

a dozen
(or so) questions
to ask about
REAL Eggs in your
formulation

incredible!



American Egg Board

LABEL & INGREDIENT STATEMENTS ARE UNDER GREATER SCRUTINY TODAY. YOU MIGHT BE EXAMINING YOUR INGREDIENT CHOICES & CONSIDERING VARIOUS OPTIONS. EACH INDIVIDUAL INGREDIENT MAKES AN IMPRESSION UPON THE CONSUMER. IN TODAY'S MARKET, THAT IMPRESSION IS EQUALLY AS IMPORTANT AS THE INGREDIENT'S FUNCTIONAL BENEFITS.

The American Egg Board (AEB) proposes the following questions to you and your ingredients suppliers to help prioritize ingredient selection and maximize your efforts toward creating the best possible formulations. A careful examination of ingredient attributes and benefits can help clarify the right choice to create gold standard products that meet consumer expectations, especially when your choice includes REAL eggs.

1 What can I ultimately achieve by adding REAL Eggs to my formulation?

Answer: Formulators can take advantage of REAL benefits egg ingredients provide, such as:

- 20-plus functional properties
- Clean label declarations
- Consumer acceptance
- Gold standard products:
 - Taste
 - Texture
 - Appearance

REAL eggs supply more than 20 functional properties in formulation, including binding, aeration, emulsification and coagulation to name a few. No single ingredient can replace the multiple functions provided by REAL eggs. With today's market emphasis on clean label statements, companies generally try to avoid any steps that might cause a product's ingredient statement to grow, or impact costs by adding extra ingredients to maintain product quality and integrity.

Egg ingredients provide proven and reliable texture and appearance and gold standard flavor. Studies show that REAL egg ingredients in bakery items like angel food cake and bread for example, produce a desirable crumb structure,

more uniform air micelles (bubbles) and provide uniform air bubble distribution to help achieve your target range for specific gravity — among other product attributes.

In addition, REAL eggs do more than just supply a neutral to pleasant taste; they react synergistically with other basic ingredients, especially in baking applications to develop unique flavor compounds responsible for that sweet baked goods flavor. REAL eggs supply results for formulators for product quality, taste, appearance and ultimately, widespread consumer acceptance.

2 How versatile are REAL Eggs?

Answer: One single ingredient, the egg, supplies more than 20 different functional benefits to food formulators. The extensive list includes:

- Adhesion
- Aeration
- Antimicrobial
- Browning/Color
- Clarification
- Coagulation/Thickening
- Coating/Gloss
- Humectancy/Insulation/Moisturizing
- Crystallization Control
- Edible Packaging Film
- Emulsification
- Flavor
- Fortification/Protein Enrichment
- Mouthfeel
- pH
- Richness
- Shelf Life Extension
- Structure
- Tenderization/Texture
- Whipping Ability

Replacing these multiple functions with a single ingredient is not a likely possibility on a large scale. REAL eggs are simple to order, store and use when processors follow good manufacturing practices.

Egg replacers are more complex because they can cause reformulation issues or machining and processing differences. In addition, replacements, depending on the source material, could lend an aftertaste to the finished food product, lengthen the ingredient statement and possibly add costs.

3 How do consumers view products containing REAL Eggs?

Answer: Consumers view products containing eggs positively because they are a familiar, easily understood and well-accepted ingredient. Eggs also fit in with the clean label philosophy.

A few standard rules apply to clean label perception, with market research showing, consumers prefer labels that are short. They also prefer ingredients similar to those they might find in their kitchens, with names that are easy to pronounce, don't sound like chemicals and don't start with the letter "x." Egg ingredients, available as dried, liquid or frozen, can generally be listed as "eggs" on the label. Most consumers, in fact 94 percent, have shell eggs in the refrigerator at home.

Due to the fact that egg ingredients can supply upwards of 20 different functional properties within formulation, eggs can help on the road to creating a clean label product. Reformulations and replacements can lengthen the label. Since eggs supply multiple functional properties, any replacement would more than likely require multiple added ingredients. While some claim the gold standard for a clean label includes five ingredients or less, this would become difficult or near impossible to achieve. And the longer the ingredient list, the more likely consumers are to encounter an ingredient they don't like for one reason or another.

4 How do REAL Eggs affect my label declaration?

Answer: REAL eggs provide great benefit to label declarations or product identity. The Code of Federal Regulations (CFR) contains some very specific guidelines that contain 300 identity standards for 20 different food categories. Certain ingredients are required while others are prohibited, in order to retain product identity and some of these identities require REAL eggs. Changing or adding ingredients can change the product identity, so more will change than just the label length; the product's very identity might be challenged.

In addition, a new group of consumers is emerging as a market force — the Millennials. Buying patterns are changing and while this demographic group craves flavor adventures, they also seek authenticity and transparency in labeling. Changing the label declaration or adding ingredients runs the risk of changing the consumer's perception of the food or beverage.

5 What costs might I incur if I stop using REAL Eggs?

Answer: There is no single, one-to-one substitution that can replace the multiple functional and synergistic properties supplied by egg ingredients. So even if the main egg substitute claims to cost less, more than likely you'll need additional ingredients. With each added ingredient, the expenses add up.

There are costs associated with new packaging and labeling changes. Transportation and shipping is a factor. Sourcing all of the substitute ingredients from one location may not always be possible.

Extra ingredients add to the number of SKUs stored in your warehouse. The list of costs can continue growing, depending on the number and type of extra, added ingredients.

6 How important are natural and consumer-recognizable ingredients on label declarations?

Answer: What is important to any company is what is important to the consumer. Research studies show consumers prefer the most simple, basic ingredients from a source considered natural. In addition, this same research identified that consumers prefer ingredients they can pronounce easily and those they are most likely to find in their own kitchen. The word "eggs" might not take up a lot of space on the label, but speaks volumes about quality and comfort to consumers.

7 Can REAL Eggs help my formulation as a high-quality protein source?

Answer: When looking for the perfect protein source, look no further than REAL eggs. Multiple research studies confirm egg protein has the highest biological value of any food, in terms of (or as a measure of) how well it supports a body's protein needs, especially when examined on a calorie per calorie basis compared to other proteins.

When protein is digested, the body breaks it into individual amino acids and among these are nine amino acids the body cannot provide on its own. A "complete" protein must contain all nine of these essential amino acids and eggs do. An individual can only obtain these nine essential amino acids by eating a food that contains them, such as an egg.

Sometimes the amounts of nutrients in the egg can vary, however, eggs are an excellent source of choline, selenium and riboflavin, and a good source of protein, phosphorus and vitamin D. In addition, eggs contain lesser amounts of, folate, vitamins B6, B12 and E, plus iron, phosphorus and zinc.

Proteins all behave in a different manner. A plant-based source might contain protein, however, the complement of additional nutrients would differ, functionality would differ and there might be undesirable flavor characteristics.

8 What kind of formulation research has been done utilizing REAL Eggs?

Answer: Scientists have been studying the egg almost as long as eggs have been a part of the food system. There are thousands of journal articles and reports on egg nutrition and functionality. This is in addition to practical hours logged year after year at bakeries and processing facilities that rely on eggs as a vital ingredient to help create successful food products. We've only begun to scratch the surface of all of the benefits eggs can provide.

Egg replacers, on the other hand, are relative newcomers in the food processing world, often listed by the manufacturers as emerging technologies. An emerging technology, or new ingredient, takes time to develop supporting research.

A single ingredient, like the egg, will produce more consistent research results. Since there is no single (one-to-one) replacement for eggs in formulation — a combination of different ingredients often are blended together to try to replicate egg functionality. This diverse body of ingredients means research results are difficult to standardize and results will vary from one application to another.

However, one study, presented at the Institute of Food Technologists' Annual Meeting & Expo in 2013, by Kansas State University researchers selected 14 different ingredients to test for improvements in taste, volume, color and moisture in a gluten-free bread formulation.

The researchers discovered that whole liquid eggs used in gluten-free sorghum bread at 25 percent on a flour basis exhibited the most favorable impact on the bread flavor, texture, volume and moisture level and the highest scores from a consumer panel. The lead researcher noted that the addition of eggs made the texture softer and helped maintain moisture and retard staling, which is important to maintaining shelf life. This study provides an excellent example of the results when comparing potential egg replacers with REAL egg ingredients.

9 Will REAL Eggs fit into my product's standard of identity?

Answer: Consumers expect their food to taste the same from one purchase — or one bite — to the next. Part of this is due to the fact the United States Code of Federal Regulations (CFR) lists standards of identity or defines various food products and lists specific ingredient requirements — specifics for the dos and don'ts. This helps standardize the U.S. food supply.

In total, the FDA details 300 identity standards in 20 categories of food, specifying minimum and maximum requirements and optional as well as prohibited ingredients for products from macaroni to frozen custard. If it doesn't meet federal standards, the product must be called by another name. REAL eggs help keep things simple, and in many cases, help maintain a standard of identity.

10 Are REAL Eggs a scalable component within formulations?

Answer: An R&D team might create amazing concepts in the lab, but the true test of any ingredient is its ability to perform consistently in a large-scale manufacturing environment.

REAL eggs have an impressive track record that spans decades, proving optimal performance under the rigors of modern processing conditions. Whether liquid, frozen or dried, egg ingredients are available in the quantities and forms manufacturers need for scaled-up operations. These egg ingredients coagulate, form foams, emulsify and contribute 20-plus functional properties essential to different applications.

11 How safe are REAL Eggs?

Answer: In a word, the safety record for further processed eggs is great. The Egg Products Inspection Act passed by Congress in 1970 requires all egg products distributed for consumption be pasteurized to destroy *Salmonella*. Further-processed and packaged egg products sold in the United States are pasteurized according to strict standards to ensure their safety. Although there have been rare instances of a product recall, there have been no recorded outbreaks of *salmonellosis* linked to pasteurized egg products since pasteurization was instituted for further processed egg products.

12 What is the GMO status of REAL Eggs?

Answer: Eggs in their natural state – in their shells – are not a genetically modified (GM), or bioengineered food. In fact, neither chickens nor eggs are genetically modified.

13 I want fewer ingredients on my label. How can REAL Eggs help?

Answer: REAL eggs supply multiple functional properties to formulators and taking advantage of these benefits can help create shorter labels. The industry as a whole continues to move towards cleaner, simpler, transparent label statements, which means real ingredients from natural sources are of great benefit. REAL eggs perform complex functional tasks within a wide range of processing parameters while remaining as simple as it gets when it comes to ingredient statements, commonly listed as “eggs” on the label.

Most egg replacers incorporate a blend of various ingredients and some can contain up to five or six in a single product. This type of blend can add length and complexity to an ingredient statement, rather than making it shorter and easier for the consumer to understand.

14 My company is very concerned about “sustainability.” How can REAL Eggs help us improve our track record?

Answer: The egg industry’s landmark 50-year study documents egg farmers’ progress to improve their environmental footprint and efforts toward greater sustainability. A few facts from the report:

- Egg farmers *increased* hen supply by just 18% to meet this increased demand while:
 - Releasing 71% *lower* greenhouse gas emissions
 - *Reducing* water usage by 32%
 - Improving hen feed to *reduce* the amount of corn and soybean crops required

Overall, REAL eggs could positively impact a sustainable track record. (More information on the study is available at [AEB.org/Sustainability](https://www.aeb.org/Sustainability))

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About The American Egg Board (AEB)

AEB connects America's egg farmers with those interested about
The incredible edible egg™. For more information, visit AEB.org/RealEggs.



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