



Stepping Up to the Plate

White Whole Wheat Bread: A Lesson in New Product Testing

Project Goal

To gain consumer response to white whole wheat bread as compared to two major barriers consumers hold regarding eating whole wheat bread: taste and color.

Background

Fewer than 8% of Americans eat enough whole grain foods. Whole wheat bread is one very convenient way to enjoy one or two servings daily. More than 40% of teens and kids never eat whole wheat bread. Of those who say they do, they do so only three or four times per week.

Whole wheat flour milled from Hard Red Winter wheat has been the standard for whole wheat bread for decades in the United States. U.S. wheat farmers are now producing “Hard White” wheat that is excellent for making bread. The whole wheat flour milled from Hard White wheat is less bitter and lighter in color than whole wheat flour made from Hard Red Winter wheat — two of the major reasons why people may not eat whole wheat bread.

Question

Would consumers eat more whole wheat bread if it were made from the new white whole wheat flour?

Objectives

Students will:

- Identify and define “whole grain” and “whole wheat” flour and bread.
- Learn the number of servings of grain foods recommended daily for their age group and how many of the servings should be whole grain foods.
- Be familiar with three reasons whole grain foods are important to health.
- Recognize the top reasons why Americans should eat more whole wheat bread.
- Distinguish between whole wheat flours made from Hard Red Winter and Hard White wheats.
- Organize student consumer test for white whole wheat bread.
- Employ baking equipment and methods used at home or in retail baking.
- Demonstrate the ability to produce whole wheat bread for a test market.
- Analyze the results of the white whole wheat bread consumer test.

Lesson Checklist

- Whole wheat flours — made from both Hard Red Winter and Hard White wheat. (Whole wheat flour at the supermarket is made from Hard Red Winter wheat unless it states otherwise.) Whole wheat pastry flour may be available and is made from soft white wheat. Pastry flour will not perform well in yeast breads.
- Bread packages (labels) — for white bread, wheat bread, whole grain bread and whole wheat bread.
- Equipment — instant read thermometers, dry and liquid measuring tools, 9x5” bread pans, and bread machine(s) that will produce whole wheat bread OR 4 or 5-qt. mixer(s) with dough hook(s).
- Ingredients — listed with recipes.
- Uniform bread samples — made from the same recipe and method to maintain product consistency (see The Baker’s Edge sidebar).
- Consumer test group — examples include an athletic team, school band or another class at school.
- Plastic gloves and napkins — used to distribute samples to consumer test group.
- Approved site(s) and time — for product sampling (example: school cafeteria).
- Forms and pencils — used for consumer test group to record responses.

Resources

Home Baking Association, www.homebaking.org

International Food Information Council, www.ific.org

Kansas Wheat Commission, www.kswheat.com

Wheat Foods Council, www.wheatfoods.org

Hodgson Mill, www.hodgsonmill.com

American White Wheat Producers Association,
www.awwpa.com

Baking as a Career? Check out

American Institute of Baking, www.aibonline.com

Bread Bakers Guild, www.bbga.org

Kansas State University Bakery Science, www.ksu.edu

Retail Bakers of America, www.rbanet.com

Lesson Outline

Pre-assignment — whole grain awareness. Have student keep a “grain food” diary for one school week. What grain foods did they eat each day? How many total servings did they eat each day? How many were whole grains?

Introduce terms — whole grain, whole wheat bread and whole wheat flour. Use bread packages to identify whole grain and whole wheat breads. Show the whole wheat flours side by side to illustrate color differences between Hard Red Winter wheat flour and Hard White wheat flour. Can they also taste a difference?

The whole wheat challenge — (Read background on page 1.) American children, teens and adults need more whole grain foods. Sliced whole wheat bread is very convenient, but many do not choose it. Why? Barriers include color, price, softness, texture, moistness/dryness and taste. White whole wheat flour could make a difference, especially with color and taste.

Assign baking lab partners. Review food safety steps.

- Select which recipe will be used.
- Read through the selected recipe.
- Review The Baker’s Edge sidebar. If students are inexperienced, demonstrate and practice measuring accurately.
- Practice taking temperatures with an instant read thermometer, inserting it into flour, water and bread.
- Bake the bread, repeating as necessary to get a uniform product.

Assign consumer research division tasks.

- List the information to be gathered during consumer testing (see sample evaluation form, page 4).
- Choose a consumer test group and an appropriate time to conduct consumer testing.
- Consider working with the school food service staff to conduct the sampling in the school cafeteria.
- Prepare a written request or meet with the appropriate person(s) to gain permission to conduct a consumer test with the selected group.
- Once the time for sampling and group size are set, meet with the baking lab teams to inform them of the timeline.
- Conduct the consumer test. Tabulate the evaluation forms and report conclusions. Evaluate results, referring to the question on page 1.

Need-To-Know Facts

Whole grain food. Food containing all three parts of a grain — bran, endosperm and germ.

Whole wheat bread. Made with flour containing all three parts of the whole wheat kernel.

Whole wheat flour. Flour produced from the whole kernel of wheat. Wheat class used may be either Hard Red Winter or Hard White wheat.

Daily recommendations for grain food servings.

Ages 9 – 18: Nine servings of total grain foods; three to four of which should be whole grains.

Teenage boys and active men: Eleven servings of total grain foods; three to five should be whole grains.

Source: www.nutrition.gov

Why eat whole grain foods? Whole grains are an excellent source of fiber, they help individuals maintain a healthy weight, and they contain:

1. **Macronutrients** — carbohydrates and protein.
2. **Micronutrients** — vitamins and minerals.
3. **Phytonutrients** — health protecting substances found in plant foods that enhance the body’s resistance to chronic diseases (heart disease, cancer and diabetes).

Sources: www.health.gov/healthypeople and www.generalmills.com/wholegrain

The Baker’s Edge

- Room temperature (78°F) ingredients.
- Check liquid temperatures with a thermometer.
- Mix (knead) dough until it is elastic and smooth. It will “clean” the mixing bowl or counter if well developed.
- Dough temperature after mixing should be 78°F - 84°F (not too warm).
- Dough rising (fermentation) temperature should be 80°F - 85°F.
- Divide dough equally into loaves; weigh each portion if possible.
- If using school oven, dough should rise (proof) at 110°F with 80% humidity OR lightly cover dough with large plastic food bag or wrap with plastic bag, sprayed with cooking spray.
- Bread loaves are done when interior is 205°F - 210°F. Sides and top should be a uniform golden brown color.
- Remove bread from pan; cool on wire racks until interior is 90°F.
- Slice or store in food storage bags at room temperature (70°F - 95°F) for up to one day OR freeze immediately.
- Thaw bread wrapped, at room temperature.

100% Whole Wheat Bread

Mixer Method

Ingredients

- 2 packages active dry yeast
- 1 cup warm water (105 - 115°F)
- 1 cup warm 1% milk (105 -115°F)
- ¼ cup honey or granulated sugar
- 5 ¼ - 5 ½ cups whole wheat flour, divided
- 2 large eggs
- 3 teaspoons salt
- ¼ cup butter, margarine or vegetable shortening
- Optional: 2 tablespoons vital wheat gluten*

Directions

1. In a large mixing bowl, dissolve yeast in warm water. Beat in warm milk, honey, 3 cups flour and eggs. Beat 3 minutes on medium speed. Cover bowl and let mixture rest 20 minutes.
2. Mix in salt and enough remaining flour to make a soft dough. If using a dough hook, add butter and knead 10 – 12 minutes. If kneading by hand, knead 10 – 12 minutes, gradually kneading in the butter until dough is smooth and elastic.
3. Place dough in a lightly greased bowl, turning to grease the top. Let rise until doubled.
4. Punch dough down; divide in half. Let dough rest 10 minutes while greasing two 9 x 5 - inch pans. Shape loaves by rolling each half into a 14 x 7 – inch rectangle. Starting with the short side, roll up tightly, pinching edges and ends to seal. Place in pans, cover with a damp cloth, and let rise until doubled.
5. Bake in a preheated 375°F oven for 25 – 30 minutes or until done. Loosely cover bread with foil the last 5 minutes to prevent over-browning. Remove from pans and cool on wire racks. Makes 2 loaves, 16 slices each.

Nutrition Facts: One (1 oz.) slice (one of 22 per loaf) provides 70 calories, 3 g protein, 1.5 g total fat, 0 mg sat. fat, 10 mg cholesterol, 13 g total carbohydrate, 2g dietary fiber, 2% calcium and vitamin A, 6% iron, 81 mg potassium, 125 mg sodium.

***Vital wheat gluten,** A flour-like product which is gluten derived and dried from wheat flour. It is available in the supermarket baking aisle. It combines with flour in the mixing process.

Bread Machine Method

Ingredients	1# Loaf	1 ½# Loaf	2# Loaf
Water, 80°F	1 cup	1 ½ cups	1 ¾ cups
Nonfat dry milk	1 Tbsp.	1 ½ Tbsp.	2 Tbsp.
Butter or margarine	1 Tbsp.	1 ½ Tbsp.	2 Tbsp.
Honey	1 Tbsp.	1 ½ Tbsp.	2 Tbsp.
Salt	1 tsp.	1 ½ tsp.	1 ¾ tsp.
Whole wheat flour	2 ¼ cups	3 ¼ cups	4 ¼ cups
Wheat gluten*	1 Tbsp.	1 ½ Tbsp.	2 Tbsp.
Active dry yeast	1 ¼ tsp.	1 ½ tsp.	2 ¼ tsp.

Directions

1. Bring all ingredients to room temperature before using. Measure ingredients accurately: with flour, stir it, spoon into a dry measuring cup and level off.
2. Place ingredients in the pan in the order specified in the instruction manual. Select the Whole Wheat/Wheat Cycle and Medium crust. If the machine does not have a Whole Wheat Cycle, compensate by using the Basic White Cycle, letting the machine operate through the first kneading cycle, then restarting it.
3. Check the consistency of the dough after 5 minutes into the kneading cycle. It should be in a moist soft ball. If the dough is too dry, add 1 tablespoon of liquid at a time. If it is too wet, add 1 tablespoon of flour at a time.
4. If the machine does not have a cooling cycle, remove bread from the pan and cool on a wire rack. The Delay Timer may be used.

Nutrition Facts: One (1 oz.) serving provides 71 calories, 3 g protein, 14 g carbohydrates, 1 g fat, 2 mg cholesterol, 2 g fiber and 143 mg sodium.

To prepare mixer method over two class periods:

Day 1: Prepare the dough. Place in large covered plastic bowls or bags sprayed with non-stick cooking spray. Place in the refrigerator. Punch the dough down after one hour. Keep refrigerated overnight.

Day 2: Take dough out of the refrigerator one hour prior to class. Divide dough in half to warm faster. Keep covered. Proceed with steps 4 – 5.

Need baking help? Visit www.homebaking.org

Sample Product Evaluation Form

Product Name: _____

Consumer Test Group Name: _____

Date: _____

Please rank the product in each category.

	5=Excellent	4=Good	3=Acceptable	2=Fair	1=Poor
_____ Color			_____ Aroma		_____ Taste
_____ Moistness			_____ Softness		_____ Texture

I eat whole wheat bread (check one):

_____ Never _____ Less than once per week _____ Often

I would (check all that apply):

_____ Like to have this bread served in the school cafeteria.
_____ Buy it at the grocery store to use at home.
_____ Not care to eat this bread again. Why? _____

Other comments:

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