

IGP-KSU Practical Flour and Dough Testing

IGP Institute / Kansas State University

August 5 - 9, 2024

Course Agenda

Day 1 - Monday

8:00 Depart hotel for KSU Waters Hall Annex (IGP shuttle)

8:15 **Welcome and Introductions:** *Thiele / Dogan*

- Course Outline and Overview
- IGP Overview and Offerings

Understanding U.S. Wheat Classes and Basic Grades - *Dogan*

- Define the six classes of U.S. wheat and uses

Introduction to Lab Milling and Grinding Methods – *Dogan*

- Overview of lab milling machines and uses.
- Understanding of particle size distribution.

Break

Quadrumat Junior – *Dogan*

- Overview of machine principles and grinding operations
- Milling wheat samples

Quadrumat Senior – *Dogan*

- Overview of machine principles and grinding operations
- Milling wheat samples

12:00 Lunch (Shellenberger 204)

Buhler MLU – *Dogan*

- Overview of machine principles and grinding operations
- Milling wheat samples

Chopin Lab Mill – *Dogan*

- Overview of machine principles and grinding operations
- Milling wheat samples

Break

Introduction to Flour Composition – *Karkle*

- Review the basic components of wheat flour: starch, gluten proteins, arabinoxylans.

NIR Moisture, Ash, and Protein – *Karkle*

- Discuss the scientific principles used in NIR measurement of moisture, ash, and protein.
- Discuss the definition and importance of moisture basis.

Depart for hotel / Goolsby's (IGP shuttle)

5:00 IGPI sponsored social hour (drinks and appetizers provided)

- Goolsby's, 1212 Bluemont Ave

Adjourn as needed

Day 2 - Tuesday

8:00 Depart hotel for KSU Waters Hall Annex (IGP shuttle)

8:15 **pH & TTA** – *Karkle*

- Recognize the difference between pH and TTA measurements
- Explain how to conduct pH & TTA testing

Flour Color – *Karkle*

- Explain which flour components contribute to color
- Discuss why measurement of flour color is important
- Describe the methods to measure flour color

Break

Falling Number – *Karkle*

- Demonstrate and compare methods of alpha-amylase testing.
- Discover physical and chemical changes that occur when starch gelatinizes and then retrogrades.

12:00 Lunch (Shellenberger 204)

1:00 **Oven Moisture and Ash** – *Pezzali*

- Explain how oven moisture and ash tests are conducted.
- Measure moisture of flour

LECO Protein – *Pezzali*

- Discover the combustion method to measure protein.

Break

Hand Gluten Washing - *Aaron Clanton*

- Isolate gluten from several types of flour and use the information in conjunction with other analyses during the course to consider flour applications

Glutomatic - *Clanton*

- Evaluate the mechanized version of gluten washing

5:00 Adjourn and depart for hotel (IGP shuttle)

Day 3 - Wednesday

8:00 Depart hotel for KSU Waters Hall Annex (IGP shuttle)

8:15 **Alpha-Amylase Determination** – *Dogan*

- Identify what alpha-amylase is and its role in baking
- Discover the scientific principles used in alpha-amylase measurement

RVA - *Dogan*

- Demonstrate and compare methods of alpha-amylase testing.
- Observe use of RVA to measure starch cooking and pasting behavior.

Break

Damaged Starch - *Dogan*

- Identify how starch is damaged and its role in baking
- Explain the scientific principles used in damage starch measurement
- Test damaged starch and interpret test results using the SD Matic

12:00 Lunch (Shellenberger 204)

1:00 **SRC Manual Method** - *Dogan*

- Identify impact of flour components on water holding capacity
- Discover the scientific principles used in SRC measurement

Break

Mixolab - Dogan

- Explain the measurements obtained from mixolab.
- Observe and describe how the mixolab test differs from other recording dough mixers

5:00 Adjourn and depart for hotel (IGP shuttle)

Day 4 - Thursday

8:00 Depart hotel for Shellenberger Baking Lab (IGP shuttle)

8:15 **Test Baking Methods and Applications** – *Karkle / Clanton*

- Conduct sponge and dough and straight dough bread test baking methods.

12:00 Lunch (Shellenberger 204)

Test Baking Continued - *Karkle / Clanton*

- Make sugar snap cookie and layer cakes with test baking methods for soft wheat flours.
- Evaluate breads, cakes, and cookies made during the test baking process.
- Perform volume and Ccell measurement on produced samples.

5:00 Adjourn and depart for hotel (IGP shuttle)

Day 5 - Friday

8:00 Depart hotel for KSU Waters Hall Annex (IGP shuttle)

8:15 **Dough Lab** – *Dogan*

- Test flour samples, interpret the data from dough lab and discuss applications.

Farinograph - *Dogan*

- Test flour samples, interpret the data from farinographs and discuss applications

12:00 Lunch (Shellenberger 204)

AlveoLAB – *Karkle*

- Explain the scientific principles of the alveograph test
- Explore how the alveograph test is conducted

Course Review and Wrap-Up – *Karkle*

Course Evaluations & Presentation of Certificates - *Shawn Thiele*

4:00 Adjourn and depart for hotel (IGP shuttle)

Course Instructors

Dr. Elisa Karkle, Assistant Professor for Baking Science, Department of Grain Science and Industry, Kansas State University, 785-532-6194, ekarkle@ksu.edu

Dr. Julia Pezzali, Assistant Professor of Pet Food Science, Department of Grain Science and Industry, Kansas State University, jpezzali@ksu.edu

Aaron Clanton, Department of Grain Science and Industry, Kansas State University; 785-532-4065; alclanton@ksu.edu

Dr. Hulya Dogan, Interim Department Head, Department of Grain Science, Kansas State University; 785-532-6161; dogan@ksu.edu

Shawn Thiele, Associate Director / Flour Milling and Grain Processing Curriculum Manager, IGP Institute, Department of Grain Science and Industry, Kansas State University; 785-313-3950; smt9999@ksu.edu