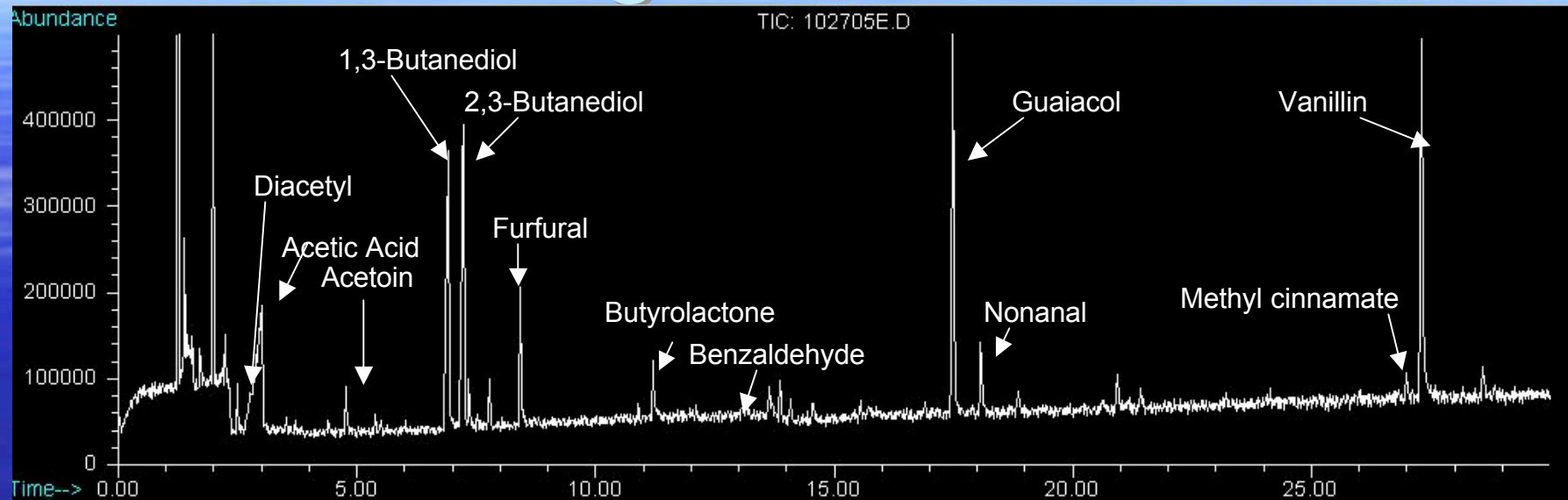
# Compound Separation and Identification



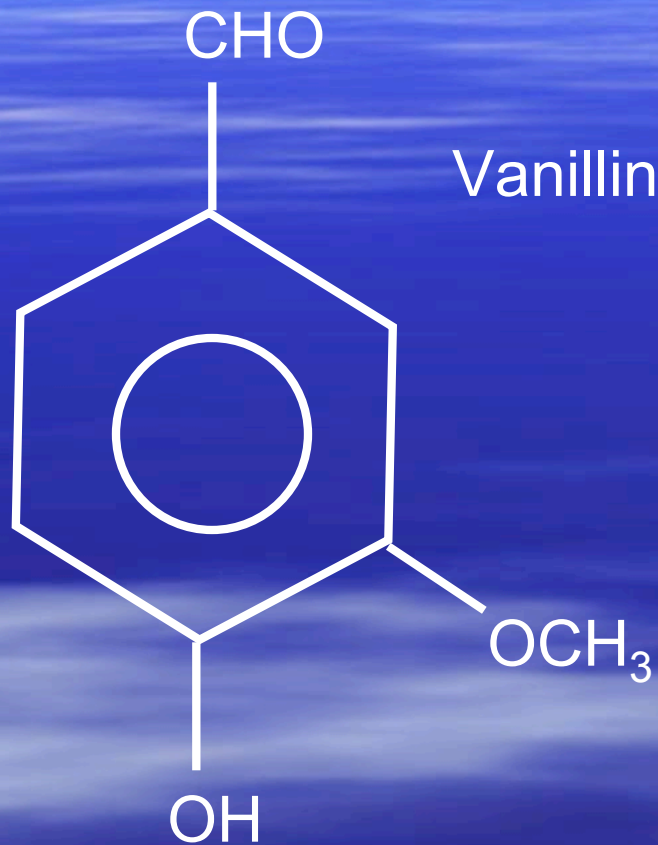
# Madagascan Vanilla



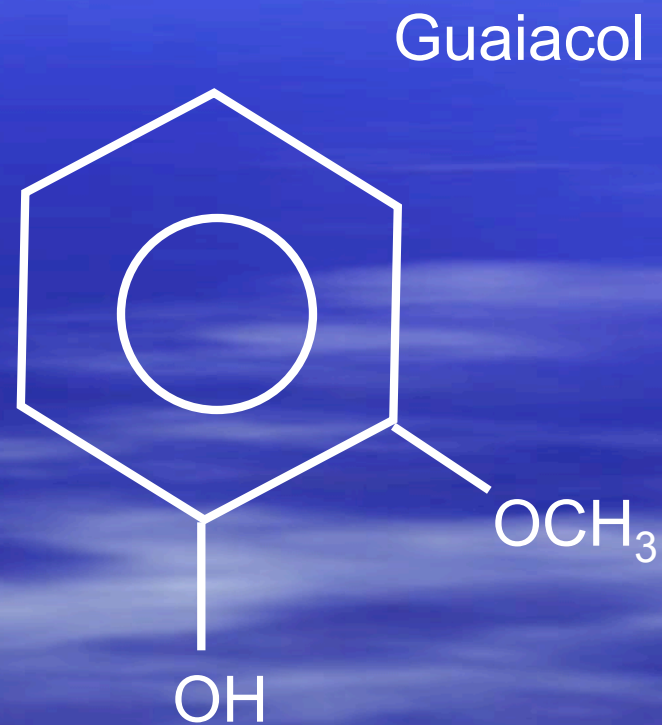
# Madagascan Vanilla



# Vanillin and Guaiacol

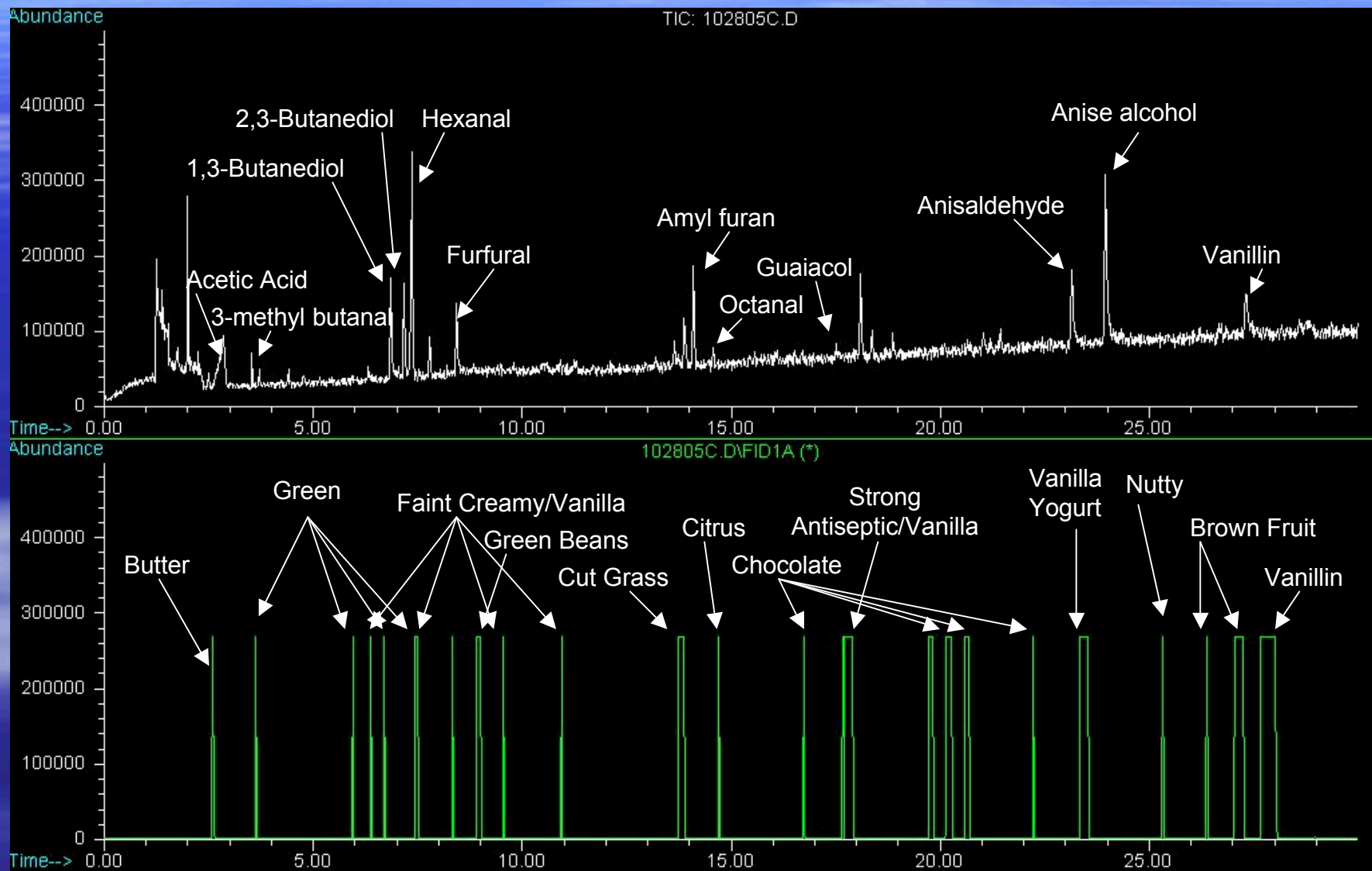


Odor Threshold ~ 100ppm

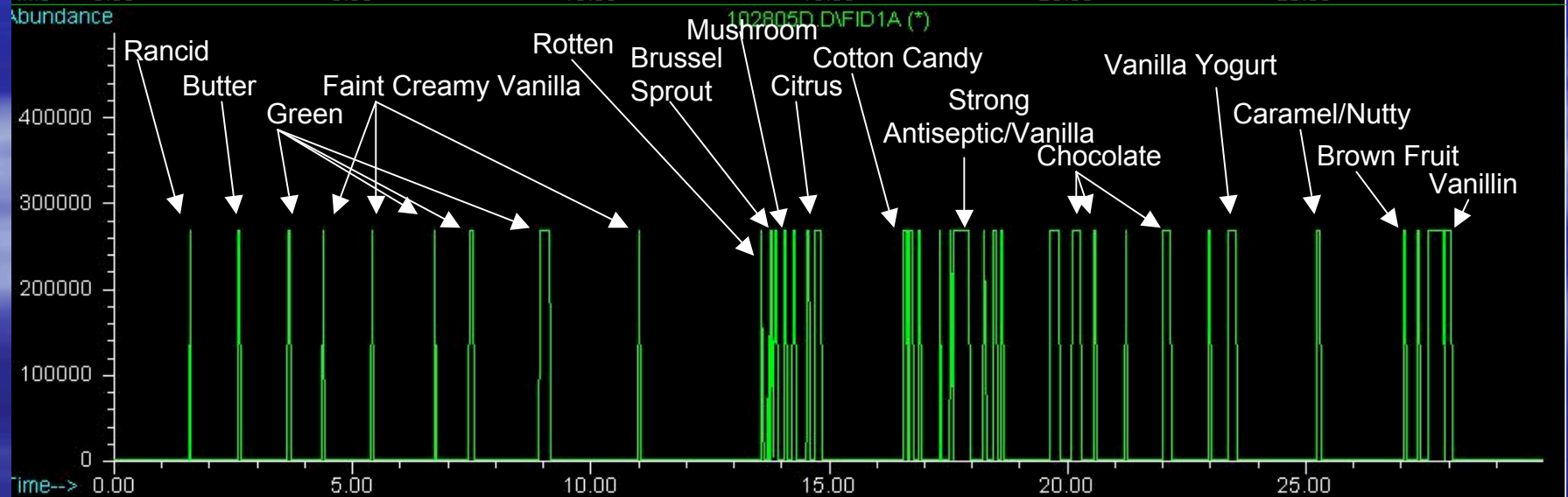
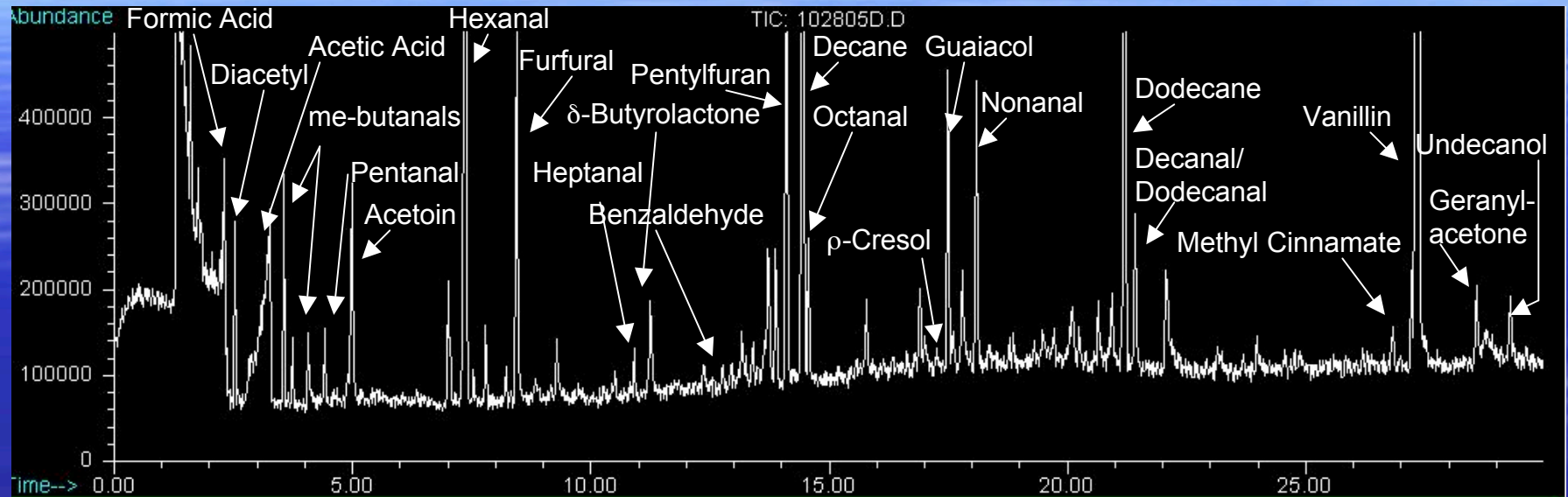


Odor Threshold ~ 0.1ppb

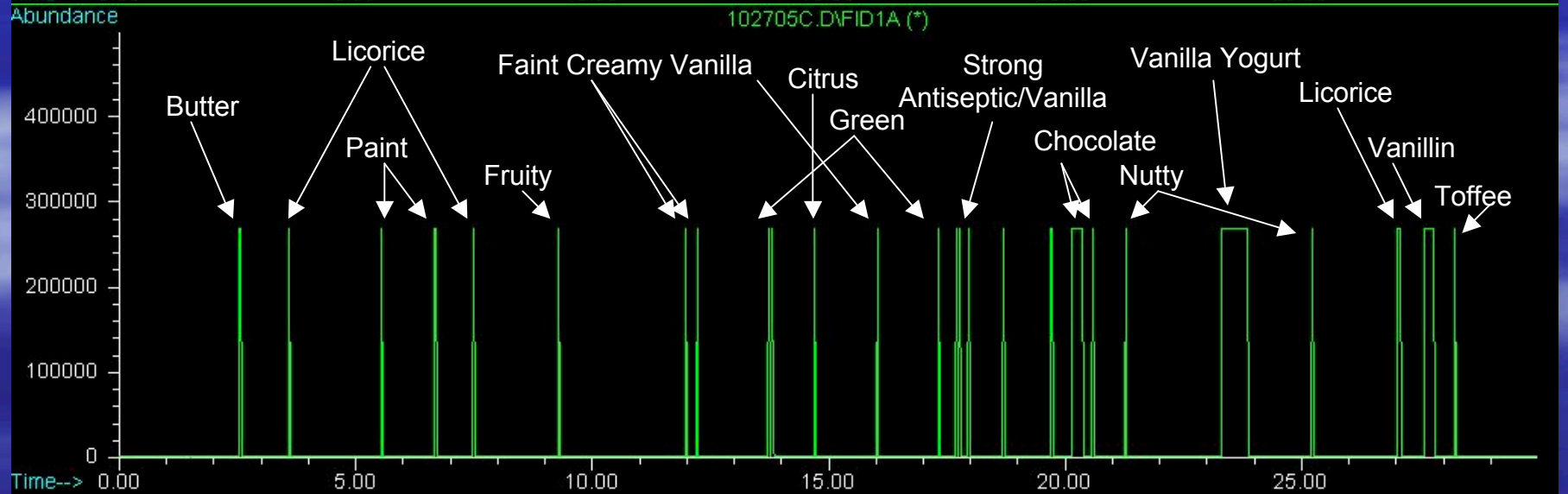
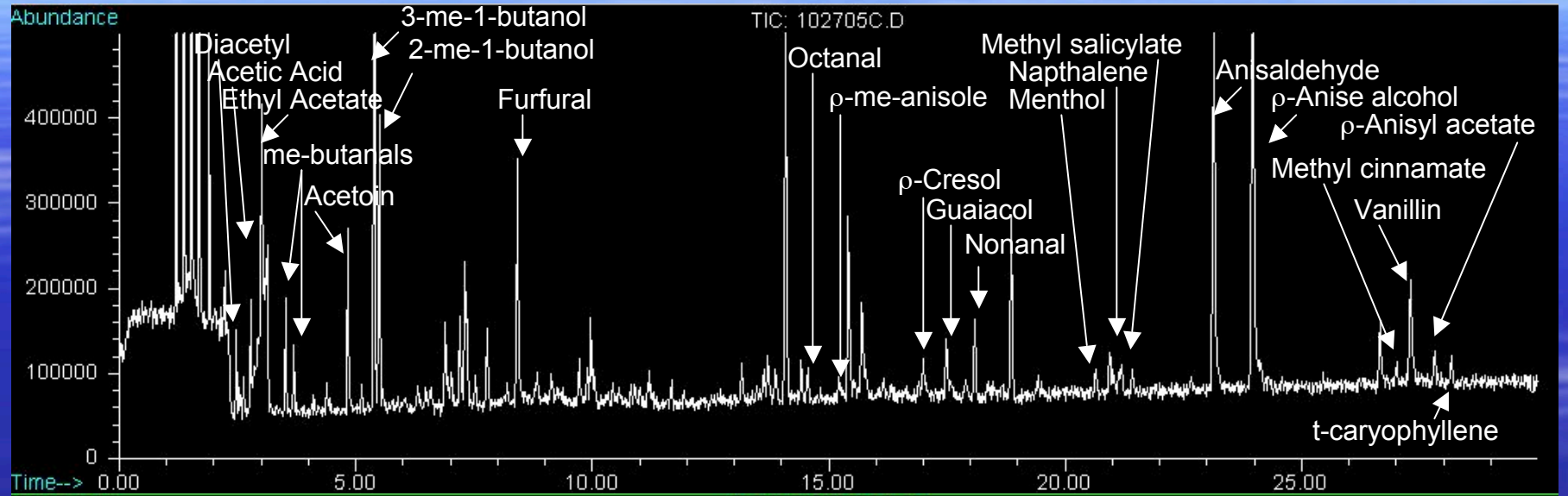
# Indonesian



# Mexican

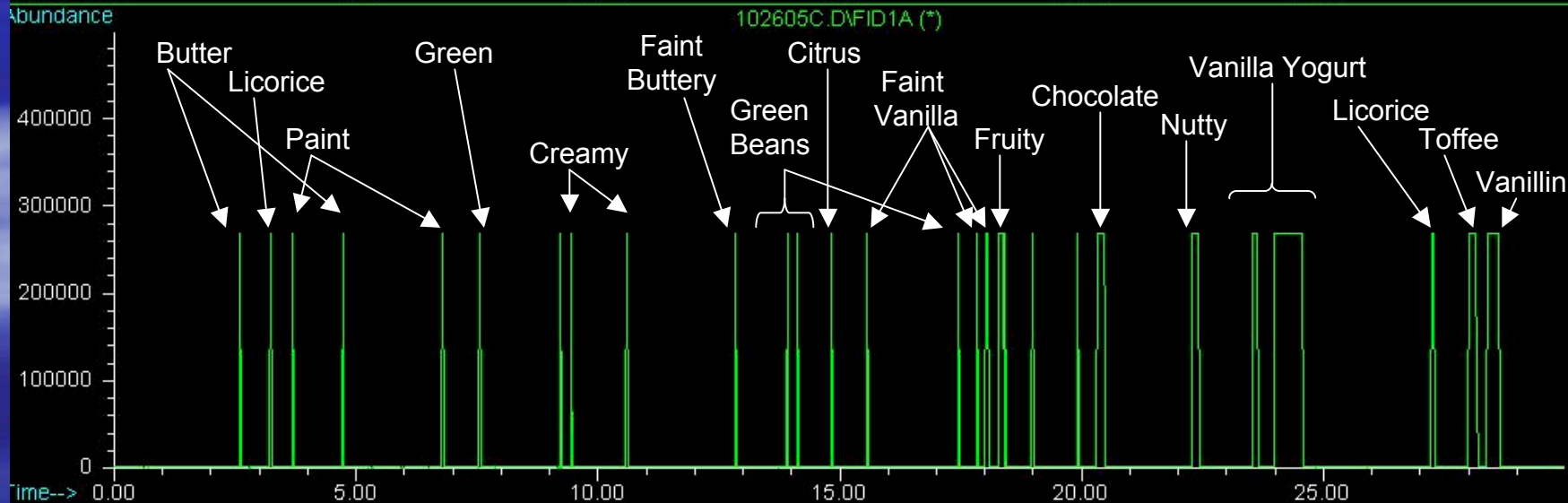
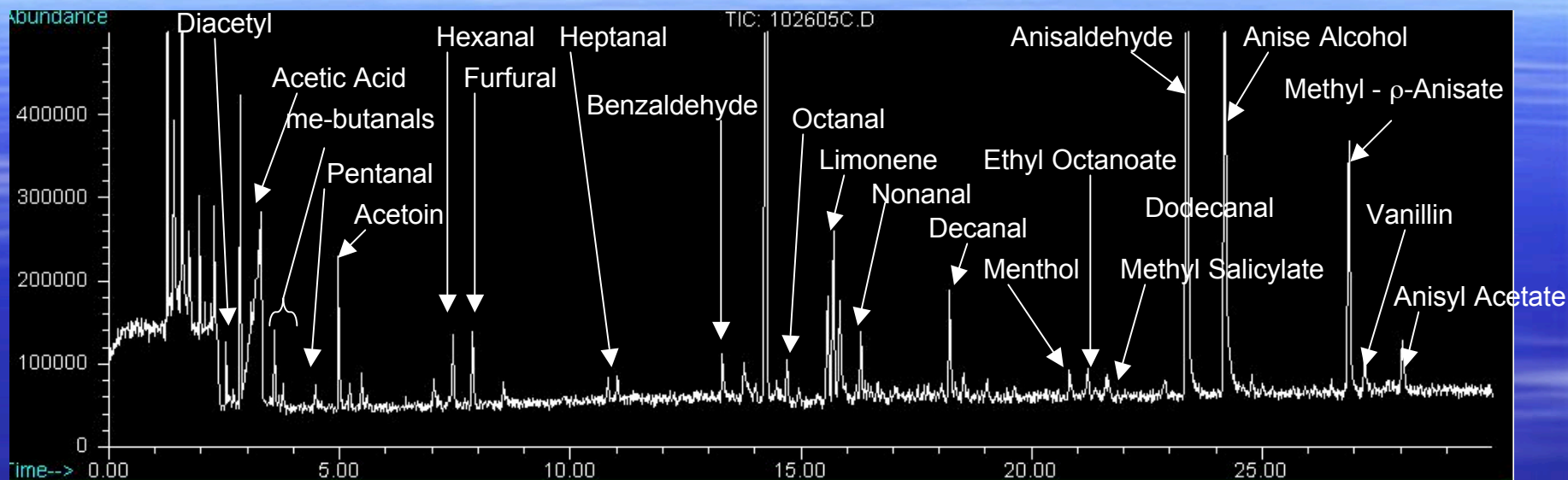


# PNG

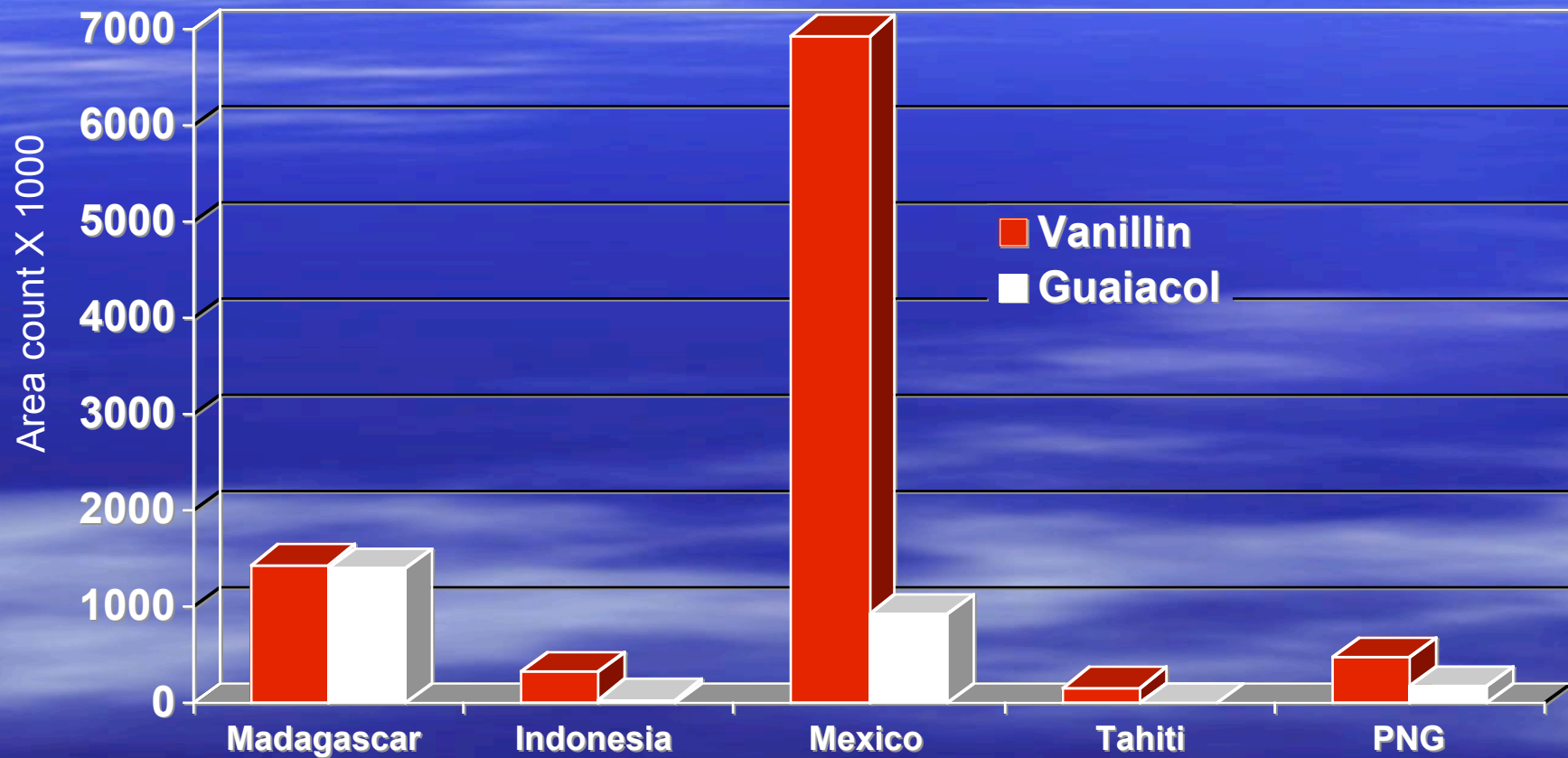




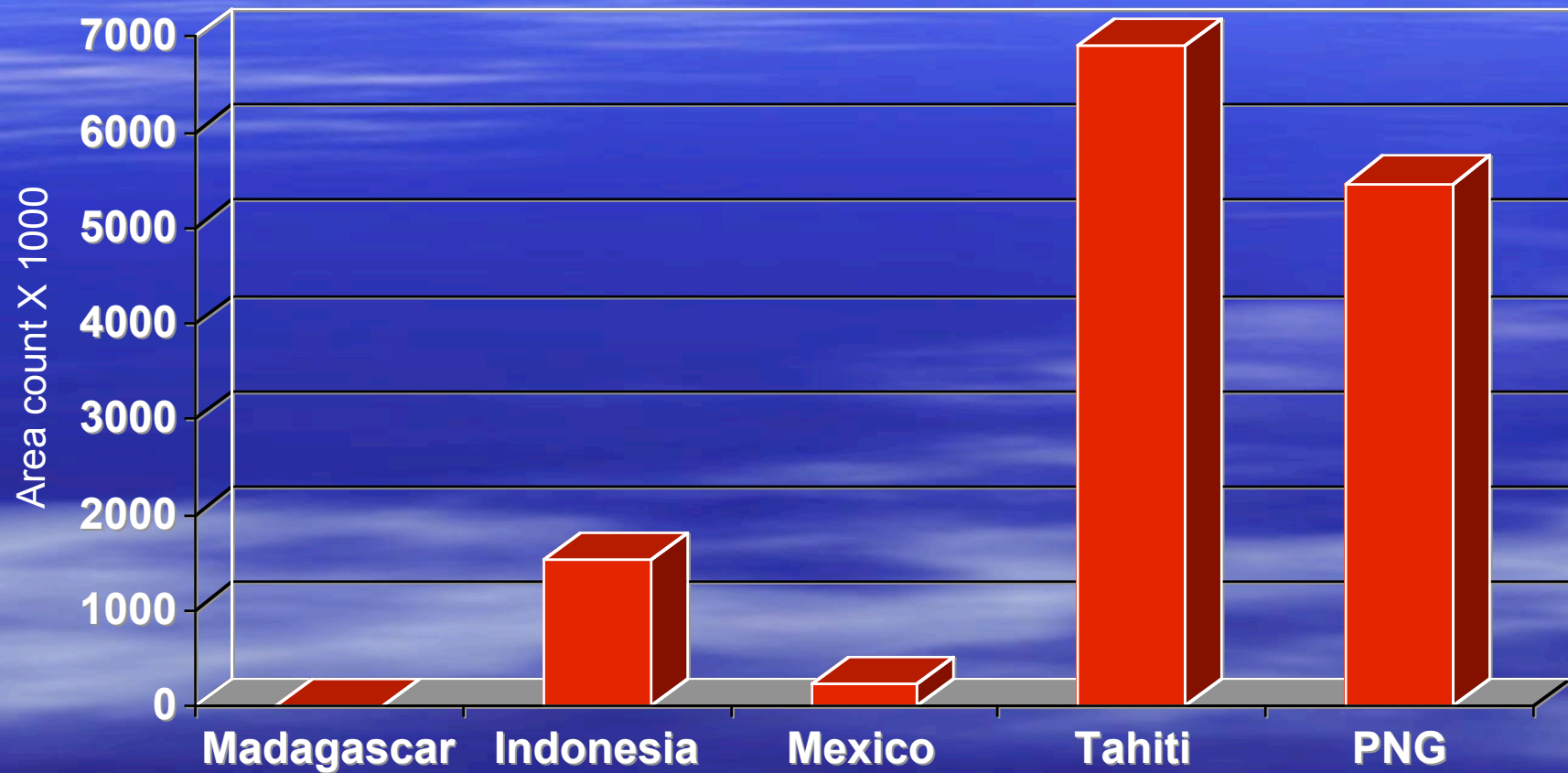
# Tahitian



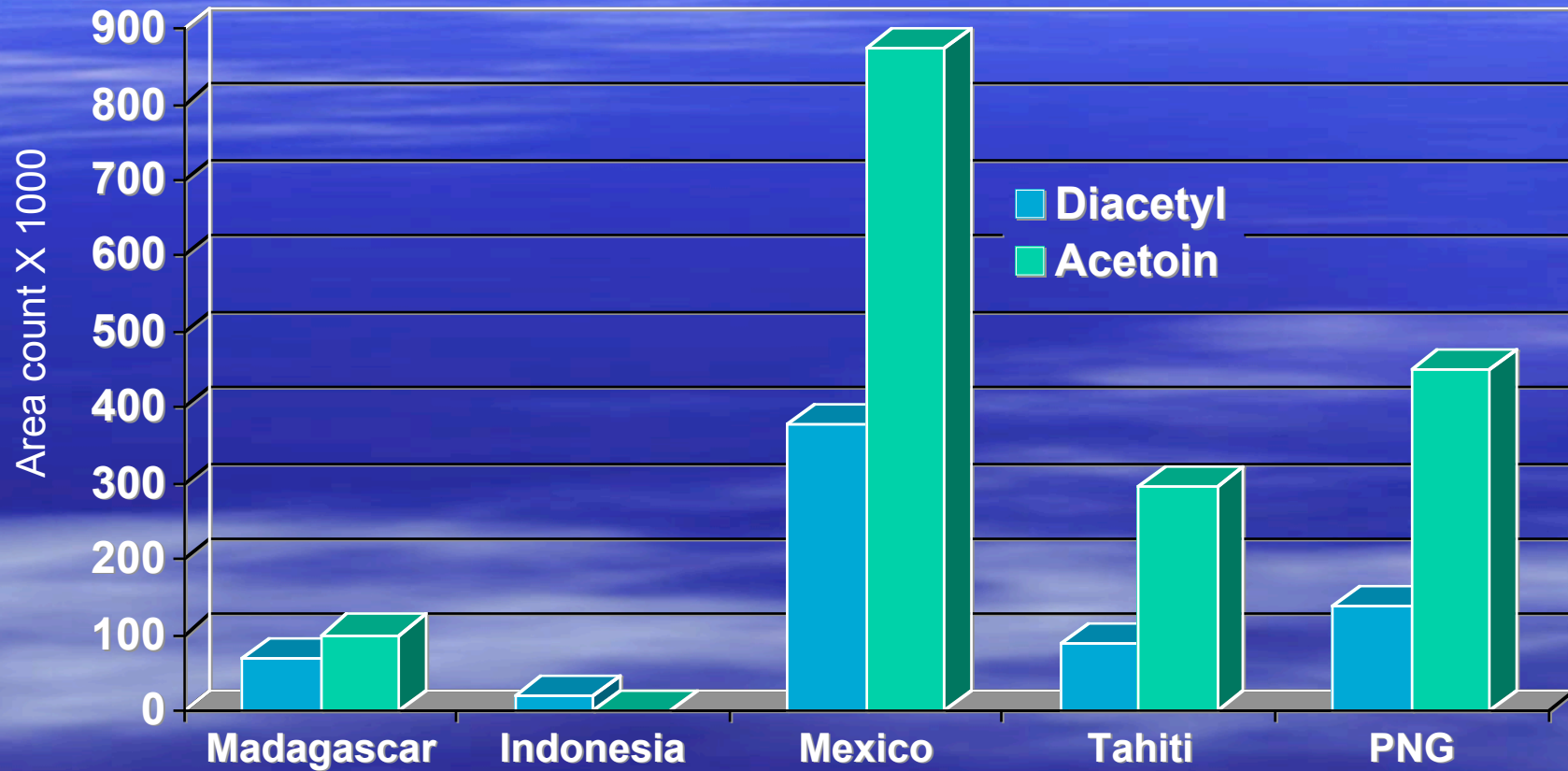
# Vanillin and Guaiacol



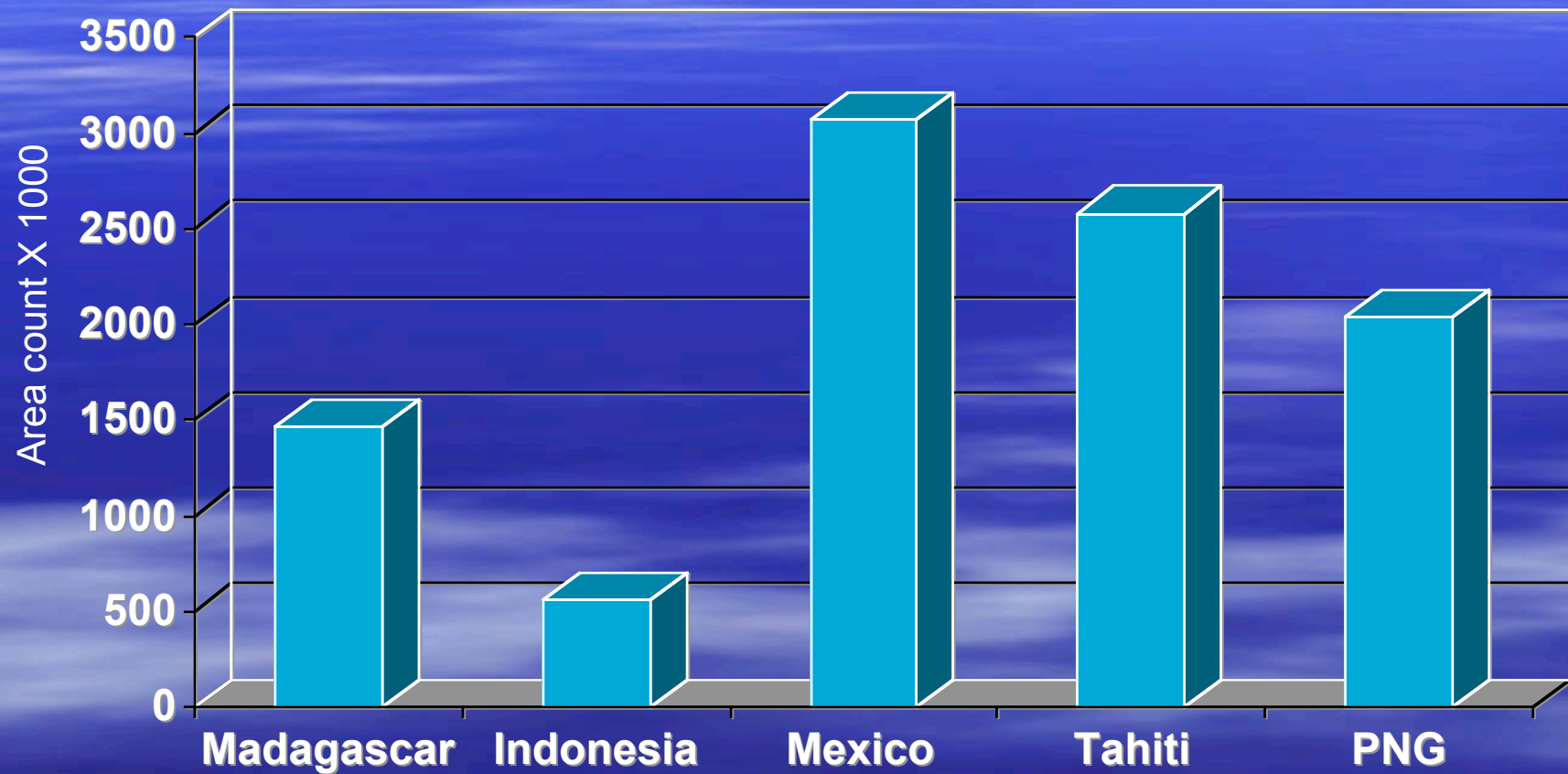
# Menthol & Anisic Compounds



# Butter Compounds



# Acetic Acid



# In Summary

- Beans are clearly different
- Vanillin is only part of the story
- PNG more similar to Tahitian - New Hybrid?
- Method - Useful for screening?
- Opportunities for new vanillas

We'll Continue to Work. . .

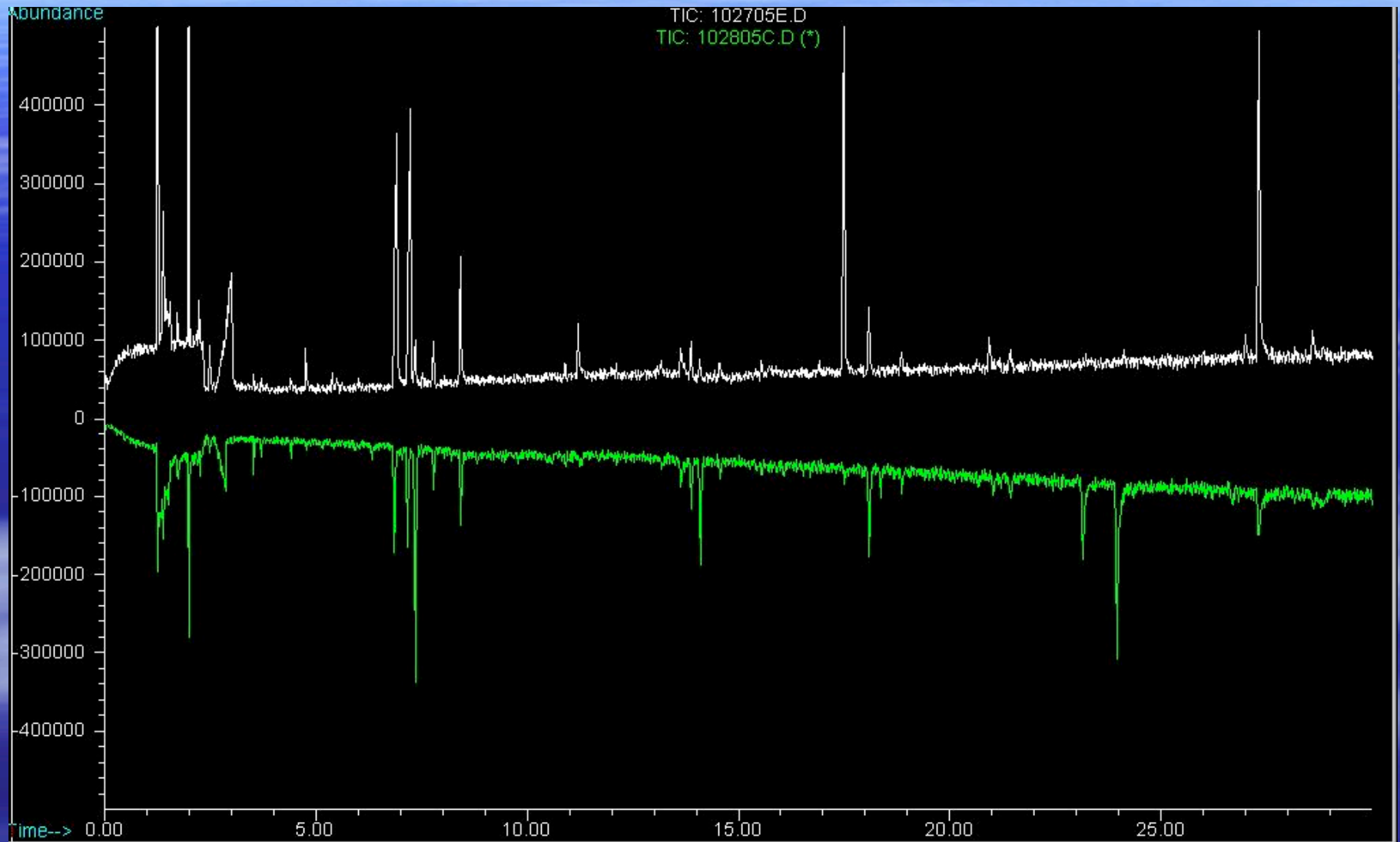


# Thanks

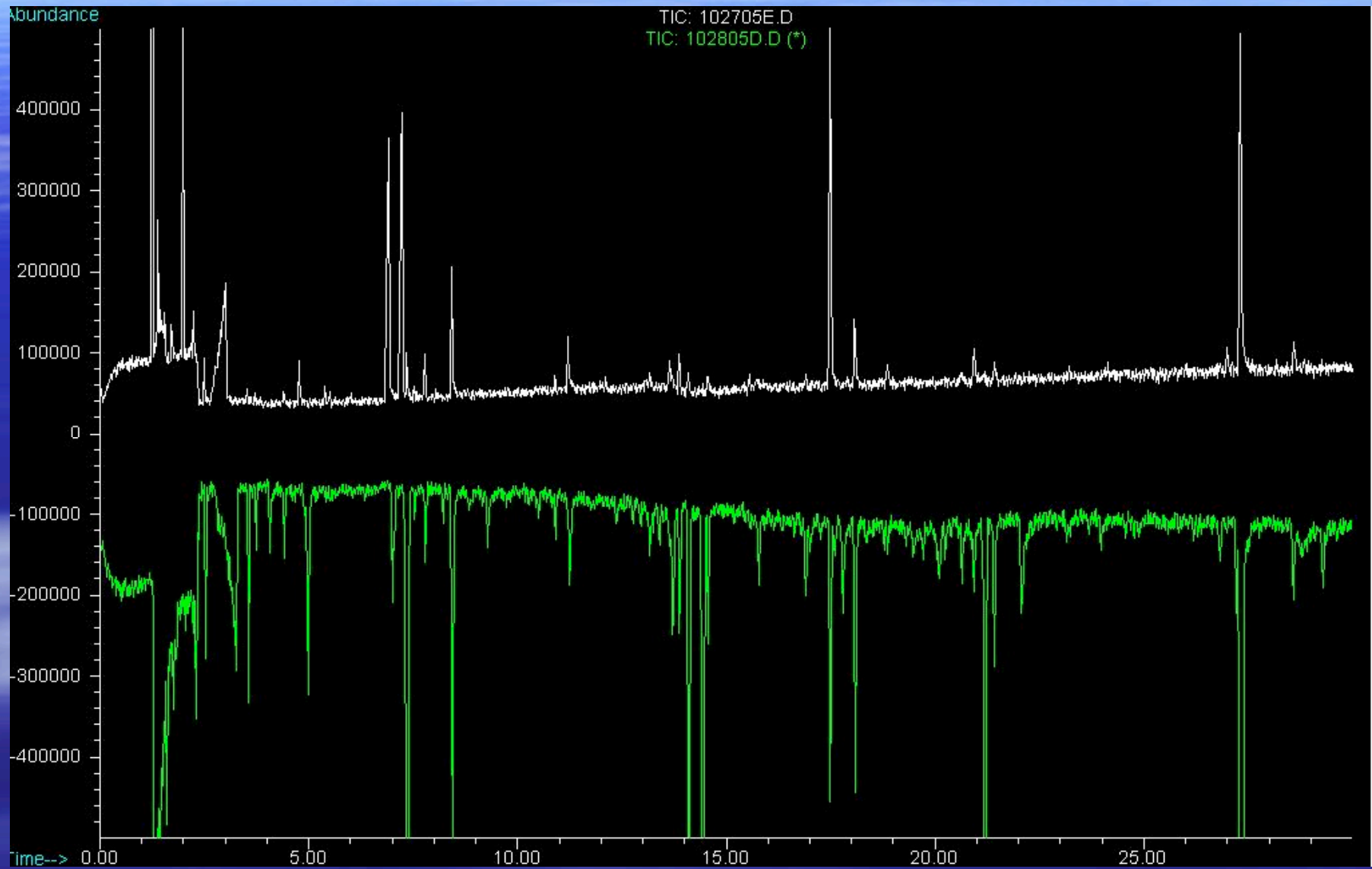
- Jean-Paul Schirlé-Keller
- Daniel Martinez



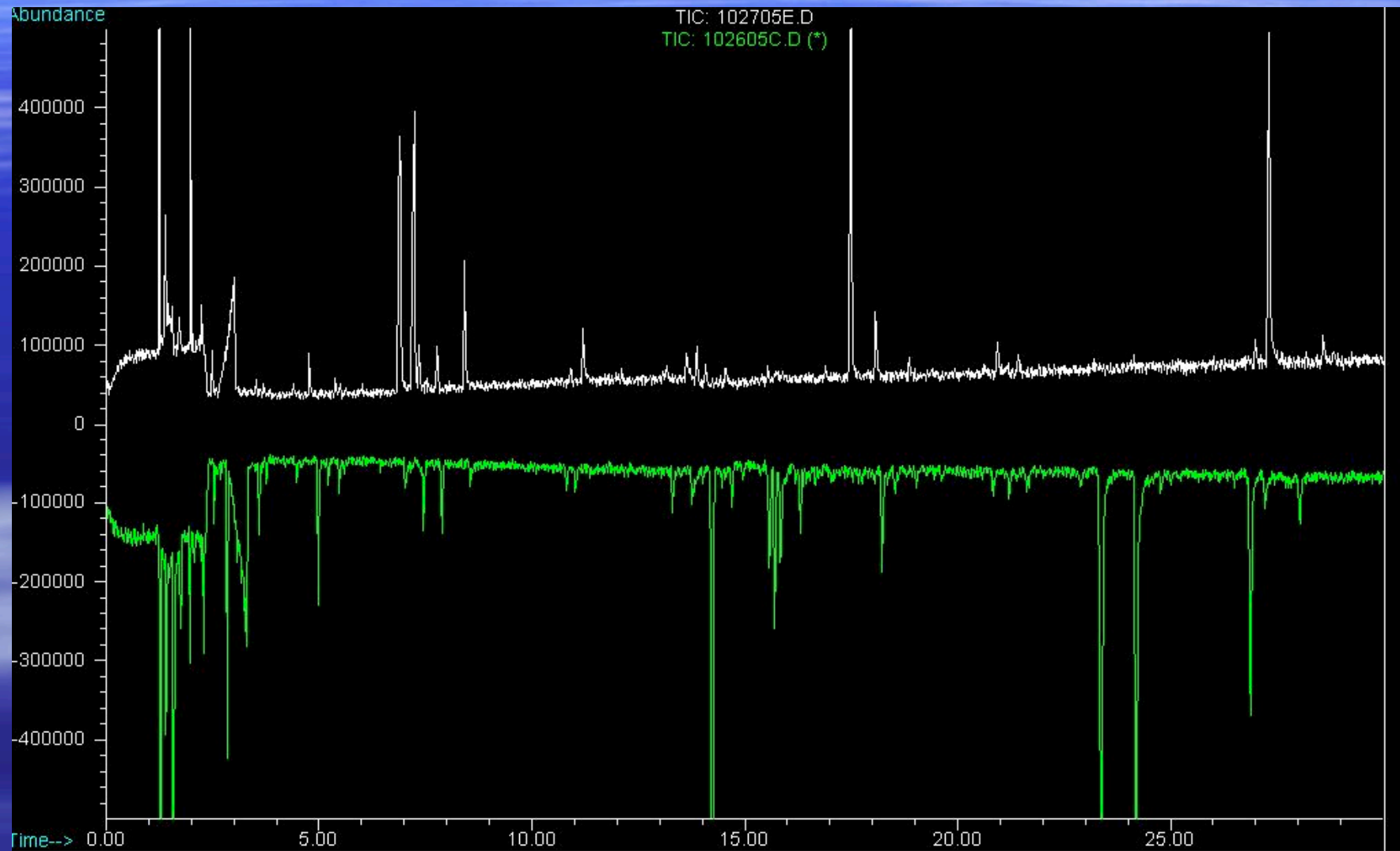
# Madagascan vs. Indonesian



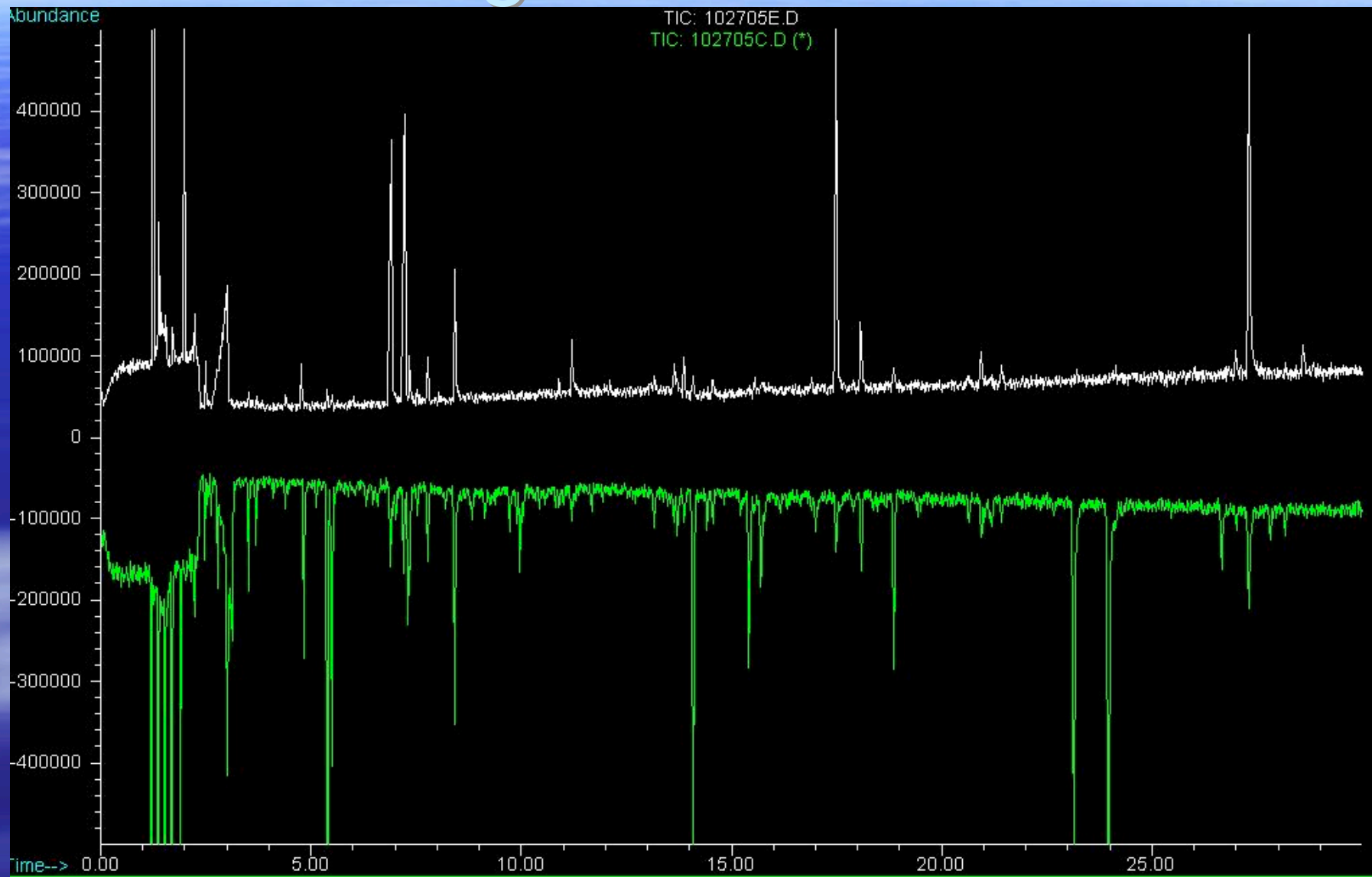
# Madagascan vs. Mexican



# Madagascan v. Tahitian



# Madagascan vs. PNG



# Tahitian vs. PNG

