

Failed Scones: Instructor Guide

Title:

Failed Scones

Author:

Dr. Sandra M. Gross
312 Sturzebecker Health Sciences Center
West Chester University
West Chester, PA 19383
sgross@wcupa.edu



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Discipline:

Nutrition and Dietetics

Target Audience

Introductory, majors and nonmajors

Keywords

Bakeshop, leavening, quick breads

Length of Time/Staging

This activity will take approximately two 75 minute or three 50 minute class periods to complete.

Abstract

A request for help comes from a mother trying to solve her daughter's baking dilemma—flopped scones. In providing this help, students must explore bakeshop principles, recognize ingredients and their uses, understand the function(s) of chemical leavening agents, familiarize themselves



with mixing methods and the baking process, and distinguish between quick bread mixing techniques.

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Format of Delivery

Students work in groups of four, submitting their list of questions from part one. The group can begin work on part two the same class period. When part two is completed, groups submit a written report of their responses.

Student Learning Objectives

After completing this problem, students should be able to:

1. Recognize and select ingredients used in a bakeshop including flours, leavening agents, sugar and sweeteners, fats, and flavorings.
2. Understand the following baking processes: gas formation, trapping of gases, starch gelatinization, protein coagulation, melting of fats, water evaporation, sugar caramelization, carryover baking, and staling.
3. Understand baking ingredients, why they function the way they do, and how to adjust for their differences.
4. Identify and use various mixing methods including beating, blending, creaming, cutting, folding, kneading, sifting, stirring, and whipping.
5. Use chemical leavening agents properly.
6. Prepare a variety of quick breads using biscuit, muffin, and creaming methods.

Student Resources

General food preparation textbook

Web resources for additional information

Instructor Resources

General food preparation textbook

homecooking.about.com/library/weekly/aa072197.htm

www.bry-backmanor.org/picturerecipe3.html

www.joyofbaking.com/scones.html

http://allrecipes.com/Recipe/Scones/Detail.aspx?event8=1&prop24=SR_Title&e11=scones&e8=Quick%20Search&event10=1&soid=sr_results_pl11

<http://www.joyofbaking.com/SconesIntroduction.html>



www.oldfashionedliving.com/scones2.html

<http://www.craftybaking.com/learn/baked-goods/quick-breads/types/scones>

www.ukstudentlife.com/Britain/Food/Cooking/Scone.htm

www.orbitals.com/self/leaven/

www.foodsubs.com/Leaven.html

www.sciencedaily.com/encyclopedia/Leavening_agent

<http://www.craftybaking.com/learn/baked-goods/quick-breads>

Author's Teaching Notes

This problem is based on a real-life story. Sharing this information with students seems to add value to the problem they are about to unravel and solve. Similarly, purchasing a scone for each PBL group to examine also might enhance their interest. Do not assume that students know what a scone looks like or how it tastes!

The problem could be modified to be more relevant to students by using direct questions students submit in part one for part two. Pertinent questions that were missed by students would be added by the professor. Part two would not be available until the next class period; however, students would recognize the questions they wrote for part one and would feel involved in solving the problem. If more time is available, the scone recipe instructions could be scrambled and students could be asked to place them in proper sequence.

In addition to solving the problem using the scone recipe presented in part two, students could submit a scone recipe they prefer the young lady try. An application of this problem would be to prepare, in the food lab, various scone recipes students submit. Students would have an opportunity to apply class work and experience the result.

Assessment Strategies

Students could be asked to submit their responses to parts one and two for course points.

This problem also could be given as a take-home examination for each individual or for each PBL group. Part one could be completed in class or outside of class, while part two could be posted outside the professor's office door for completion outside of class.

Solution Notes

There are numerous solutions to this problem—one is presented.

Part 1

The list of questions we would ask the woman in order to make a recommendation(s) for flawless scones would be similar to those listed at the beginning of the problem statement of part two. The rationale for each question should be related to one of the following: quality of the finished product, ingredients and their relationship to a desirable product, preparation methods, and quality of ingredients used.

Part 2

1. Review why each ingredient is included in the recipe.

Scone flour (white flour, cream of tartar, bicarbonate of soda): Scone flour is a combination of several ingredients, each with a unique purpose. Primarily, scone flour consists of white flour, which contributes to the structure of a baked good (Labensky & Hause, 2003). It produces a scone more tender than a bread product made from whole wheat flour, but with more body and texture than a cake made from cake flour (Krasner, 1994). In addition to the white flour, scone flour also contains bicarbonate of soda, or baking soda. This is present to act as a leavening agent. Thirdly, scone flour contains cream of tartar, an acidic component which, in conjunction with moisture, will serve to activate the baking soda (Labensky & Hause, 2003). The reaction will produce carbon dioxide gas, which enables the scone to rise and provides texture.

Butter: Butter serves as a tenderizer in this recipe by shortening gluten strands (Labensky & Hause, 2003). It also provides rich flavor and color.

Bicarbonate of soda: Bicarbonate of soda, or baking soda, provides leavening action in this product. It releases carbon dioxide gas when both an acid and moisture are present. As the product bakes, the dough sets around the air pockets, which are formed from the carbon dioxide gas. This gives the scone its rise and texture. Heat is not needed for this reaction to occur (Labensky & Hause, 2003).

Baking powder: In the absence of a strongly acidic ingredient, baking powder aids the leavening activity of baking soda; baking powder, a leavening agent which contains its own acid, reduces the need for additional baking soda, thereby decreasing the potential for a bitter and/or discolored product while maintaining a baked good's rise (Labensky & Hause, 2003).

Salt: Salt provides flavor and conditions and strengthens gluten in dough. This makes the gluten stronger and more elastic (Labensky & Hause, 2003).

Sweet Milk (whole milk): (Krasner, 1994) Sweet milk provides richness without creating a heavy product. It also acts as a moistener, enhancing gluten formation (Labensky & Hause, 2003).

Castor sugar: Castor sugar provides flavor and tenderizes the scone by weakening the gluten strands. It also acts as a creaming or foaming agent to assist with leavening. The smaller-sized grains of castor sugar are recommended in this recipe because they dissolve quickly in liquids and help to create light and tender cake product (Labensky & Hause, 2003).

Blueberries: Blueberries contribute color, flavor, and nutritional value to the scones. As a fresh fruit, they may also add an acid component to work in conjunction with the baking soda in leavening the product (Labensky & Hause, 2003). However, this PBL group believes that because this recipe calls for whole blueberries, it is unlikely that their natural acid will be completely effective in activating the baking soda. Baking powder and cream of tartar will contribute the majority of acid in this recipe.

Egg: The egg, like the butter, acts as a tenderizer to shorten the gluten strands in the scone dough (Labensky & Hause, 2003). The yolk also will add color to the final product.

2. Review each preparation method included in the recipe.

Sieve the dry ingredients: Sifting the dry ingredients together allows them to be thoroughly combined before a liquid ingredient has the opportunity to activate leavening action. Liquids will initiate leavening activity of baking powder upon contact. If an acid is present (i.e., cream of tartar), liquids also will initiate the leavening activity of baking soda. Delaying the start of leavening activity until close to the time of baking helps to ensure a tender, well-risen product (Labensky & Hause, 2003). Sifting dry ingredients thoroughly also aerates the mixture making for a lighter, flakier product, and ensures that dry ingredients are evenly distributed throughout the final product.

Rub in butter: Rubbing in or cutting in fat will create a specific consistency and texture in a baked good. Larger pieces of fat produce a flaky product, while smaller pieces will result in a more cake-like product (Labensky & Hause, 2003). This recipe does not specify the recommended size of the butter pieces; however, the text suggests that scones be prepared using the biscuit mixing method, the ultimate goal of which is a light and flaky product (Labensky & Hause, 2003). Thus, the butter pieces should resemble small nuts after they are cut into the dry ingredients (Labensky & Hause, 2003).

Add enough milk to make a soft dough: This instruction implies that milk should be added gradually so that dough will be soft and workable, but not overly wet and too sticky to roll or cut. Also, adding too much milk will make for a dense, heavy product.

Turn on to a floured board: A board provides a smooth surface on which to roll dough to a consistent thickness. The flour on this surface acts as a drying agent (Labensky & Hause, 2003); it will absorb excess moisture on the dough's surface and facilitate the rolling process.

Knead lightly: This instruction implies that while kneading is necessary to develop gluten, overkneading will toughen a final product. According to the text, 20-30 seconds of kneading should suffice (Labensky & Hause, 2003).

Add drained blueberries: Draining blueberries prevents the addition of excess moisture, which would create dough too sticky to roll. Also, berries won't crush as easily if added during a final step.

Roll out: Rolling dough gives a baker the opportunity to create a product with consistent height (and, ultimately, rise). Care should be taken to roll dough evenly (Labensky & Hause, 2003). A thickness is not specified in this recipe; however, the text recommends scone dough be rolled to a thickness of 1/2 inch (Labensky & Hause, 2003). An alternative recipe is in agreement with this instruction (Krasner, 1994).

Cut in rounds: Scones are traditionally cut in rounds, although other shapes may be considered. Scones should be cut uniformly and without twisting of the cutter to ensure they all bake evenly and rise.

Place on greased tray: Greasing the baking tray prevents sticking and promotes an even, appealing brown color on the scone bottom.

Brush with egg: An egg wash will enhance a scone's color and create an appealing glaze (Krasner, 1994).

Bake in a quick oven (400-425 degrees) for 10 to 15 minutes: According to Krasner (1994), "speed is of the essence to prevent toughening of the dough." High heat and short baking time will enhance the tenderness of the final product.

3. List possible reasons for the scones flopping.
 - a. Refrigerating dough overnight decreased (or eliminated) leavening activity during baking time. The baking powder was activated upon contact with the milk's moisture; the baking soda was activated by both the milk and the acid in the baking powder and cream of tartar. Together, these leavening agents began a series of chemical reactions, releasing carbon dioxide gas within the dough even in the absence of oven heat. By the time the daughter was ready to roll and bake the scones, these reactions had most likely run their course (Labensky & Hause, 2003).
 - b. Allowing dough to rest at room temperature prior to rolling further decreased the bake-time leavening capacity of the baking soda and baking powder (Labensky & Hause, 2003).
 - c. The daughter specified that she used softened butter in her recipe, but softened butter will not promote flakiness in a baked good. Only chilled butter or fat will help to achieve this texture and consistency (Krasner, 1994; Labensky & Hause, 2003).
 - d. The dough was rolled to 3/4 inch thickness prior to cutting; this was perhaps too thick, compared to other recipe recommendations to roll dough to 1/2 inch thickness (Krasner, 1994; Labensky & Hause, 2003).
 - e. Possible twisting or wiggling of the biscuit cutter occurred, contributing to toughness. Krasner recommends "one decisive punch" to cut scones from rolled dough. The daughter might consider greasing and flouring her biscuit cutter to facilitate this step (Krasner, 1994).
 - f. Although she claims to have kneaded the dough lightly, inexperience may have led this young baker to overknead her dough prior to rolling. This typically results in a tough product (Labensky & Hause, 2003).
 - g. The daughter's interpretation of "as needed" in reference to sweet milk may have been insufficient at 1/3 cup. Krasner (1994) recommends having the dough "as wet as you can handle."
 - h. Heat from the exterior of the refrigerator may have deteriorated the baking soda and baking powder stored in an adjacent cupboard. Such improper storage will cause leavening agents to lose their leavening capacity, rendering them useless in a recipe (Labensky & Hause, 2003).
 - i. The daughter's interpretation of sweet milk as 2% milk may have provided too little fat to shorten gluten strands and promote tenderness (Labensky & Hause, 2003). She might consider using whole milk or cream instead.
 - j. The description of how the daughter blended her liquid and dry ingredients requires more clarification. Her mother stated that after the fat was cut into the dry ingredients, the daughter "blended in an egg and enough 2% milk." If the egg and milk were combined together before being added to the dry ingredients, there was no problem with the daughter's procedure (Labensky & Hause, 2003). However, if she blended the egg and the dry ingredients before adding the milk,

this would have resulted in two potential difficulties. First, the leavening agents would have been exposed to moisture for an even longer time prior to baking, causing their bake-time leavening capacity to decrease. Secondly, blending the egg first would increase the potential for overmixing the dough, as the milk would need to be blended next.

4. List three recommendations, in order of rank, for flawless scones. Provide an explanation, in layman's terms, for each recommendation.
 - a. Mix, knead, roll, cut, and bake immediately—don't store scone dough overnight. Baking scones immediately after they are prepared allows leavening agents to act to their full potential. Storing dough overnight "wastes" the chemical reactions, which ideally will produce carbon dioxide gas that is responsible for a baked good's rise. In this recipe, the baking soda begins to react in the presence of the milk and the acid from both the cream of tartar and the baking powder. The baking powder's activity is initiated by the milk alone. Thus, these two agents, if left to act overnight in the refrigerator, will release their carbon dioxide before the scones even make it to the oven. The gas will escape, and consequently few air pockets will form during baking, resulting in dense and heavy scones (Labensky & Hause, 2003).
 - b. Chill butter prior to cutting it into the dough. Chilled butter, as opposed to softened butter, will maintain its shape better as it is cut into the dry ingredients and the scones are baked, resulting in a flakier product. The flakes are actually the pockets created by the butter pieces as they melt during baking. In essence, the more solid the butter pieces, the more prominent the flakes in the final product (Labensky & Hause, 2003).
 - c. Pay careful attention to the way ingredients are combined. The liquid ingredients are added to the dry ingredients in order to avoid overmixing which causes toughness and inhibits rise (Labensky & Hause, 2003). Once liquid touches the flour, mixing must be kept to a minimum to avoid developing gluten in the flour, which will in turn produce a tough scones. (Rombauer, Becker, & Becker, 1997). Overkneading causes toughness as well. Also, the dry ingredients are sifted together in the beginning for lightness and to avoid clumps. Do not skip this step if a product with a quality texture is desired.

Also used as the third response were: 1) Make sure the scones are cut properly and placed with the sides nearly touching. A biscuit cutter should be dipped in flour and pushed straight down through the 1/2 inch dough. If the biscuit cutter is twisted while making the cut, the rise of the biscuit will be inhibited. Cut the biscuits as close together as possible to minimize scraps, and place the scones on a lightly greased or paper-lined sheet pan with the sides nearly touching. This step will help the biscuits rise and have softer sides (Labensky & Hause, 2003). 2) Replace leavening agents that were potentially damaged by the heat from the refrigerator's exterior. Store the new baking soda and baking powder in a cool, dry place. Tightly reseal them after opening, and take care not to contaminate them with other ingredients or moisture. Baking soda and baking powder will lose their effectiveness if they are not stored properly. Although they may have been dry in this case, their placement in a cupboard adjacent to a refrigerator may have resulted in some deterioration from heat (Labensky & Hause, 2003). From personal experience,

this spot in a kitchen is often a warm one, and should be used only for non-food items like dishes or appliances.

5. Explain why you ranked your recommendations in the order given.

Of all the possible mistakes made by this novice baker, storing the dough overnight seems as glaring as a neon sign. This faux pas almost certainly depleted the baking soda and baking powder of their leavening capacity. This was the single most probable cause of the scones' failure. Thus, immediate baking is the first recommendation.

Secondly, chilled butter in lieu of softened butter is suggested. Given the ultimate goal of a flaky product, and assuming the proper functioning of the leavening agents, using chilled butter is one of the best means to achieve a quality scone. This is evidenced by the specific instruction to use "chilled butter" in published scone recipes (Krasner, 1994; Labensky & Hause, 2003).

The third recommendation is more difficult to control, albeit crucial—pay careful attention to the way ingredients are combined. The recipe instructions are vague about how well to mix and knead the dough. This is one step that can be variable and difficult to get correct without practice and proper instruction; but, it is important to avoid developing too much gluten, which will produce tough scones. Because this recommendation requires the most precision and skill, it should be tried last.

References

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