



Baking bad

Cake is a wonderful thing. Perfect for celebrations or a relaxed half hour with a cup of coffee. There's nothing quite like sharing delicious homemade cake with family or friends. But how does the simple combination of basic ingredients come together to create something so mouth-wateringly sweet, delicate and delicious?

First off – just like a scientific experiment – precision is key. For a great bake, ingredients need to be weighed carefully, mixed together in the right way and at the right moment. Each vital ingredient – flour, eggs, sugar, butter and baking powder – has its own special role. The flour and eggs strengthen and build structure; the sugar and butter are structure weakening. Their combination makes the perfect bake.

MIX SUGAR, FLOUR AND BUTTER: The best cakes have a light, melt-in-the-mouth texture. This comes from air bubbles that divide the batter into fragile sheets. Baking a cake starts with vigorous mixing of the fat and sugar – a process called creaming, where most of the air bubbles are incorporated into the mixture, creating that light, fluffy texture. The air bubbles stick to the rough surfaces of the sugar crystals. Caster sugar is finer than granulated, offering a larger surface area on which to trap as many bubbles as possible. The bubbles of air are then encased by a film of fat, creating a foam.

BEAT THE EGGS INTO THE MIXTURE: Eggs are critical at this point the – beaten egg is added to the mixture to stop the air bubbles created by creaming from collapsing when heated. The egg proteins create a film around the fat-coated air bubbles, then as the temperature of the cake rises in the oven this layer coagulates to form a rigid wall around each bubble, preventing it from bursting and ruining the cake's texture.

GENTLY FOLD IN THE FLOUR: The gentle folding action used to incorporate the flour avoids breaking the bubbles you worked so hard to put into the mixture. The cake's structure-builder, flour's elastic nature allows the batter to expand during baking (to incorporate gases) and then coagulate into

a strong network that supports the sugar and fat. The starch in the flour is a like reinforcing agent – it stiffens and helps strengthen the foamy egg. Some of the proteins in the flour join to form an extensive network of coiled proteins, called gluten. It's the gluten that glues the cake together. But this is a delicate process – too much gluten creates a heavy consistency like bread. The fat has another crucial role here, as a 'shortener'. Coating the starch and protein of the flour with an oily film, the fat helps keep just the right balance of tough gluten.

ADD BAKING POWDER AND MIX: containing sodium bicarbonate, when baking powder is combined with moisture and an acidic ingredient, it produces a chemical reaction, creating bubbles of carbon dioxide. As you stir the mixture, the ingredients start to

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interact – the baking powder is activated by the moisture from the butter/egg, releasing gas making the mixture rise.

PLACE IN A PRE-HEATED OVEN: Placing the cake in the middle of the oven where the temperature is uniform helps with an evenly-baked cake. Fan ovens that create uniform temperature by circulating hot air are by far the best for baking. As the cake bakes, air expands as water vapour and carbon dioxide is released, the egg cooks and coagulates forming a permanent risen form of the cake. Tempted to open the oven door too early? Don't! – letting

cool air in before the egg has fixed the shape prevents it from expanding and the cake will collapse. Browning (Maillard) reactions take place on the cake surface, enhancing the cake's flavour and creating that perfectly caramel brown, light, scrumptious cake.

When you next grab a cupcake take a little time to appreciate the exact science that went into that brilliant baking to create that mouth-watering little treat.

Rachel Perrin, PhD, is a science communication writer based in Bristol, UK.

