

# Top 10 Most Common Ingredients in Fast Food

by William Harris / How Stuff Works / A Discovery Company

On newer fast-food menus you may be able to find the caloric information, but do you know what that food's made of?

Order a meal in any fast-food restaurant, and you'll likely walk away with a sandwich, fries and a drink. If you had to identify the ingredients of this meal, you might list beef (or chicken), lettuce, tomato, cheese, ketchup, bread, potatoes and soda. Not complicated, right? Wrong.

Burger and chicken joints don't think of the building blocks of a menu item as ingredients. They think of them as components, which, are made of ingredients. For example, McDonald's famous Big Mac jingle -- "two all beef patties, special sauce, lettuce, cheese, pickles, onions on a sesame seed bun" -- suggests the sandwich has seven components. Would you believe it has 67 ingredients?

Clearly, fast food is more complicated than it looks. Many menu items contain processed foods, which have been modified from their natural state for safety or convenience. Processed foods tend to have multiple additives to keep them fresher longer. Across an entire fast-food menu, there are thousands of ingredients, ranging from the commonplace (water) to the exotic (xanthan gum).

Considering that some of these ingredients have been implicated in serious health issues, it would be good to know which are the most common. We've set out to answer that very question. We started with menus from five popular fast-food chains -- McDonald's, Burger King, Taco Bell, KFC and Arby's -- did some tallying, then cross-matched our findings with the U.S. Food and Drug Administration's list of common food ingredients and colors. The result is the top 10 most common ingredients in fast food, organized by the type of ingredient and what it does.

## 10. Citric Acid: The Most Common Preservative

Salt has been used for centuries to preserve meats and fish. It works to inhibit the growth of bacteria cells, which lose water and become dehydrated in salty environments. Over the years, food scientists and manufacturers have discovered that other chemicals also can serve as preservatives.

**Citric acid**, an organic acid found in many fruits, especially limes, lemons and grapefruits, is one of those chemicals. It increases the acidity of a microbe's environment, making it harder for bacteria and mold to survive and reproduce. It can also be used to bind to and neutralize fat-degrading metal ions that get into food via processing machinery.

What's great about citric acid is that it does all of this without harming the organisms that ingest it. It occurs naturally in all living things and is an important intermediate chemical in a metabolic pathway known as the citric acid cycle, or **Krebs cycle**. As a result, citric acid doesn't cause side effects in 99.9 percent of

the population and is approved by the U.S. Food and Drug Administration for use in foods and beverages [source: Driver]. Maybe that's why the chemical appeared 288 times on the fast-food menus we surveyed.

The next item on our list -- high-fructose corn syrup -- doesn't fare as well in the court of public opinion.

## To Preserve and Protect

Citric acid has lots of company. The following preservatives also appeared frequently on the menus we analyzed: sodium benzoate (122 times), calcium propionate (64 times) and ascorbic acid (52 times).

### 9. High-fructose Corn Syrup: The Most Common Sweetener



High-fructose corn syrup is easily more popular than sucrose on fast-food menus. Why? Price and preservation.

Fast-food restaurants have many different ways to sweeten beverages, baked goods and condiments. Sucrose, or sugar, reigned as the traditional sweetener for years until food scientists began to synthesize sugar substitutes. Saccharin arrived first, followed by aspartame and sucralose.

A more significant revolution came in 1957 when two scientists worked out a process to manufacture **high-fructose corn syrup (HFCS)**. Since then, HFCS has evolved into the sweetener of choice, finding its way into a myriad of foods and beverages. In our survey of fast-food menus, the chemical appeared as the first ingredient almost twice as much as sugar.

So what is it and why is it controversial? The process to make HFCS involves changing one simple sugar -- glucose -- in cornstarch to another simple sugar known as fructose. The product, a combination of the two simple sugars, is just as sweet as sucrose, but much cheaper to process. It also acts as a preservative, extending the shelf life of foods. No wonder it's one of the most ubiquitous ingredients in fast food.

Unfortunately, some research has shown a link between HFCS and obesity. At the very least, many beverages and processed foods made with this corn-derived sweetener are high in calories and low in nutritional value.

## 8. Caramel Color: The Most Common Color Additive

When it comes to the psychology of eating, food has to look good if it's going to taste good. That's why fast foods contain color additives -- to prevent the loss of a food's inherent color, to enhance color or to add color when it doesn't exist naturally. Hardly a single fast-food menu item doesn't have at least one artificial color buried somewhere in its ingredient list.

Common additives include Yellow No. 5, Yellow No. 6 and Red No. 40. According to one source, Red No. 40, which finds its way into jellies, pastries and those neon-red maraschino cherries perched atop your Chick-fil-A shake, is the most widely used food dye in America. This same source says Yellow Nos. 5 and 6, which provide the golden glow to cheeses, pudding and pie fillings, and soft drinks, are the second and third most common food colorings, respectively [source: Women's Health]. But when we analyzed the ingredients of five popular fast-food menus, we found caramel color to be even more common.

Caramel color is the dark brown material that results from carefully heating food-grade carbohydrates. Just think of the color of sautéed onions (a process known as caramelizing, by the way), and you'll get a good idea of this particular hue, although it can range from reddish-brown to light yellow. Contrary to what you might think, caramel color has no significant effect on the flavor profile of the finished product.

### Natural Redhead

Red No. 40 even sounds like it might be bad for you, which is why fast-food chains and food processors are always looking for other, more natural additives, like annatto. The additive comes from the Central and South American plant *Bixa orellana* and can look yellow if it has more of a carotenoid pigment known as **norbixin**. If it has more **bixin**, another closely related pigment, it can look reddish-orange. Annatto appeared 59 times across the five menus we surveyed.

## 7. Salt: The Most Common Flavor or Spice

In terms of frequency, salt -- or sodium chloride -- appeared more times on the fast-food menus we surveyed than any other ingredient. It's not always first, but it's always there, even in sweet foods (shakes and sundaes, for example) that don't seem salty at all. Fast-food chains use salt primarily to make their meals more palatable. It's paired with pepper to season hamburgers, and it's a major ingredient in bread, ham, bacon, sausages and cheese. A single slice of American cheese, in fact, contains 250 milligrams of sodium. That makes a double cheeseburger, a popular fast-food item, especially salty. The McDonald's version of this favorite contains 1,150 milligrams (1.15 grams) of sodium [source: McDonald's USA Nutrition Facts].

Most health experts warn against eating too much salt, pointing to studies that show a link between sodium and high blood pressure. The government

recommends a maximum of 6 grams of salt per day for adults, 5 grams a day for children between ages 7 and 10, and 3 grams for children between 4 and 6. Compare that recommendation to a typical family meal from KFC, which delivers a whopping 5.2 grams of salt per person [source: BBC News]!

The New York City health department banned trans fats and started requiring restaurants to include calories on menus. It's setting its sights on salt limits next, according to AP.

## **6. Monosodium Glutamate: The Most Common Flavor Enhancer**

Monosodium glutamate, or MSG, earned its reputation in Asian takeout kitchens across America, but almost all fast-food restaurants use the flavor enhancer to some extent. Interestingly, MSG has no distinct taste itself. Instead, it amplifies other flavors, especially in foods with chicken or beef flavoring, through processes that scientists don't fully understand.

MSG is the sodium salt of the amino acid glutamic acid and is just one form of glutamate, a chemical that exists naturally in many living things. In fact, Asians historically used a broth made from seaweed as their source of MSG. Today, the food industry obtains the white powder through a fermenting process involving carbohydrates such as starch, sugar beets, sugarcane or molasses.

The safety of MSG has been in question for many years. In 1959, the U.S. Food and Drug Administration classified MSG as a "generally recognized as safe" substance. Then, in the 1980s, researchers began to wonder whether chemicals in the glutamate family could harm brain tissue based on studies that revealed glutamate's role in the normal functioning of the nervous system.

An extensive FDA-sponsored investigation has since determined that MSG is safe when consumed at levels typically used in cooking and food manufacturing, although two groups of people -- those who eat large doses of MSG on an empty stomach and those with severe asthma -- may experience a set of short-term adverse reactions known as MSG Symptom Complex.

## **5. Niacin: The Most Common Nutrient**

That sesame seed bun isn't the only place you can find niacin, or vitamin B3, good for things like producing energy and metabolizing fats.

It seems strange that fast-food chains would add nutrients to our extra-value meals. Doesn't food already come with a natural supply of nutrients? Broccoli, for example, contains significant levels of many essential vitamins and minerals, including vitamins C, K and A. Of course, broccoli isn't generally found on a fast-food menu. In the place of fresh fruits and vegetables are scores of highly processed foods. Manufacturing these foods often has the unwanted side effect

of eliminating key vitamins and minerals, which then have to be replaced in a process known as **enrichment**. **Fortification** is the companion process, which adds nutrients that may be lacking in the diet.

Wheat flour is one of the most common processed items in the world of fast food. It is used to make plain buns, sesame seed buns, corn-dusted buns and specialty buns of all shapes and sizes. The wheat flour found in all of these bread products has been enriched with several vitamins and minerals, including riboflavin, folic acid and iron. But the most commonly added nutrient is niacin, or vitamin B3. Niacin is water-soluble and constantly eliminated from the body through urine. That means you need a continuous supply of the vitamin in your diet. But you don't need to eat bread products to get your recommended daily allowance. Poultry, fish, lean meats, nuts and eggs also contain plenty of niacin.

#### **4. Soybean Oil: The Most Common Oil or Fat**

Drive around America long enough, and you're bound to see a soybean farm. According to the U.S. Department of Agriculture, nearly 75 million acres (30 million hectares) of farmland were used in 2008 to grow soybeans, resulting in 2.9 billion bushels of crop [source: U.S. Soybean Industry Statistics].

What happens to all of those soybeans? Many are crushed and mixed with solvents to extract soybean oil -- a fast-food staple used for deep-frying and as a key ingredient in margarine, pastries, cookies, crackers, soups and nondairy creamers. Some ingredient lists describe it as soybean oil, others as vegetable oil.

Soybean oil contains several unsaturated fatty acids, which means their component molecules have fewer hydrogen atoms. Unfortunately, unsaturated fats don't have long shelf lives. **Hydrogenation**, or forcing hydrogen gas into soybean oil under extremely high pressure, eliminates this undesirable characteristic. But it also leads to the creation of trans fatty acids, which have been linked to heart disease.

Scientists have recently developed varieties of soybeans that produce oils low in unsaturated fats. As a result, this new and improved oil doesn't require hydrogenation. Fast-food restaurants are slowly embracing trans-fat-free soybean oil, although hydrogenated oil is still widely used.

Food processors also use soybean oil as a starting point for other additives, including the two closely related ingredients we're about to cover.

#### **Oil Reserves**

Soybean oil appeared 355 times in our tally of fast-food ingredients, but it wasn't the only oil we found. Cottonseed oil made 86 appearances, followed by canola

oil with 62 appearances and corn oil with 38. Canola oil, by the way, comes from the canola plant, a crossbreeding experiment from the 1970s.

### **3. Mono- and Diglycerides: The Most Common Emulsifiers**

People harvest kelp for the emulsifier algin that's in beer, ice cream and toothpaste, among other items.

Cooks and food preparers have been working with **emulsions** -- two or more liquids that can't normally be mixed together -- for a long time. Fortunately for our taste buds, they've discovered several substances that encourage liquids to overcome their unwillingness to combine. These substances are known as **emulsifiers**.

Egg is commonly used as an emulsifier, but most food manufacturers today use glycerides obtained from palm oil, soybean oil, sunflower oil or tallow. Vegetable oils and animal fat contain mostly triglycerides, but enzymes can be used to break down triglycerides into mono- and diglycerides. These are the ingredients you see so frequently on fast-food menus.

Mono- and diglycerides allow smooth mixing of ingredients, prevent separation and generally stabilize food. You can find them in ice cream, margarine, baked goods, whipped topping and certain beverages. Luckily, glycerides pose no serious health threats, although they are a source of fat. The U.S. Food and Drug Administration has classified them as a "generally recognized as safe" substance, indicating that experts consider them safe as food additives.

### **2. Xanthan Gum: The Most Common Stabilizer or Thickener**

In the 1950s, a chemist working for the U.S. Department of Agriculture began conducting research on an interesting new molecule. The chemist was Allene Rosaline Jeanes, and the molecule was **dextran**, a giant molecule made of thousands of sugar building blocks. Jeanes had great difficulty finding large quantities of dextran until a soft drink company came to her with a bottle filled, not with refreshing root beer, but with something slimy and viscous. Jeanes discovered that the bottle had become contaminated with a bacterium that produced dextran as a byproduct of fermentation. She isolated the bacteria cells and suddenly had a mechanism to produce all of the dextran she needed.

Jeanes also discovered another similar molecule that would become known as **xanthan gum**. Also produced by a bacterium -- *Xanthomonas campestris* -- xanthan gum is widely used by the food industry as a thickening agent. It's especially useful in salad dressings to help keep components like oil and vinegar from separating. Xanthan gum is not an emulsifier, however. It works by stabilizing emulsions, increasing the viscosity of the mixture so that the oil and vinegar stay together longer and so that spices stay suspended.

Xanthan gum also creates a smooth, pleasant texture in many foods. For this reason, it appears in ice cream, whipped topping, custard and pie filling. And the really good news: It's not associated with any known adverse effects.

## 1. Chicken: The Most Common Meat Product

Fast-food chains can work chicken onto their menus multiple times -- in salads, wraps, nuggets and sandwiches. With beef, it gets tougher once you get beyond burgers.

We're just as surprised as you to list chicken, not beef, as the most popular fast-food meat, and to be honest, this one is tricky. In our analysis of several menus, chicken appeared as the first ingredient more than beef, pork or turkey. But that's a little misleading because many fast-food chains have more chicken-based menu items than beef. For example, McDonald's features chicken sandwiches, chicken nuggets, premium chicken strips, chicken snack wraps and a full line of premium salads topped with, you guessed it, chicken. If you talk consumption, though, you get a slightly different result. McDonald's bought 663 million pounds (301 million kilograms) of chicken in the U.S. in 2007, compared to 795 million pounds (361 million kilograms) of beef [source: Hughlett].

The future, however, is chicken. McDonald's 2007 purchases of chicken were up 59 percent from 2003, while its beef purchases were up just 10 percent over the same period [source: Hughlett]. Numbers from the U.S. Department of Agriculture bear this out: Chicken consumption more than doubled between 1970 and 2004, from 27.4 pounds (12.4 kilograms) per person to 59.2 pounds (26.9 kilograms) [source: Buzby]. Most of this growth can be traced to fast-food chains, where people like us step up to the register and order fried or grilled chicken -- and a hundred other ingredients that transform farm-fresh poultry into the fast-food chicken that we hate to love.