

# The Acceptance of Eggs as a Natural Aerator in Baking

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**Abstract:** Eggs are one of the most important, natural ingredients in baking. Egg-free baking recipes are few and far between, and for good reason – for many products eggs are indispensable. Eggs bind, aerate, leaven, emulsify, thicken, aid in setting, are the base in many recipes and can be used as fillings, toppings, glazes and also for adding flavour and colour to baked goods. No other single ingredient can do so much in baking. Nature's very own miracle food product, the humble egg's ability to do so many jobs – and all at once - is the reason why bakers the world over depend on it so much. This highlights key aspects of the culinary world, focusing on aeration as a process that introduces air into ingredients to enhance texture and volume. It emphasizes the multifaceted role of eggs in baking, from providing structure to flavour. Additionally, it introduces the concept of bakery premixes, which streamline the production of a wide range of bakery products, enriching their taste, texture, and appearance.

**Keywords:** Aeration, Coagulation, Baking, Binding, Glaze, Thickening, Emulsifying.

## I. INTRODUCTION

The function and behaviour of eggs can really vary depending on how we treat them in these recipes, and just knowing more about the different parts of an egg — the whites and the yolks can help make even the trickiest pastries feel a little more approachable. Eggs play an important role in everything from cakes and cookies to meringues and pastry cream — they create structure and stability within a batter, they help thicken and emulsify sauces and custards, they add moisture to cakes and other baked goods, and can even act as glue or glaze.

### The Role of Egg Yolks: Fat

Recipes that use just the yolk of an egg typically do so for the yolk's fat content and emulsifying abilities. The fat gives baked goods extra-rich flavour and a velvety texture. The yolk also has the unique ability to bind liquids and fats together, creating an emulsion that prevents them from separating.

This emulsion process helps create a more homogenous mix of ingredients — aiding in an even distribution of liquid and fats throughout a recipe for smooth batters, satiny custards, and creamy curds.

When yolks are heated, the proteins they contain unfold and gel together. This is a delicate situation; too much heat and the proteins will gel too much and turn curdled and grainy, but when warmed gently over low heat, egg yolks have a great ability to thicken products like sauces and custards. Again, their emulsifying properties enhance and thicken cream when they are cooked together.

**Common egg yolks recipes:** Custards, pastry cream, cakes, ice cream, crème brûlée, and curds.

### The Role of Egg Whites: Foam

When egg whites are used alone, they perform an entirely different role from the yolks, especially when whipped. Whipping and using egg whites in a recipe does not have to be as intimidating as you may think, and we'll be talking much more about this in a few days.

For now, just know that whipping egg whites means incorporating millions of little air bubbles within the white. This creates a fairly stable foam that we can use to make everything from a soufflé to meringue. To help stabilize egg whites even further, we can add acidic elements, like cream of tartar and lemon juice.

One of the best ways to use whipped egg whites is as a natural leavening agent in something like a delicate cake or a soufflé. In the heat of the oven, the air trapped in the foam starts to expand, causing the recipe rise without the need for things like yeast or baking soda. In fact, whipped egg whites are how many classic baked goods, like sponge cakes, got their lift in the days before baking soda and baking powder.

Egg whites can also be whipped with sugar to make meringue, which can then be baked into crunchy meringue kisses, made into billowy Pavlovas, or dolloped on top of desserts like baked Alaska. Sugar makes whipped egg whites incredibly stable — you can even pipe it using a piping bag into stars, kisses, and toadstools.

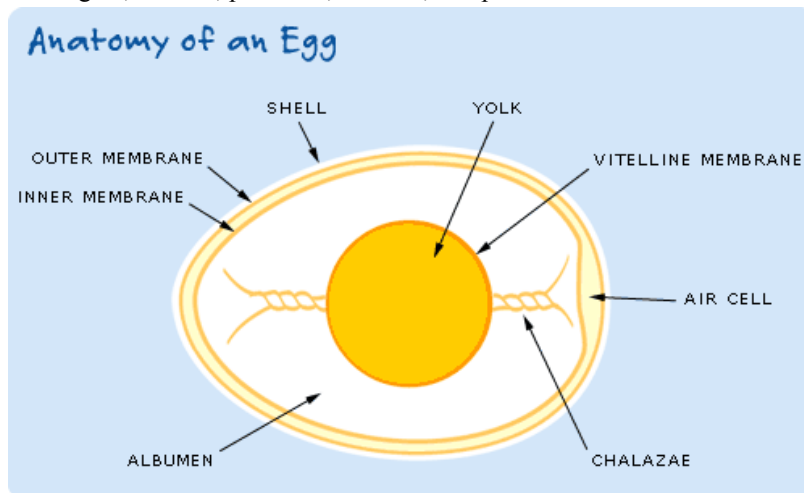
While the idea of “light” and “airy” whipped egg whites might make you think that more is better, it is possible to overdo it. Over-whipped whites will become clumpy, grainy, and difficult to fold into your batter. Also, using too many whites in a batter can wind up making the final product dry. **Common eggwhite recipe:** Meringues, Pavlova, chiffon cakes, macaroons, marshmallows, marshmallow fluff, and frostings.

The Role of Whole Eggs: Fat and Foam

When you use whole eggs in a recipe, you get some of the best properties of both the yolk and the white. While whole eggs aren't quite as good as straight yolks at creating an emulsion, they are still excellent binding agents, especially in cakes, cookies, and other baked goods. Eggs also firm up and solidify when heated, giving crucial structural support to delicate desserts and pastries. At the same time, eggs make baked goods tenderer, creating light textures, soft breads, and delicate crumbs.

When mixed with sugar (like in a cake or cookie batter), eggs help trap and hold air — not quite as well as whipped egg whites, but enough to give the finished product some lightness and lift. The combination of eggs and sugar also adds a great deal of moisture and flavour to a recipe.

Yolks and whites can also be used separately in the same recipe. This truly is the best of both worlds, with the yolks providing richness to a base or batter while the whipped whites do their job of lightening and leavening. Chiffon cakes and soufflés are good examples of this kind of recipe. **Common recipes that use whole eggs:** Butter cakes, cookies, brownies, bread dough's, waffles, pancakes, muffins, and pastries.



A single large boiled egg contains:

**Vitamin A:** 8% of the DV (daily value)

**Folate:** 6% of the DV

**Vitamin B5:** 14% of the DV

**Vitamin B12:** 23% of the DV

**Riboflavin (vitamin B2):** 20% of the DV

**Phosphorus:** 7% of the DV

**Selenium:** 28% of the DV

Eggs also contain decent amounts of vitamin D, vitamin E, vitamin B6, calcium and zinc. This comes with 78 calories, 6 grams of protein and 5 grams of fat. Eggs also contain various trace nutrients that are important for health. If you can

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get your hands on pastured or omega-3 enriched eggs, these are even more nutrient dense. They contain higher amounts of omega-3 fat and are much higher in vitamin A and E.

### **Benefits of eggs as a natural aerator**

#### **Affecting in structure**

Like gluten in flour, eggs give construction to what you're baking.

As their proteins coagulate, eggs give an elective paste that helps supply shape and structure. While most things don't depend on eggs for their construction, eggs become very significant while making cakes and prepared merchandise that utilization light flours, similar to baked good or cake flour.

Not offsetting it with legitimate tenderizers, similar to fat and sugar, be that as it may, can make the surface of heated merchandise extreme and chewy. One more capability of eggs is as a thickener. In dishes like bread pudding, custard, and pumpkin pie the eggs decide immovability as well as whether the dish holds its shape. Eggs can be thickeners for nearly anything you long for in both baking and cooking.

#### **Acts as a leavening agent**

As you beat an egg, it normally integrates air into the egg. After the air gets caught, the intensity of cooking makes it grow. This gives raising, which yields a lighter, fluffier surface.

Most individuals just consider whipped egg whites as an approach to involving eggs for raising. This is on the grounds that the whites are more straightforward to whip as a general rule, which is the reason you separate eggs for baking recipes. However, the yolks and whites are both equipped for making raising. Simply recollect, on the off chance that you really do whip your eggs independently of your hitter, try to overlap the eggs or egg whites in so as not to smash the air you just endeavoured to prepare.

#### **Adds moisture**

Did you had at least some idea that eggs are made of generally water?

Truth be told, an entire egg is made of around 70%-75% water and various pieces of the egg can give you more dampness than others.

For instance, an egg white is around 85% water while egg yolks contribute just around half. Most recipes will simply require an entire egg, however on the off chance that you feel it's a piece dry, take a stab at including an additional egg white next time. The dampness sums from eggs additionally influence the surface of your cake.

Eggs yolks makes more extravagant and gentler heated merchandise, while egg whites give you a lighter and airier item. Most recipes require a customary enormous egg in baking. Be that as it may, you can change the egg size to in any case get a rich eventual outcome, yet decrease or increment dampness.

#### **Emulsification**

Egg yolk is rich in fat and lecithin, an emulsifier, and can therefore be used as a highly effective, natural aid to emulsification. Emulsifiers provide superior palatability, mouth feel, texture and a consistent, high-quality appearance.

Emulsifiers are a crucial baking aid because they deliver process stability during the baking process, which results in volume increase and a good crumb structure. In general, emulsification stabilises the fat phase in batters, with one part of the emulsifier molecule attaching to the fat and the other to the water. By sitting at the fat-water interface, they hold the two phases together. This provides stability to the bubbles that form in the dough, helping to deliver an open, light, aerated texture.

With the help of emulsifiers, once mixed with other food ingredients, many of the fatty components of egg yolk are held in suspension, such as in batters (a non-baking example would be mayonnaise).

### **Limitations of eggs in baking**

#### **Cholesterol**

In spite of their wholesome profile, eggs don't address a solid eating routine choice for everybody. Eggs contain a great deal of cholesterol - - 185 milligrams for every huge egg, or 62% of your most extreme day to day cholesterol

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consumption, as indicated by Colorado State College. Albeit not every person answers inadequately to dietary cholesterol, certain individuals notice an expansion in blood cholesterol levels when they eat food sources that contain cholesterol. Since high blood cholesterol jeopardizes you of coronary illness, cholesterol "responders" ought to keep away from eggs. Notwithstanding, in light of the fact that the cholesterol in an egg is all found in the yolk, eating the egg white just permits you to appreciate eggs without eating cholesterol.

(By Sylvie Tremblay <https://www.weekand.com/healthy-living/article/advantages-disadvantages-eggs-18002276.php>)

### **Diabetes**

Consuming at least one eggs each day might build the gamble of diabetes by 60%, as per a review distributed in the English Diary of Sustenance. Scientists contrasted egg utilization and blood glucose levels in excess of 8,000 members from the China Wellbeing and Sustenance Overview. The people who routinely consumed the most eggs expanded their gamble for diabetes when contrasted with the individuals who ate the least eggs.

These outcomes support comparable discoveries. A survey of 14 examinations distributed in the diary Atherosclerosis showed that the people who consume the most eggs increment their gamble for diabetes by 68%. Another audit tracked down comparable outcomes: a 39% higher gamble of diabetes in individuals who eat at least three eggs each week. Egg utilization additionally expands the gamble of gestational diabetes, as per two examinations in the American Diary of The study of disease transmission.

## **II. REVIEW OF LITERATURE**

### **A review of egg replacement in cake production: Effects on batter and cake properties by Gamze Nil Yazici**

In recent years, there is a growing demand for and interest in egg replacement, due mainly to health problems (phenylketonuria, egg allergy) or health-related concerns (cholesterol, avian influenza), dietary preferences (vegan, vegetarian), and/or religious beliefs of consumers; and also to issues concerning sustainable food supply and economic factors for producers. In this regard, the food industry is searching for egg alternatives to produce partially or totally egg-replaced, in other words, eggless goods.

<https://www.sciencedirect.com/science/article/abs/pii/S0924224421001795>

### **Lipids Basics: Fats and Oils in Foods and Health**

Marjorie P. Penfield, Ada Marie Campbell, in Experimental Food Science (Third Edition), 1990. C.

Egg Substitutes: Several commercial egg substitutes have been introduced to the market in response to recommendations for cholesterol-free diets. The chemical composition and nutritional properties of several of these products have been reported (Childs and Ostrander, 1976; Pratt, 1975; (Placeholder1) and Kameron, 1974). Several investigators have studied the quality of products made from selected egg substitutes. These products usually contain a high proportion of egg albumen but contain no yolk. Fat-soluble nutrients are provided by product fortification (Placeholder1) ((1977) reported that experienced panellists found that scrambled eggs from a frozen egg substitute had more cooked egg flavour and aroma than scrambled whole eggs. Colour and texture did not differ. Consumer panellists liked the flavour of the whole egg product better. Gardner *et al.* (1982) reported that flavour, tenderness, moistness, and overall acceptability of scrambled whole eggs were superior to that of scrambled frozen egg substitute.

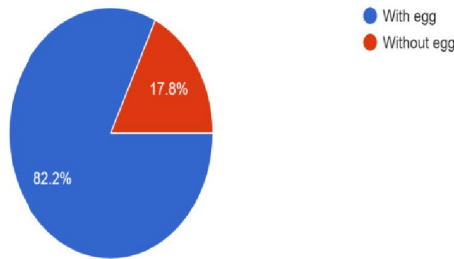
### **Chia (*Salvia hispanica L.*) Gel as Egg Replacer in Chocolate Cakes by Lorenza Rodrigues and others.**

Eggless cakes were prepared by replacing egg for chia gel stored in different conditions. The sensory evaluation was carried out with 112 untrained individuals. Microbiological stability of the gel for 15 days during refrigeration and 30 days of freezing demonstrated that it is a potential product. Sensory analysis showed that chia gel stored in different conditions could replace egg in chocolate cake not impairing acceptability. It is possible that cold storage improves chia gel functionality, especially when it is stored frozen.

**Objectives**

- To understand eggs as a natural aerator in baking.
- To study the acceptance and usage of eggs.

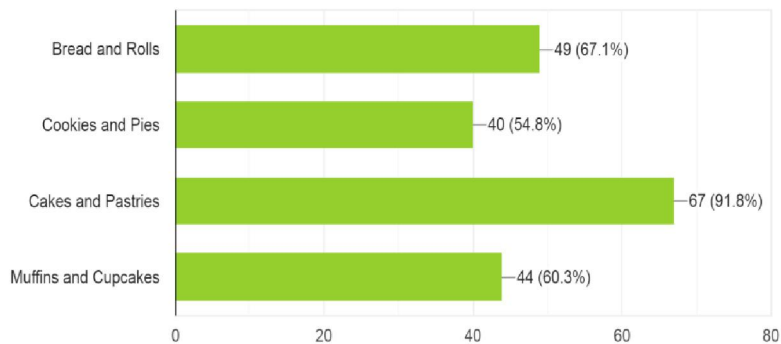
7. What is your choice of baked products?  
73 responses



**INTERPRETATION**

82.2% of the respondents prefer egg in their baked products.  
17.8% of the respondents do not prefer eggs in their baked products.

6. Which of the following baked products have you tried?  
73 responses

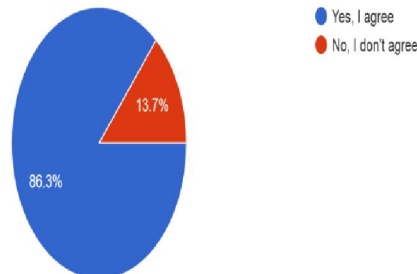


**INTERPRETATION**

Out of 73 responses  
67.1% people have tried breads and rolls  
54.8% people have tried cookies and pies  
91.8% people have tried cakes and pastries  
60.3% people have tried muffins and cupcakes

8. Do you agree if eggs play a major role in baking?

73 responses



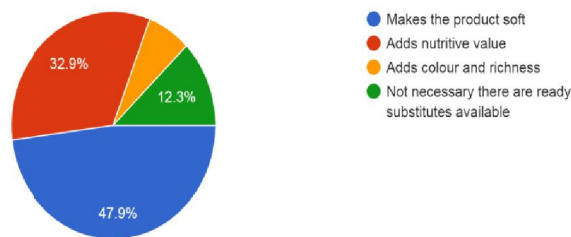
**INTERPRETATION**

86.3% of the respondents agree that eggs play a major role in baking.

13.7% of the respondents disagree that eggs do not play a major role baking.

9. Why do you prefer eggs in baked products?

73 responses



**INTERPRETATION**

47.9% of the respondents feel using eggs makes the product soft.

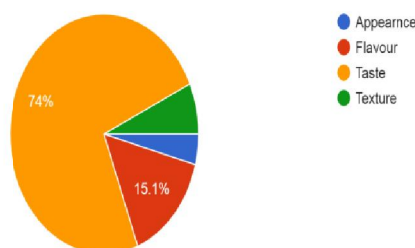
32.9% of the people feel using eggs adds nutritive value in the baked product.

6.8% of the people feel using eggs adds colour and richness to the baked products.

12.3% of the respondents feel using eggs isn't necessary there are ready substitutes available.

10. When buying baked products what is important to you?

73 responses



**INTERPRETATION**

74% of the respondents feel taste is important while buying baked products.

15% of the respondents feel flavour is important while buying baked products.

6.8% of the respondents feel texture is important while buying baked products.



4.3% of the respondents feel appearance is important while buying baked products.

### III. CONCLUSION

Creating quality baked goods for consumers using eggs can pay off when their expectations are met. Another study says that not only are consumers looking for original, high-quality products in bakeries, they're also considering the benefits of egg in food. One portion of the study said, "all-natural ingredients (with) no added preservatives will increase the value of products made using eggs. Eggs deliver on the quality promise for both the consumer and the manufacturer. On the consumer side, eggs represent a comforting staple that appear in 94% of kitchens nationwide. On the manufacturing side, egg ingredients deliver more than 20 functional properties that interact synergistically with both common and unique ingredients used to create gold standard cakes, muffins, cookies, cheesecakes, and other popular products. The product appearance, taste and subtle variables like crumb quality, tenderness and texture can be traced in part to the role eggs play in baking operations.

Eggs play a vital part in all bakery goods and is a natural aerating agent with other usage in binding, coating, emulsifying and much more. Using them appropriately is very beneficial in bakery.

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