



How Old is Too Old?

Karin Allen, Ph.D., Food Quality & Entrepreneurship Specialist

Ah, the holiday season. For many of us, it is the one time each year that our cookbooks are put to good use. But while recipes don't go bad, ingredients can – especially those that haven't been touched since last year's baking frenzy.

Flour

What does it do?

Flour is the principal ingredient in most baked goods. When mixed with water, gluten is formed from two specific proteins (*gliadin* and *glutenin*; Kontogiorgos 2011). The more it's mixed, the more gluten is formed. This is what gives dough and batter their texture and structure at room temperature. During baking, moisture in the dough begins to change the starch from the flour, causing it to swell and soften. This is important for the texture and structure of the finished product.

What happens as it ages?

Starch changes very little as flour sits. However, when the proteins that normally form gluten are exposed to air, they can change significantly. These changes limit the amount of gluten that can be formed.

Can it still be used?

Yes – but it is best to use flour more than 1 year old in products that don't need a lot of gluten formed, like cakes and crumbly cookies. Use new flour for bread and chewy cookies.

How should it be stored?

Keep flour in a tightly sealed container, away from heat and moisture. Whole wheat flour can be stored in the freezer in air-tight bags to prevent it from becoming rancid.

Eggs

What do they do?

The protein in eggs (especially the whites) gives structure to many baked goods, including sponge cake, meringue, and cream puffs. Eggs also contribute moisture, and they are the only source of water in many cookie recipes.

What happens as they age?

Egg shells appear solid, but they are actually very porous. As eggs sit in the refrigerator moisture is lost through the pores (Jones & Musgrove 2005). This is why old eggs (about 6 weeks) will float in water.

Can they still be used?

Yes – as long as the egg has been refrigerated, it is safe to use. To use old eggs in cookies, you may need to add some water (1 – 2 teaspoons per egg) or the dough will be too dry. Do not use old eggs in cakes, cream puffs, or meringue.

How should they be stored?

Keep eggs refrigerated until you are ready to use them. Eggs can be frozen, but they must be separated first. To freeze yolks, add ¼ teaspoon sugar for each yolk and mix well (remember to reduce the sugar in your recipe when you use them). Freeze whites as they are.

Fat

What does it do?

Butter gives flavor to many baked goods, but shortening often gives a better texture. Fats and oils “tenderize” baked products by limiting the amount of gluten that can form.

What happens as it ages?

Fats and oils turn rancid when they are exposed to air. Oxygen reacts with fatty acids, creating off flavors and aromas (Waraho et al. 2011). Oils, which contain more mono- and poly-unsaturated fatty acids, become rancid more quickly than fats that are solid at room temperature.

Can it still be used?

Yes, but if it smells bad, chances are your baked product will taste bad. Do not use old shortening or butter in icing.

How should it be stored?

Butter, shortening, and oils do not need to be refrigerated or frozen, but they will last much longer if they are. The chemical reaction that leads to rancidity happens more slowly at lower temperatures.

Sugar

What does it do?

In addition to flavor, sugar helps incorporate air when creamed together with shortening or butter. Honey and brown sugar (which contains molasses) make moister baked products.

What happens as it ages?

Granulated sugar does not change, but sometimes will develop an odd aroma. This will not affect the baked product. Brown sugar may harden and honey may crystallize.

Can it still be used?

Yes. If brown sugar or honey has hardened, it can be microwaved on low power for 15 – 20 seconds. As it sits it will begin to crystallize or re-harden, so use it immediately. The honey container can also be put in a pan of boiling water to remove crystals.

How should it be stored?

Keep sugar in an air-tight container away from moisture and bugs. Sugar and honey do not need to be refrigerated or frozen.

Ingredient	Can it still be used?	How should it be stored?
Chocolate	If the chocolate has a white layer on the surface (“blooming”), it may not work well for dipping. Chocolate chips can still be used in cookies.	Chocolate should be stored in a cool place. Chips and baking bits can be frozen.
Nuts	The oil in nuts can go rancid quickly. If the nuts smell bad, chances are they’ll taste bad as well. Discard any nuts that appear moldy.	Nuts should be stored in an air-tight container away from heat and light. Nuts can be frozen.
Baking Powder	Baking <i>powder</i> contains baking soda and a powdered acid. Baking powder loses its leavening power as it sits. Baking <i>soda</i> does not go bad.	Baking powder should be stored in the original container away from heat and moisture. Most baking powders are stable for 1 year.
Spices	Ground spices such as ginger, cinnamon, and nutmeg lose flavor over time. More of the spice can be used to get the desired flavor intensity.	Spices should be stored in a cool place. Whole spices can be frozen and ground when needed.
Extracts and Oils	Extracts contain alcohol, which makes their flavor stable for a long time. Flavored oils may become rancid, but this is unusual.	Extracts can be stored at room temperature. Oils can be refrigerated to maintain flavor.

References

- Jones, D.R. & Musgrove, M.T. (2005). Effects of extended storage on egg quality factors. *Poultry Science*, 84, 1774-1777.
- Kontogiorgos, V. (2011). Microstructure of hydrated gluten network. *Food Research International*, 44, 2582-2586.
- Waraho, T., McClements, D.J., Decker, E.A. (2011) Mechanisms of lipid oxidation in food dispersions. *Trends in Food Science & Technology*, 22, 3-13.

Utah State University is committed to providing an environment free from harassment and other forms of illegal discrimination based on race, color, religion, sex, national origin, age (40 and older), disability, and veteran’s status. USU’s policy also prohibits discrimination on the basis of sexual orientation in employment and academic related practices and decisions. Utah State University employees and students cannot, because of race, color, religion, sex, national origin, age, disability, or veteran’s status, refuse to hire; discharge; promote; demote; terminate; discriminate in compensation; or discriminate regarding terms, privileges, or conditions of employment, against any person otherwise qualified. Employees and students also cannot discriminate in the classroom, residence halls, or in on/off campus, USU-sponsored events and activities. This publication is issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Noelle E. Cockett, Vice President for Extension and Agriculture, Utah State University.