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Processed Foods, Demystified: Scientific Insights to Put into Practice

THE SCIENCE AND PURPOSE BEHIND FOOD INGREDIENTS AND PROCESSING

By Dennis P. Cladis, PhD, and Mario G. Ferruzzi, PhD

What you need to know:

- **Food processing is foundational to food security and safety.** Defined broadly as any deliberate change in a food occurring between harvest and consumption, food processing has played a central role in food preservation for thousands of years to reduce waste, extend shelf life, preserve nutrition, and enable affordable, safe foods at scale – benefits often overlooked in public discourse.[4]
- **Ingredients and additives serve science-based functions.** From safety and stability to texture, flavor, and fortification, ingredients are selected and regulated to meet strict functional and safety standards, including FDA oversight and GRAS criteria.
- **Nutrition matters more than processing labels.** All processed foods, including those labeled ultra-processed, are formulated and regulated similarly; their health value should be assessed by nutrient content and dietary role, not degree of processing alone.

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It is impossible to miss the growing and intense discussions surrounding processed foods in scientific research, popular media, and the newly released 2025-2030 *Dietary Guidelines for Americans*.[1] Headlines often highlight health concerns linked to ultra-processed foods and food additives, raising questions about how everyday foods are made and delivered, their health effects, and their future role in American diets. This has led to an all-time low in U.S. consumers' confidence in the safety of the U.S. food supply.[2] Americans are looking for more transparency from both food companies and the government, with ~40% of consumers saying they would have higher confidence in the U.S. food supply if they better understood how companies and the government work to ensure that foods and food products are safe for consumption.[2]

While some evidence suggests that processed foods may impact health in different ways than "whole" foods, public discussion often oversimplifies and discounts the role food processing plays in providing a safe, affordable, and nutritious food supply. This situation highlights the need for a deeper understanding of how and why food is produced commercially, including formulation with regulated food ingredients/additives, processing and packaging, and a better understanding of how government regulations serve to protect consumers in this space.

To help provide transparency for health professionals, their patients, and scientists new to the area of food, this article explores the role of food ingredients and additives, as well as their synergy with food processing techniques to create foods that are safe, affordable, palatable, and nutritious. This illustrates how modern food systems continue to focus on balancing quality, safety, affordability, and accessibility for the population.

Why Do We Process Food?

All food is inherently perishable because it comes from living systems that deteriorate immediately after harvest. In 2021, post-harvest losses totaled over 13% of global food production, with almost 19% at retail and in the home.[3] These losses hit developing nations hardest, limiting the availability of safe and nutritious food. One possible solution is to grow more food, but we are quickly running out of the resources (like farmland and water) needed to feed 8.2 billion people. To minimize food waste and maximize the availability and affordability of perishable food globally, we need effective post-harvest management, which includes food processing, that can preserve the food we already grow and raise.

Food processing, in the broadest sense, can be defined as "any deliberate change in a food occurring between the point of origin and availability for consumption."[4] Food processing can increase shelf life, inactivate spoilage and pathogenic microorganisms, add convenience, and preserve the sensory and nutritional qualities of food.[4] Processing is not a modern invention. It has played a central role in food preservation for thousands of years, using techniques like salting or smoking meat, fermenting vegetables and milk, and separating milk to produce cheese. These traditional techniques extend shelf life and are still used in home food preparation today, as heat from your oven or stove is used to cook food and spices in your pantry are added to enhance the taste and aroma of finished food.[4]

Why Do We Process Foods on a Commercial Scale?

Commercially, these same food processing techniques are applied on a much larger scale, one that is designed for high efficiency and broad distribution. Commercial food processing is supported by equipment designed to convert agricultural products, such as grains, meats, vegetables, fruits, and milk, into ingredients and/or processed food products. This approach helps manage the high amounts of seasonally produced food by making products that are affordable, safe, and nutritious available for a longer period of time.

Commercial food processing, like home cooking, uses ingredients chosen for specific sensory, nutritional, and functional qualities. Common examples include flour, sugar (sucrose), salt (sodium chloride), and vinegar (acetic acid). It also incorporates functional additives such as antioxidants (e.g., BHT, ascorbic acid), hydrocolloids and thickeners (e.g., corn starch, xanthan gum, guar gum), emulsifiers (e.g., lecithin), and preservatives (e.g., benzoic and propionic acids) to enhance the shelf life of products which must last longer than home-cooked products due to the need to distribute and minimize losses.

"Processing" can be broken down into unit operations that include simpler steps (e.g., washing, peeling, mixing, heating, cooling) or more complicated operations (e.g., filtering, fermenting, pressurizing, freeze drying).[4] For example, canned peas may seem as easy as adding peas to a can and heating them, but in fact is a process that typically involves 10+ unit operations: receiving, shelling, sorting (color and size), blanching, filling, formulating (salt addition), heat sterilizing, labeling, secondary packaging (boxing), and palatizing (bulk packaging) all prior to shipping to local grocery stores.

So, the term "processed food" refers to all food products created by combining food ingredients or additives (i.e., food formulation) with one or more processing steps (i.e., unit operations).[4] Processed foods, and those who produce them, strive to meet consumer expectations for flavor, texture, shelf life, nutritional and health benefits, price, and convenience. By leveraging modern food manufacturing and distribution systems, commercial food processing provides national scalability of safe and affordable foods while also increasing the availability and security of food.

What Are Food Ingredients and Additives and What is Their Role in a Safe and Stable Food Supply?

Ingredient selection and formulation by product developers is similar to home recipe development, but with an additional need to meet strict safety and stability standards while delivering a high-quality product that meets consumer expectations. Each ingredient selected for a formula plays one or more roles in food, influencing how it behaves during processing, storage, and even during consumption and digestion. Ingredients also help meet consumer expectations for taste, aroma, and mouthfeel. In processed foods, the selection of ingredients, including food additives, is guided by the chemistry and physics of the food. Thinking back to canned peas, salt is added not only for taste but to improve texture of the peas as they undergo thermal treatment.

The primary goal of ingredient selection and formulation is to create a finished product that is not only fundamentally safe but also has desirable sensory properties. Ingredients can modify food structure/texture (e.g., viscosity, gelation), water activity (aw – the availability of water in food for biological and chemical use), and acidity (pH), all of which modify flavor, texture, shelf stability, and safety by controlling microbial growth and enzymatic and chemical reactions in foods. To highlight the factors critical to spoilage of foods by microorganisms, enzymes, and other biochemical processes, the acronym FATTOM (Food, Acid, Time, Temperature, Oxygen, Moisture) is often used.[5]

Many ingredients used in processed foods are classified as food additives, which are defined by the FDA as:

"any substance the intended use of which results ... in its becoming a component or otherwise affecting the characteristic of any food ... All food additives are subject to premarket review and approval by FDA unless the substance is considered generally recognized as safe (GRAS) or sanctioned prior to 1958 or otherwise excluded from the definition of food additives."[6]

GRAS ingredients are considered safe by qualified experts under their intended conditions of use. The main difference between GRAS ingredients and broader food additives is the type of information that supports the GRAS determination. For GRAS ingredients, the supporting information must be publicly available and generally accepted by the scientific community.[6] More information on the GRAS process is available from FDA for those interested.[7]

Ingredients and additives can be broadly classified according to their chemical properties and/or function, as shown in the table below (adapted from Igoe (2011)[8] and FDA[6, 9]):

Ingredient/Additive	Definition & Function	Examples
Acidulants	Organic and mineral acids that modify the pH of the finished product	Citric and phosphoric acids
Preservatives	Antioxidants, chelating agents (to bind reactive metals), and organic acids that inhibit microbial growth	Sodium benzoate, sorbic acid, calcium propionate
Sweeteners	Caloric (sugars) and non-caloric (natural and artificial) sweetening agents	Sucrose, aspartame, stevia
Texturants	Thickening and gelling agents	Starches and gums
Emulsifiers	Substance that enables mixing of two immiscible phases	Lecithin, mono- and di-glycerides
Macronutrients	Starch or protein ingredients and fats/oils added to products	Protein powder, omega-3 fatty acids
Fortificants	Vitamins and minerals added to a food product	Iodine in table salt, folic acid (vitamin B9) in flour
Colorants	Dye or pigment that adds color to food products	FD&C Blue No. 1, titanium dioxide, beet root extract
Flavors	Substances that supplement, enhance, or modify the original taste or aroma of a food	MSG, natural and artificial flavors

The FDA maintains a list of over 3,000 ingredients that are added to food in the U.S. Detailed information on the nature and function of specific ingredients is available from the FDA[10] or from other references such as the Dictionary of Food Ingredients.[8]

Examples of Industrial Food Processing Methods

Many industrial food processing methods do have parallels to in-home cooking (e.g., thermal treatment, acidification, fermentation), while others are really only used industrially (e.g., extrusion and high-pressure processing). While it is impossible to capture the full range of physical processing methods used industrially, a classification of major industrial processing methods is shown below (adapted from Fellows (2017)[11]):

Processing Method	Definition/Purpose	Examples
Ambient temperature processing	Room temperature preparation of foods for consumption or further processing.	Washing, trimming, milling, separation, mixing, forming
Thermal processing	Using heat to process foods; time, temperature, and intensity vary by product needs. This is the most common method for home and industrial food processing.	• Blanching: frozen spinach • Pasteurization: milk, fruit juices • Sterilization: canned vegetables, soups, meats • Smoking: meat • Baking/Frying: bread, fried foods
Heat removal	Refrigeration and freezing; commonly used for long-term storage.	• Refrigeration: milk, yogurt • Freezing: frozen meals, Frozen vegetables
Water removal	Reduce water content and activity to control spoilage and pathogenic microbes.	• Salt curing: meats, fish, cheese • Sun/oven hot air drying: raisins, vegetables, herbs • Spray drying: coffee, tea, milk, infant formula • Freeze drying: fruits, vegetables, vegetable powders, coffee • Freeze concentration: coffee
Acidification & fermentation	Use of microbial fermentation or direct formulation with acid ingredients to reduce pH and control microbial and spoilage microorganisms.	• Acidification: pickles, salsa, hot sauce • Fermentation: yogurt, sauerkraut, sourdough
Non-thermal processing	Room temperature methods that replace thermal processing while maintaining fresh attributes including nutrients.	• Ultraviolet light pasteurization: fruit juice • High-pressure processing: avocado and salsa
Extrusion	Continuous processing method that forces mixed ingredients through a shaped die and uses heat, sheer mixing, and pressure to generate novel products.	Breakfast cereals, pastas, snack foods

Depending on ingredient functionality and the desired characteristics of the final food product, these methods can be used in combination to make both simple and complex products. For example, to make a simple, extruded oat breakfast cereal, multiple processing unit operations may be applied. First, raw oats are received, cleaned, and ground into whole grain flour that is mixed with sweeteners, salt, and fortificants (i.e., vitamins and minerals). Water is added and the blend introduced into an extruder, where it is exposed to high sheer mixing, pressure, and heat that continuously cooks the cereal as it moves through the extruder before exiting through a die that promotes puffing (expansion) of the product. This process results in a puffed cereal which can be further coated with additives, including flavor or coloring agents, before being packaged.

How Are Processed Foods Regulated?

To protect consumers, all foods and food products are regulated by agencies at the federal, state, and local levels. These regulations apply to processed foods and the ingredients used to make them, with the goal of protecting consumers from adulteration and false labeling, preventing foodborne illnesses, and ensuring consumers are not exposed to unsafe levels of food ingredients or additives.

The FDA has created standards of identity (SOIs) for over 250 foods to prevent food fraud. SOIs are detailed descriptions that define what a food must contain, what ingredients are optional, the amount or proportion of each ingredient, and the production methods used.[12] These regulations protect consumers and food processors by defining foods and their components.

Food processing and manufacturing facilities must also comply with laws designed to prevent foodborne illnesses and maintain high quality food products for consumers. These laws include Current Good Manufacturing Practices (CGMP), Hazard Analysis Critical Control Point (HACCP), and the Food Safety Modernization Act (FSMA). These laws are complementary and work together to ensure the safety of foods produced in processing facilities. CGMPs regulate the design and construction of food processing facilities, employee hygiene, and the sanitary use and maintenance of food processing equipment.[13] HACCP is a systematic protocol to monitor biological, chemical, and physical hazards associated with foods, from raw materials to finished product.[14] FSMA focuses on preventing contamination rather than responding to outbreaks and provides the FDA with more authority to regulate food safety at all points in the supply chain and initiate recalls.[15] Combined, these regulations guide companies in safely producing food on a large scale.

A Comment on Ultra-Processed Foods (UPFs)

There are many headlines and debates regarding ultra-processed foods (UPFs), also referred to as "highly processed foods" in the 2025-2030 *Dietary Guidelines for Americans*. Like all processed foods, UPFs are composed of ingredients that are processed in a specific way to make a food product that meets consumer expectations and is safe to consume. UPFs are formulated and regulated in the same manner as all other processed foods; the apparent difference between "processed foods" and "UPFs" appears to be the degree of formulation and (to a lesser extent) processing applied to the product. As with all processed foods, UPFs provide consumers with desirable products, including new product forms, that have extended shelf lives and are generally more affordable.

The oat-based breakfast cereal described above exemplifies the importance of evaluating foods based on nutrient, fiber, and bioactive content; not the degree to which they have been processed. Even within the same processing category, foods can differ greatly in nutritional value. For example, a vitamin- and mineral-fortified protein shake and a typical pastry may be classified similarly, yet they offer very different nutritional contributions. When health concerns are linked to diets high in UPFs, it is often because these diets tend to be low in overall nutritional quality — not because processing itself determines health outcomes.

Summary

Food processing and the use of safe, regulated ingredients and additives are essential for delivering a safe, nutritious, and affordable food supply. While headlines often oversimplify and malign food processing, it plays a critical role in reducing food waste, extending shelf life, preserving nutrition, and ensuring food safety, all while meeting consumer expectations for taste, texture, and convenience. Ingredients and additives are selected for functional purposes, and modern food systems integrate these ingredients to make safe food products that fulfill consumer expectations. Food processing remains a cornerstone of global food systems and security, enabling access to safe, high-quality, and affordable foods to meet the needs of a growing population.

ABOUT THE AUTHORS:

Dennis Cladis, PhD, works as an assistant professor of Phytochemistry and Functional Foods in the Department of Food Science & Technology at Virginia Tech. His research focuses on phytochemical bioavailability and metabolism across the food to table to health spectrum to better understand how the phytochemical content of foods can be maintained through processing to benefit human health.

Mario G. Ferruzzi, PhD, serves as the dean of the College of Agriculture and Life Sciences at Virginia Tech. His research explores the impact of processing and formulation on the bioavailability and metabolism of bioactive compounds including polyphenols, carotenoids, and micronutrients. He focuses on translating food chemistry and nutrition science into strategies that improve diet quality and public health.

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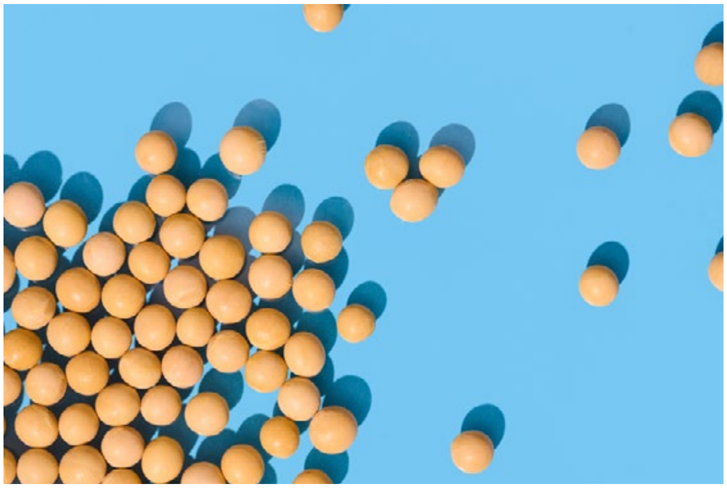

UNDERSTANDING SOY'S IMPACT ON THE GLOBAL FOOD SUPPLY

By Mark Messina, PhD, MS

What you need to know:

- **Soybeans are a cornerstone of the global food system.** Their high yields, unique macronutrient profile, and versatility support widespread use. While most soy is used for animal feed,5 soy protein and soybean oil also enter the human food supply in numerous forms.
- **Soybean oil and other soy-derived components play important nutritional and functional roles in the food supply.** Soybean oil contributes essential fatty acids and cholesterol-lowering polyunsaturated fats[9] (recognized by an FDA qualified health claim),[11] while other soy components include bioactives such as lecithin – a major dietary source of choline – and phytosterols with demonstrated lipid-lowering effects.
- **Soy protein ingredients provide high-quality, complete protein and essential food functionality.**[23,24] They support muscle health, improve nutrient density, and enhance texture and stability in both animal-based and plant-based foods, with evidence supporting their efficacy across diverse dietary applications.

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When a typical consumer thinks about the role of soybeans in the food supply, foods like tofu and soy burgers may come to mind. While traditional soy foods such as tofu, and more modern options such as soy burgers, are important components of many diets worldwide, they represent only a small fraction of soybeans' overall contribution to the U.S. and global food supply.

The significant role of soybeans can be attributed to their sheer volume of production, versatility, and unique macronutrient composition. Relative to other legumes, a soybean is much higher in fat — most beans are <5% fat on a caloric basis whereas soybeans derive >40% of their calories from this macronutrient — and are higher in protein — most beans are about 25% protein, whereas soybeans are about 35% protein (some varieties are even higher) on a caloric basis.[2] Higher oil and protein content make the soybean especially well positioned for meeting the world's protein and energy needs.[2]

Based on a percentage of total production, the leading soybean producing countries are Brazil (40%), the U.S. (28%), Argentina (12%), and China (5%).[3] Approximately 400 million metric tons of soybeans are produced annually, which is equivalent to 882 billion pounds or about 106 pounds per person — enough to meet the annual caloric needs of everyone in the world for about one-third of the year — assuming a daily energy requirement of 2,000 kcal and ~2,000 kcal per pound of raw soybeans.[3] However, most of the world's soybeans are consumed by livestock, not humans. According to the American Soybean Association, 90% of U.S. soybeans produced are used as a protein source for animal feed.[5]

After harvesting, estimates are that more than half of all U.S. soybeans are crushed so the oil can be separated from the meal (protein);[6] 97% of the separated U.S. soybean meal goes to feed livestock and poultry.[5] The protein used for human consumption and the oil extracted from the bean enter the food supply in myriad ways. Until just two decades ago, nearly all of the soybean oil produced was consumed by humans, but increasingly, the oil is also being used for biofuels, another way in which soybeans contribute to society.[7]

In addition to being consumed directly, soybean oil also serves as a source of several common ingredients and bioactives.

Soybean Oil

Soybean oil and palm oil are the two leading edible oils consumed worldwide[8] whereas soybean oil, by far, is the leading edible oil in the U.S., accounting for over 40% of total consumption.[9] In 2011, based on economic food disappearance data, Blasbalg et al.10 estimated that soybean oil accounted for over 7% of U.S. caloric intake and for more than 40% of the intake of both essential fatty acids, the omega-6 polyunsaturated fatty acid linoleic acid and the omega-3 polyunsaturated fatty acid alpha-linolenic acid. The high polyunsaturated fat content of soybean oil accounts for its ability to lower blood cholesterol levels when replacing dietary saturated fat, an attribute that was formally recognized by the U.S. Food and Drug Administration (FDA) in 2017 in the form of a qualified health claim for reducing risk of heart disease. The claim states: "Supportive but inconclusive scientific evidence suggests that eating about 1½ tablespoons (19.5 grams) of soybean oil daily may reduce the risk of coronary heart disease."[11]

Despite being so ubiquitous in the U.S. food supply, many consumers may not appreciate its importance and widespread use or even recognize they are consuming it because soybean oil is typically marketed as "vegetable oil". This point is illustrated by a recently conducted survey of U.S. consumers which revealed that vegetable oil is much more highly rated than soybean oil.[12] Soybean oil may suffer reputationally because it is often found in relatively highly processed foods, often of low nutrient quality.[13] However, it is important not to attribute the health effects of these foods to the presence of soybean oil. Regardless of the type of fat contained in these products, many of them are high in calories and sodium, low in fiber and/or protein, and hyperpalatable.

Lecithin

Crude soybean lecithin is obtained as a by-product of soybean oil processing. Soybean lecithin typically contains 18% phosphatidylcholine, 14% phosphatidylethanolamine, 9% phosphatidylinositol, 5% phosphatidic acid, 2% minor phospholipids, 11% glycolipids, 5% complex sugars, and 37% neutral oil.[14] Phospholipids, which are found in all plant and animal cell membranes arranged as lipid bilayers, usually have two hydrophobic fatty acyl chains and a polar hydrophilic head group. For this reason, lecithin is classified as an amphiphilic compound — a molecule with both water-loving (hydrophilic) and fat/oil-loving (hydrophobic) parts. Consequently, lecithin is widely used by the food industry as an emulsifier to stabilize foods (think of mayonnaise) by bringing water and oil together. The percent distributions of lecithin products among the various sectors are margarine, 25-30%; baking chocolate and ice cream, 25-30%; technical products, 10-20%; cosmetics, 3-5%; and pharmaceuticals, 3%.[14]

From a health perspective, much of the lecithin-related research involves cardiovascular disease, in large part, because of its potential to lower LDL-cholesterol and raise HDL-cholesterol; the latter because of its effect on lecithin cholesterol acyltransferase and the role of this enzyme in reverse cholesterol transport.[15] However, because of its widespread use and the dominant phospholipid being phosphatidylcholine, lecithin is also an important source of the essential nutrient choline. Consequently, lecithin may favorably affect cognitive performance. To this point, an analysis of the UK Biobank found that moderate choline intake was associated with a reduced risk of dementia, Alzheimer's disease (AD), and mild cognitive impairment (MCI).[16] Among the 125,594 participants (55.8% female) with a mean age of 56.1 y (range: 40-70 years) at baseline and a median follow-up of 11.8 y, 1,103 cases of dementia (including 385 AD and 87 cases of MCI) were recorded. The protective associations of choline against dementia and AD gradually dissipated with higher intakes although the hazards ratios were still below 1.0, whereas for MCI, risk was reduced by about half when comparing fourth and first intake quartiles.

Phytosterols

Phytosterols are phytosteroids, similar to cholesterol, that serve as structural components of biological membranes of plants. They encompass both plant sterols and stanols. More than 200 plant sterols and related compounds have been identified.[17] Recognition of the hypocholesterolemic effect led to the marketing of foods such as phytosterol-fortified margarines.[18] More than 20 years ago, it was shown that in male college students, consuming phytosterol-supplemented ground beef lowered plasma total cholesterol and LDL-cholesterol concentrations from baseline by 9.3% and 14.6%, respectively.[19] No significant changes were found in the control group.

A recently published meta-analysis of randomized controlled trials found that phytosterols reduce levels of total cholesterol, LDL-cholesterol, triglycerides, C-reaction protein (a marker of inflammation), and systolic and diastolic blood pressure.[20] However, the authors acknowledged that more research is needed before reaching definitive conclusions. There is also interest in the role of beta-sitosterol, the primary soybean phytosterol,[21] in reducing risk of prostate cancer and as a treatment for enlarged prostate.[22] In the U.S. alone, in 2020, consumers spent $24,827,065 on supplements containing beta-sitosterol.[22]

Soy Protein and Soy Protein Ingredients

Soy protein is well recognized as a high-quality protein as determined by both the protein digestibility corrected amino acid score[23] and the digestible indispensable amino acid score,[24] but the form or matrix in which that protein is provided influences the quality of the protein. Quality is affected because the matrix influences digestibility – one of the two factors determining score – and processing can cause subtle changes in amino acid profile – the other factor determining score.[25] Components such as fiber, which can be removed during processing, can inhibit protein digestion.[26] In addition, processing may more effectively inactivate compounds such as protease inhibitors, which can potentially inhibit protein digestion.[27]

There are limited data on the protein quality of the protein provided by whole soybeans[28] and traditional soy foods such as tofu and soymilk,[29] and modern soy foods such as soy burgers.[30] In contrast, there is a wealth of information about the quality of soy protein when delivered in the form of concentrated sources of soy protein or soy protein ingredients, [2,31] the main ones being soy protein isolate, soy protein concentrate, and soy flour. These products are ≥90%, 65–90%, and 50–65% protein, respectively.

Soy protein ingredients are widely used by the food industry to boost the protein content of commonly consumed products and when added to foods in smaller amounts for their functional properties, solubility, water absorption, viscosity, emulsification, texture, and antioxidation.[32] According to Mintel, estimates from a few years ago were that 40% of all meat and seafood products contain soy ingredients.[33]

Soy protein isolate is available as a supplement like proteins such as whey, casein, and pea protein. Although whey protein receives most attention as a protein source for building muscle and increasing strength in response to resistance exercise, soy protein isolate is equally efficacious. Soy protein isolate has a neutral flavor and is found in a variety of beverages, nutritional bars, snacks, and cereals.

Soy protein isolate is often a component of soy-based meat alternatives, although that role also falls to soy protein concentrate. Soy protein concentrate is used extensively to provide meat-like texture and as a water or fat-binding ingredient in processed meat and plant-based meat alternatives. In some low-income countries, soy flour has been used quite effectively in combination with foods such as cassava to make porridge that is both acceptable in taste and texture and richer in high-quality protein.31 Adding 15% soy flour to gluten-free bread improves bread quality, sensory characteristics, and nutritional properties of bread.[34]

Soy flour can be further processed through extrusion to textured vegetable protein (TVP). TVP is used extensively as a meat substitute or in combination with meat in home recipes and food manufacturing. Incorporation of 10-40% TVP into beef patties was seen by researchers as a promising strategy for improving orosensory properties and even nutritional attributes.[35]

ABOUT THE AUTHOR:

Mark Messina, PhD, MS, is chairperson of the Soy Connection editorial board and director of nutrition science and research for Soy Nutrition Institute (SNI) Global. He is also the co-owner of Nutrition Matters, Inc., a nutrition consulting company, and is an adjunct professor at Loma Linda University. His research focuses on the health effects of soy foods and soybean components.

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FOOD RATING APPS: HELPFUL SHORTCUT OR OVERSIMPLIFIED SCORECARD?

By Kacie Barnes, MCN, RDN

What you need to know:

- **Food rating apps use streamlined scoring systems designed for quick guidance.** In the Yuka app, composite scores integrate nutrient metrics alongside food additive and organic criteria, which can be helpful for awareness but may not fully reflect real-world risk or overall nutrition quality on their own. Other examples of popular food rating apps include Open Food Facts, Fooducate, and diet-tracking tools like MyFitnessPal or Cronometer.
- **Food rating apps can boost interest in nutrition, but their simplified "good/bad" scores don't always capture the full picture.** Important factors like portion size, overall dietary patterns, and individual needs may be missed, and some users may develop unnecessary concern or moral judgments about certain foods, particularly those that are processed or contain additives.
- **Clinicians can leverage food rating apps as supportive learning tools.** Health professionals are well positioned to help clients and patients interpret scores, emphasize key nutrients and dietary patterns, clarify risk versus hazard, and guide them toward more personalized, non-moralizing digital resources.

Read more...

Walk down almost any grocery aisle today and you'll see shoppers scanning barcodes with their phones. A brightly colored score pops up, quickly categorizing foods as "good", "bad", or somewhere in between.

For many, food rating apps have become a go-to shortcut to healthier eating. They don't have to fumble through label reading to guess if a product is healthy — there's an app for that.

Among these tools, the Yuka app has gained significant traction, particularly among those seeking to avoid ultra-processed foods and food additives. While the appeal is understandable, these apps raise important questions for health professionals: How are foods being evaluated? What scientific assumptions are built into these scores? And how might these tools influence dietary behaviors and perceptions of various foods?[1]

How Food Rating Apps Work: Yuka as a Case Study

Food rating apps typically scan a product's barcode and assign a numerical score and/or color-coded rating intended to summarize its "healthfulness". Yuka's scoring system is based on three components: overall nutritional quality (60%), the presence of food additives (30%), and whether the product is organic (10%).[2]

The nutritional quality component is derived from the Nutri-Score system, which weighs nutrients including calories, saturated fat, sugar, sodium, fiber, protein, and fruit and vegetable content. Nutri-Score was developed by French public health researchers and adopted by the French government in 2017 as a voluntary front-of-pack labeling system. It was intended to aid consumers in quickly assessing nutritional content of a product, and to encourage food manufacturers to improve the nutrition of their products.[3]

However, Yuka layers their own additional criteria onto this foundation. Food additives are penalized based on hazard classifications rather than exposure-based risk assessments. That means they evaluate based on the question, "Could this substance ever be harmful, in any amount?" instead of, "Is this harmful at the amount we actually consume?"[4] And if a product is organic, it contributes positively to the score, regardless of nutrient composition.

Why These Apps Resonate with Consumers

From a behavioral standpoint, food rating apps tap into several powerful motivators. They reduce decision fatigue, provide instant feedback, and align with growing public skepticism toward processed foods. Many users say that scanning products encourages them to consider ingredient lists and nutrition labels more closely — often for the first time.[5]

From a public health lens, this increased engagement with food labels and formulation is not inherently negative. Awareness is often a necessary first step toward behavior change. But awareness alone does not equal understanding.

Where Food Rating Apps Oversimplify Healthy Eating

The most significant limitation of food rating apps lies in how they collapse complex nutritional and formulation realities into binary judgments. A single score cannot account for portion size, dietary context, frequency of consumption, or individual health needs. Foods are evaluated in isolation, divorced from the dietary patterns in which they are actually consumed.

Food additive scoring presents another challenge. Many additives penalized by apps like Yuka serve important functions like improving shelf stability, food safety, texture, and nutrient delivery.[4] Hazard-based classifications, when removed from regulatory context and real-world exposure levels, can unintentionally frame all additives as inherently harmful rather than functionally neutral or beneficial.[6-8] In the Yuka app, any food without additives includes the claim, "no hazardous substances," making it seem like any food with additives is hazardous/dangerous.

This approach and accompanying strong negative language around all additives can amplify fear around foods that are widely consumed and considered safe, particularly for children.

Similarly, the "good" versus "bad" language embedded in many scoring systems risks reinforcing moralized views of food. For some individuals, especially those prone to rigidity or anxiety around eating, these tools amplify fear rather than foster informed choice.

Using Food Rating Apps as Educational Tools, Not Verdicts

Despite their limitations, food rating apps are unlikely to disappear — and outright dismissal can alienate clients who feel empowered by these tools. Instead, health professionals can play a critical role in reframing how these apps are used.

Practical guidance includes:

- Encouraging patients/clients to view scores as conversation starters, not final judgments.
- Redirecting focus toward key nutrients of concern (fiber, added sugars, sodium, saturated fat) rather than composite scores.
- Explaining the functional role of additives and the difference between hazard and risk.
- Reinforcing that nutrition quality is determined by patterns over time, not individual foods in isolation.
- Guiding patients/clients with food allergies or sensitivities to use apps as a tool for identifying certain ingredients they need to avoid.

Dietitian-Recommended Digital Alternatives

Apps that support nutrient tracking, meal planning, or food journaling can complement clinical counseling by increasing awareness without moralizing food choices or creating unnecessary fear.

One app called Open Food Facts allows users to filter and highlight nutrition information based on individual priorities, like avoiding allergens, or limiting sodium or saturated fat. It also uses the Nutri-Score nutrition rating system, but it is more personalized and guides users toward products that fit their individual needs. For example, a user can search for granola that is dairy free and low in saturated fat, and it will provide "best fit" options based on those specific parameters.

Conclusion: The Role of Health Professionals in a Scored Food World

Food rating apps reflect a real consumer desire for clarity, transparency, and control in an increasingly complex food environment. While they can promote engagement and awareness, they also risk oversimplifying nutrition and reinforcing misconceptions about processed foods.

For health professionals, the opportunity lies not in endorsing or rejecting these tools outright, but in helping patients interpret them and use them appropriately. In a world where algorithms increasingly shape food choices, professional insight remains essential in guiding people toward healthy eating patterns, not just to the products that receive an "A" grade.

ABOUT THE AUTHOR:

Kacie Barnes, MCN, RDN, is a registered dietitian and founder of Mama Knows Nutrition. She specializes in pediatric nutrition, helping families build healthy, low-stress relationships with food through evidence-based, practical guidance. Follow her at @mamaknowsnutrition. Learn more on Instagram at @MamaKnowsNutrition or www.mamaknowsnutrition.com.

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