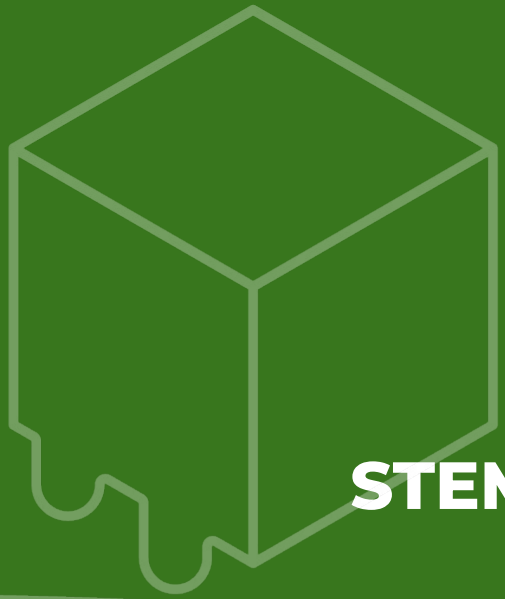

# ¡SALUD!

## STEM Teaching through Bar Service

12th International Workshop on Molecular and Physical Gastronomy (IWMPG 12)

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# An Opportunity

University students and alcohol pair well (Slutske, 2005).

- We may have their attention
- We have an opportunity

# A Course

We designed a Bar Service class for second semester students with the explicit goal of introducing **molecular gastronomy**.

- What was meant was alginate spheres and lecithin foams
- We decided to go deeper, and the proposal was accepted

# This is Preliminary

We are presenting this as a **Work in Progress**, and would love to hear your comments and suggestions.

# Learning Objectives

For culinary students:

1. Prepare and serve an assortment of drinks
2. Understand and apply principles of energy transfer and phase changes in the chilling of drinks
3. Use flavoring effectively in drinks
4. Control texture and mouthfeel in drinks
5. Learn how to drink responsibly

Image: Pexels

# Course structure

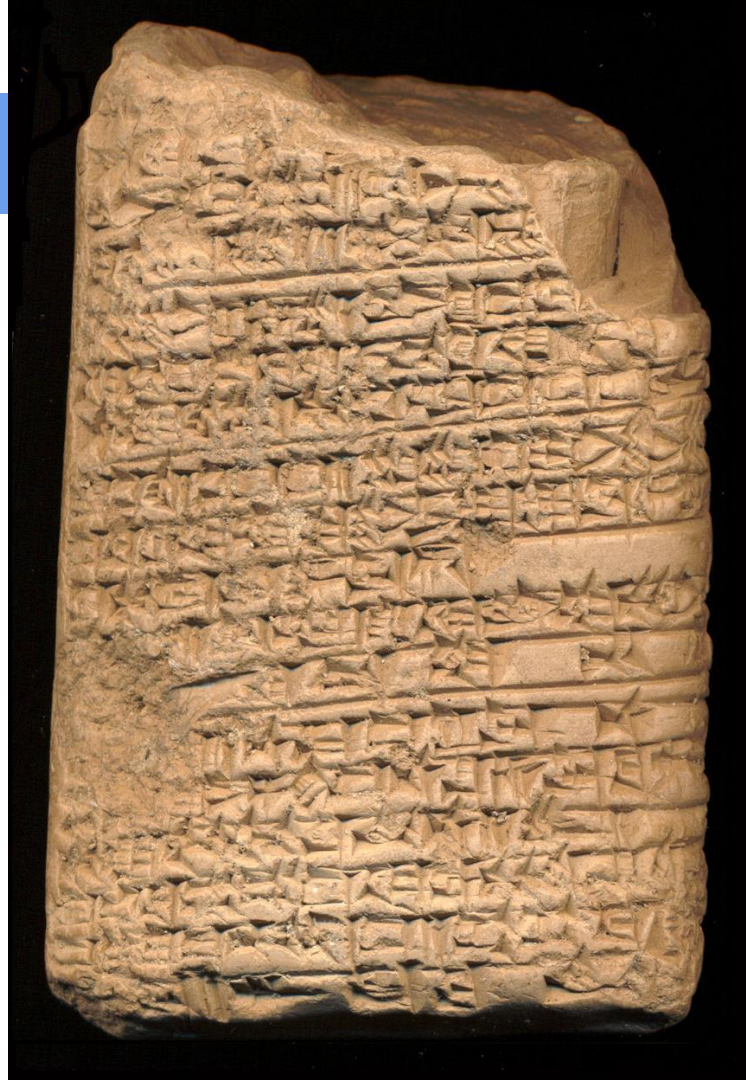
1. The Bar
    - Safe drinking
    - Food safety refresher
2. Drinks
    - Fermented
    - Distilled
    - Modifiers
3. Cocktails
    - Classic
    - Modern
    - Author

# Safe drinking

- MeOH vs EtOH: a problem in Ecuador
- ABV and proof: dilution
- Risk. Under 25 g/day (Zhao et al, 2023).
  Less than two “standard” drinks /day.
- Alcohol metabolism ≈12 g/h.
  Avoid getting tipsy

# Content: Fermentation

- Alcoholic, lactic and acetic
- Carbonation
- Chicha, Wine, Beer, Cider, Perry, Mead, Kumis, Rice wine &c.



# Concepts: Fermentation

- Sugar
- Starch hydrolysis (malting, chewing)
- Yeasts and SCOBYs
- 15% ABV limit
- Discussion of fermented drinks

# Content: Distillation

- History
- Uses
- Head, heart, tail, and MeOH poisoning
- Fractional distillation
- Redistillation for flavoring

Maria Prophetissima

# Concepts: Distillation

- Phase change
- Vapor pressure
- Theoretical plates
- Vacuum distillation

# Spirits

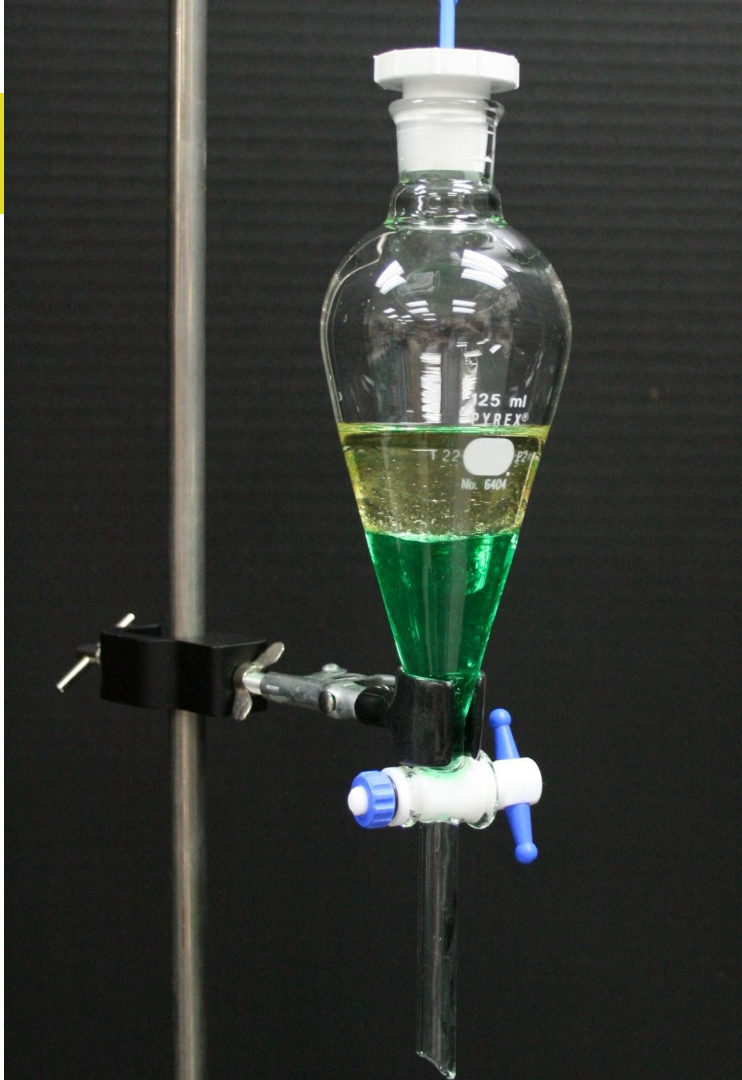
- Again, fermentation
- Again, distillation
- Flavoring
- Aging (+ - ⇔)
- Accelerated aging: sterification and lignin breakdown (Lowe, 2015)

# Modifiers

- Syrups
- Liqueurs
- Bitter aperitifs and digestives
- Bitters
- Fruit juice
- Shrubs

# Solubility and Flavor

- Polarity and solubility
- Macerations, infusions and decoctions
- Extracts and tinctures
- Fat washing
- Use of *sous vide*



# Osmosis

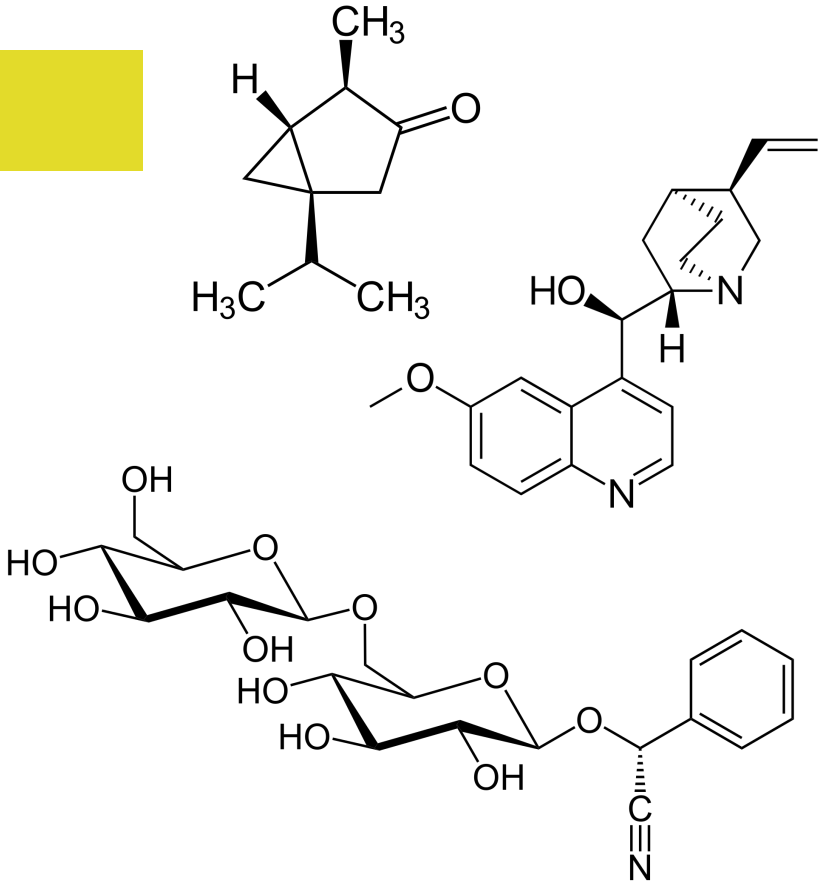
Latin-sounding names for osmotic extractions

- *Oleo saccharum* (sugar+peels)
- *Oleo citrate* (citric-malic acid+peels)
- *Coffee saccharum* (sugar+grounds)

Not oils, but just viscous aqueous liquids

# Bitters and toxicity

- Absinthe was innocent (Padosch, 2006)
- Quinine and cinchonism
- Amygdalin and orgeat



# Cocktails: Content

- Classic cocktails
- Modern cocktails *
- Author cocktails **

* Classic and modern cocktails after the IBA list

** Author cocktails with much trepidation, and Bloom's Taxonomy in hand

# Cocktails: Concepts

Here we get molecular *and* physical

- Ice. Sensible and latent heat 🧊
- The Fundamental Law of Cocktails (Arnold, 2014)
- Colligative properties of solutions
- Blending, shaking and stirring
- Fractional crystallization
- Extraction: *Sous pression*?

# Cocktails: Concepts

“Modernist” techniques

- Foaming agents
- Clarification
- Mouthfeel modification
- Carbonation/$N_2O$
- Texturizers
- Color changing cocktails
- & cetera.

# Initial Survey

Second semester students *n*=23 Answer format: 5 point Likert scale

- Bar service as a work skill **4.65±0.48**
- Bar service as a social skill **4.35±0.87**
- Interest in STEM **3.65±0.91**
- Fear STEM **3.04±1.20**
- STEM worthwhile to make better drinks and dishes **4.52±0.93**

# A Hallway Comment

**“I got into cooking to avoid mathematics and physics”**

-Student who shall remain anonymous

Therein lies our challenge


Norman Rockwell: “The bookworm”

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