Remote Citrus QC Measurements. Tools for Teaching and Training

José I. Reyes De Corcuera
Tracy Irani
Art Teixeira
September 16, 2010
Background
Distance Education Strategies

Lecture delivery

• Mailing
  • Kits with printed lecture, audio tapes, VHS, etc.

• Internet
  • Recorded simultaneous narration and slide presentation, journal, grading book, quizzes, links, etc. (WebCT, Vista, Sakai ~2004-2010)
    • No live interaction with instructor or among students
    • Interaction replaced by ‘chat rooms’
  • PC-based real time lecture (Elluminate)
  • Video conference (Polycom)
Distance Education Strategies

- Laboratories

  Virtual Labs
  - No actual experiment takes place
  - Mathematical models
  - Allow running many experiments in a short time
  - No instrument or equipment or consumables
  - Students typically do not observe real instr. and equip.

  Remote Labs
  - Experiments are taking place in real time
  - ‘Real’ data
  - Run experiments off-site
    - Time and safety
  - Need local set-up
  - Students observe real instruments and equipment in cases unique
Objectives

Long term
- Remote Citrus Quality Assurance and Unit Operations Lab.

Unit Operations
- Extraction and Finishing
- Centrifugation
- Pasteurization (2011)
- Evaporation (2006-08)

Quality Assurance
- SSC and TA (2011)
- Recoverable Oil (2010)
- PME (2011)
- Viscosity (2010)
Students will be able to identify different parts of a TASTE evaporator
Students will be able to describe the operation conditions of a TASTE
Recoverable Oil
Recoverable Oil
Viscosity of OJ
Orange Juice Viscosity Lab

Learning objectives

• Explain the effect of temperature on the rheological properties of orange juice at selected concentrations
• Understand the effect of concentration on the rheological properties of orange juice
• State the order of magnitude of orange juice viscosity at selected temperatures and concentrations
• Describe the principle of operation of a Brookfield viscometer and its components
Welcome to the Viscosity Remote Laboratory
Press the arrow in the toolbar to get started.

STOP
1. Set the temperature setpoint
2. Press "OK"

This window will remain open until the waterbath has reached the set-point temperature within 0.2°C.

Temperature Set Point
(deg C)
0.0 OK

Water Bath Temperature
(deg C)
1. Set the temperature setpoint
2. Press "OK"

This window will remain open until the waterbath has reached the set-point temperature within 0.2 °C.

Temperature Set Point
(deg C)
25.0 OK

Water Bath Temperature
(deg C)
44.8
1. Please wait until the sample reaches the desired temperature.
2. Press "Continue" once the sample has reached the desired temperature within 0.5 °C.

Temperature

42.8
Student Experience Prior to the Remote Lab

- Familiar with methods of determination of viscosity.
- I can name two or more courses where remote and/or virtual labs are being used.
- I have participated in a remote lab before.
- Familiar with remote laboratories.
- Familiar with virtual laboratories.
- Familiar with the concept of viscosity.
- I have used a Brooksfield Viscometer.
- I have used a rotating spindle viscometer.

Legend:
- % SD
- %D
- %N
- %A
- %SA
Satisfaction Level

- Satisfied with remote laboratory
- Level of real-time online interaction
- Quality images network cameras
- Quantity of process diagrams and displays
- Quality of the process diagrams and display

Legend: %VS - %S - %U - %US - %VUS
Perceived Learning

Positive learning experience

I would recommend this lab to another student

Increased confidence in ability to determine viscosity locally

Understanding of viscosity improved due to remotely determining it

Understanding of viscosity determination improved as a result of operating the viscometer
Why you would recommend this lab?

- Good to learn how to measure viscosity
- Interesting topic, good tool to remote test machines
- This lab was great. I would recommend this to be used in other classes
- The lab was OK. However, still there was a need for an on-site operator when link broke
Conclusions

- Perceived as positive
- Effective learning tools
- Reach out to distance students
  - Gainesville
  - Abroad?
  - Industry?
- Can serve as the foundation for virtual laboratories and assay automation
Future Trends

- Consolidate courses
  - Continued development of virtual labs.
    - INTERACTIVE VIRTUAL EXPERIMENTS FOR FOOD PROCESSING EDUCATION (MORGAN, M. T. HAYES, K. D.)
  - Virtual reality
  - 3-D Videogame-type training
Acknowledgements

- UF CALS
- Shelley Jones
- John Henderson
- Brittany Tomlin
- Elyse Payne
Happy Independence Day!

1810 2010
Thank you!

- FOS 5561 ‘Citrus Processing Technology’ will be taught in the Spring 2011

- For more information: jireyes@ufl.edu

- Syllabus
  http://www.crec.ifas.ufl.edu/academics/faculty/reyes/reyes_jose.htm