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A WORLD OF FLAVOR POSSIBILITIES

These days, global flavor is big news. From Asian to Latin American, Mediterranean to mainstream, a whole world of delicious innovation is redefining the way America eats.

For close to four centuries, Kikkoman has built our heritage on mastering the techniques—and applying the leading-edge technologies—that maximize flavor. You’d expect nothing less from the name that’s synonymous with soy sauce. Yet while food manufacturers have long trusted Kikkoman as their leading source for the largest selection of soy sauces in liquid and dehydrated form, today’s Kikkoman offers much more.

With premium and reduced-sodium options, clean-label flavor enhancers and a growing line of pan-Asian products—all designed to optimize flavor and performance across applications—Kikkoman’s flavor-forward lineup supplies the finishing touch that brings product profiles into harmony, whether you’re extending your line with global foods or formulating classic American favorites.

TRUSTED SOURCE, TRUSTED RESOURCE

At a time when product sourcing matters more than ever, you can trust Kikkoman’s transparency. Our soy sauce is traditionally brewed in state-of-the-art, HACCP-approved production facilities in Walworth, Wisconsin, and Folsom, California, using only North American–grown soybeans and wheat, 100% natural salt and pure water. Our multiple North American distribution centers ensure consistent supply, quality, flavor and safety with each shipment.

We create our products with application functionality in mind, from ensuring flavor and storage stability to understanding ingredient interactions. When you work with us, you’ll share access to cross-functional R&D and production teams with onsite, timely formulation and real-world operational solutions. And with pack sizes ranging from 55-gallon drums to railway cars and tankers, we’re ready for any need at any scale. Kikkoman is your trusted source for flavor expertise and your resource for product-development success. We hope you’ll find this guide useful as we help you explore a world of flavor possibilities.
THE STORY OF SOY SAUCE

Would it surprise you to learn that soy sauce is more than 2,000 years old?

Modern soy sauce’s ancient ancestor first emerged in China in the third century, BCE. This simple seasoning made of fermented soybeans (and later, from wheat) was used to enhance the flavor of meatless foods. It spread across Asia, eventually arriving in Japan, where craftsmen refined it into the iconic condiment it is today.

By the 1600s, the Kikkoman founding families were already brewing soy sauce in the time-honored artisanal tradition. Descendants of those families still operate Kikkoman today, making it one of the world’s oldest food companies.

But soy sauce is also a 21st-century seasoning, through and through. As interest in gastronomy grows, more consumers and culinarians are coming to appreciate how soy sauce elevates flavor and balances ingredients in foods. In entrées, sauces and dressings, and even snacks, dry mixes and desserts, traditionally brewed soy sauce adds the depth, richness, color and satisfying roundness that bring flavor profiles full circle without masking, overpowering or even necessarily adding a pronounced “Asian” or soy sauce flavor.

THE SCIENCE OF SOY SAUCE: A TALE OF TWO METHODS

True soy sauce is the product of natural brewing—a fermentation process that, as in the production of wine and beer, requires several months to complete. And like wine and beer fermentation, natural brewing yields soy sauce with a unique profile, with more than 300 identifiable constituents contributing to its complex, savory flavor.

The more recently developed process of chemical hydrolysis can also produce soy sauce products with speed and economy. But speed and economy come at a cost. Only natural brewing—a composite of centuries-old tradition with cutting-edge technology and strict attention to detail—creates the distinctive flavor, flavor-enhancing functionality and clean-label profile that make traditionally brewed soy sauce superior.

MAKE HASTE. SLOWLY.

There is an old Japanese saying, isogaba maware—“make haste slowly.” In other words, be restless in your quest for progress, but take the time to do it right. Kikkoman understands this like no one else. It’s an idea that’s built into our company name. Kikko means “tortoise shell” and man means “ten thousand.” In Japanese folklore, the tortoise is a symbol of steady progress and longevity, said to live as long as ten thousand years. Our logo, designed more than three and a half centuries ago, is a hexagon representing the tortoise shell, with the character for “ten thousand” in the center—a fitting symbol for one of the world’s oldest food brands.
TRADITIONALLY BREWED VS. NON-BREWED

THE TRADITIONAL BREWING PROCESS
Several months from start to finish
Brewing is accomplished in three distinct steps: koji making, brine fermentation and refining.

1. Koji making. Combine select soybeans and wheat under carefully controlled conditions. Introduce the koji Aspergillus seed mold. Mature the koji for three days in large vats with air circulation.

2. Brine fermentation. Mix the koji culture with salt water to produce a moromi mash. Ferment for several months to allow osmophilic lactic acid bacteria and yeast to transform it into a semi-liquid, reddish-brown “mature mash” imbued with soy sauce’s distinctive flavor and fragrance compounds.

3. Refining. Separate the raw soy sauce from the “cake” by pressing through layers of filtration cloth. Refine, pasteurize and package the liquid as finished soy sauce.

KIKKOMAN LIQUID PRODUCTS
Our extensive line of traditionally brewed soy sauce products in liquid form offers you options for any formulation need. We offer reduced-sodium and preservative-free alternatives, as well as an innovative clear variety.

Beyond soy sauce, we offer a number of other sauces and seasonings, from our original teriyaki to sriracha, hot chili sauce and salted mirin in a range of pack sizes suitable for any infrastructure.

THE NON-BREWED PROCESS
A matter of hours
Chemical hydrolysis involves briefly boiling soybeans with hydrochloric acid for 15 to 20 hours, until they’ve liberated their maximum free amino acids. Following neutralization and filtration of the hydrolyzed vegetable protein, the addition of caramel color, corn syrup and salt supplies sensory characteristics not produced during chemical hydrolysis.

NON-BREWED SOY SAUCE: Water, Hydrolyzed Corn and Soybean Protein, Corn Syrup, Salt, Citric Acid, Caramel Color and Sodium Benzoate as a preservative.

BREWED SOY SAUCE: Water, Soybeans, Wheat, Salt and less than 0.10% Sodium Benzoate as a preservative.

A CLEANER LABEL—NATURALLY
Because soy sauce has no standard of identity in the U.S., its contents must be broken out in the ingredient statement when used in a product. The differences between brewed and non-brewed soy sauces affect not only flavor and functionality but the ingredient declaration as well.

The difference is clear: Traditionally brewed soy sauce is transparent, with a light amber color and wonderfully balanced flavor and aroma.

Non-brewed soy sauce is often opaque, with a harsh, overpowering flavor and a pronounced chemical aroma.

THE TRADITIONAL BREWING PROCESS

WHEAT

SOYBEANS

SALT

WATER

KOJI

PEUFIN

BRINE

MOROMI MASH

MATURED MASH

PRESSED

CAKE

RAW SOY SAUCE

OIL

FILTERED

PASTEURIZED

REFINED

REFINED SOY SAUCE

BOTTLED

275-gal tote

55-gal drum
WHY BREWING IS BETTER

The production differences between brewed and chemically produced soy sauce translate directly into the superior flavor and color of traditionally brewed sauces as well as their cleaner label. A quick analysis of traditionally brewed soy sauce’s composition reveals why.

SALT: Starting with the fermentation brine, salt—in finished concentrations ranging from 12% to 18%—provides a pleasing, mildly salty taste while also encouraging proper flavor development in the resulting moromi mash. The salt concentration protects the finished sauce from spoilage, too.

AMINO ACIDS: During fermentation, moromi enzymes break down soybean and wheat protein into shorter peptides and umami-producing amino acids, including glutamic acid, aspartic acid, lysine, alanine, glycine and tryptophan. These amino acids and peptides contribute a full, robust taste to the sauce and can also act as flavor potentiators. Finished soy sauce contains between 1.5% and 1.65% total nitrogen, weight per volume (a measure of protein content), and glutamic acid is its most predominant amino acid.

SUGAR: Moromi enzymes convert wheat starch into glucose along with 10 other sugars that balance the sauce’s saltiness and feed the yeast’s production of the alcohols—predominantly ethanol—that are important aroma components in brewed soy sauce. During fermentation, reducing sugars engage with free amino acids in the Maillard reaction, allowing for the natural development of soy sauce’s characteristic flavor notes and reddish-brown color.

ORGANIC ACIDS: Some soy sauce sugars react with alcohols to produce more than 10 identified organic acids, giving finished soy sauce a pH of about 4.8 and a roughly 1.0% concentration of lactic acid, the most prominent acid in traditionally brewed soy sauce. These acids supply the refined, rounded tartness that’s emblematic of brewed soy sauce, while also acting as natural preservatives.

AROMATIC ESTERS: Ethanol is a critical aromatic ester in soy sauce because it combines with some organic acids to form esters similar to those that give fine wines their bouquet. Without this reaction, virtually all of soy sauce’s aroma components would be missing. Because the sense of smell is so critical to taste, alcohol’s absence would lead to a much less enjoyable flavor result.

POST-FERMENTATION DEVELOPMENT: While much of brewed soy sauce’s flavor can be attributed to extended fermentation, the refining process is also critical. The heat of pasteurization further develops many compounds that contribute aroma, flavor and color. Pasteurization also improves stability by deactivating most enzymes and producing organic acids and phenols that inhibit microbial growth.

The net effect of all these constituents working together gives soy sauce its unique complexity. Because so many of these key components are different from or missing in a non-brewed sauce, its flavor can never be the same.
APPLICATIONS: KIKKOMAN SOY SAUCE IN ACTION

From savory to sweet, Asian to mainstream...no matter what you’re formulating, Kikkoman can be your key to bigger, better flavor.

**BACON/CURED MEATS**
Adds color, balances sweet and smoked flavor, contributes salt for curing, adds natural preservatives.

**BEEF**
Contributes savory flavor and aroma, adds color, helps blend spice flavors.

**BREAD & ROLLS**
Helps blend yeast and grain flavor notes, adds color.

**CHOCOLATE**
Rounds cocoa flavor, moderates sweetness; alcohol enhances fruity top notes, contributes color.

**COOKIES & CAKES**
Helps blend flavors and add complexity, tempers sweetness, adds color.

**DRY MIXES**
Adds savory notes and color; enhances aroma and flavor; granulated forms dissolve easily when prepared at home.

**JERKY**
Contributes salt for curing, blends spice flavors, enhances meaty flavors, contributes color, can enhance or even replace preservatives.

**DRESSINGS**
Adds savory flavor, helps temper vinegar, rounds spice flavors, contributes preservation to cold-filled dressings, adds color, replaces Worcestershire sauce.

**SNACKS**
Blends flavors of other seasoning ingredients, contributes salt, enhances color and savory flavor.
KIKKOMAN FLAVOR SOLUTIONS: SOY SAUCE IS JUST THE BEGINNING

THE ASIAN EXPERTS
Asian flavors are hotter than ever. As Americans warm to the cuisines not just of China and Japan, but of Thailand, Vietnam, Malaysia and beyond, the flavor quotient in the nation’s kitchens is bound to rise.

Kikkoman’s full line of liquid and dehydrated Asian sauces and seasonings—from Teriyaki and Thai Chili to Sake, Mirin and much more—provides a toolkit for building rich, full “Savor Asian” flavor across applications. Whether you’re developing traditional Asian foods or adding a flavor accent to mainstream ones, make Kikkoman your first call for authentic flavor; safe, reliable products; and formulation expertise.

BEYOND ASIAN
Kikkoman sauces and seasonings not only unlock authentic Asian flavor, they also enhance flavors in applications beyond those that are specifically Asian. Use our soy sauces and our NFE (Natural Flavor Enhancer) line of products as essential clean-label flavor boosters and building blocks in everything from prepared entrées and meal kits to sauces and dressings—as ingredients or as stand-alone condiments. Our sauces are complete, balanced flavor systems that save you from sourcing hard-to-find, inconsistent ingredients from specialty suppliers. Because they’re Kikkoman, you can always count on their quality, safety and availability.

Don’t see the ingredient form or flavor you’re looking for? Just ask. We’ve got the growing product line to help you meet demand.

CHICKEN
Contributes savory flavor, helps blend spice flavors, enhances aroma.

LATIN FOODS
Blends and enhances spices, enhances salt perception, “grilled” color and meaty flavor.

SOUPS & STEWS
Enhances savory flavor profile, contributes aroma, adds color.
SOY SAUCE— IN CHOCOLATE?

Surprising but true: Traditionally brewed soy sauce can enhance more than just savory flavors. Recently, a chocolate ice cream syrup was developed using 10% Kikkoman Less Sodium Soy Sauce and 6% cocoa powder. The soy sauce, with its rich umami qualities and delicate salty flavor, enhanced the richness of the cocoa and depressed the extra sweetness of typical ice cream syrups. The result: a deep, nutty, roasted chocolate flavor.
UMAMI AND NATURAL FLAVOR ENHANCEMENT

The elusive, alluring qualities of umami are what traditionally brewed soy sauce is all about. It’s what makes Kikkoman Soy Sauces natural flavor enhancers that boost the flavor of foods—Asian and beyond—while maintaining a clean label.

THE SCIENCE OF FLAVOR ENHANCEMENT

The overall flavor experience is a combination of several concurrent reactions in the mouth. The molecules in various foods trigger the taste receptors located on the tongue, palate and even the esophagus. While this is happening, aromas enter the nose through both the nostrils and the roof of the mouth. From there, olfactory receptors transmit odor signals to the brain, where those messages combine with signals from the taste receptors to flesh out the flavor experience further. And finally, physical perceptions in the mouth—the texture or viscosity of a food, for instance—send their own sensory messages to the brain, wrapping up the whole eating experience.

So how do flavor enhancers combine these reactions into a unified, blended experience that intensifies the overall effect? By having the right chemical composition. The science of umami teaches us that amino acids—in the ideal amounts and ratios—are critical to the umami sensation that makes foods more savory and satisfying. In fact, as much as sugar molecules interact with taste receptors to generate sweetness, glutamate salts of glutamic acid trip the receptors that generate umami.

SOY SAUCE AND UMAMI

Fermented foods like traditionally brewed soy sauce contain just the right quantities of amino acids, and in the right proportions—glutamic acid being among the most predominant—to act as natural flavor potentiators and umami contributors.

But the glutamic acid found in traditionally brewed soy sauce and other flavor enhancers derived from traditionally brewed foods aren’t the only components contributing to their flavor-enhancing capability. Umami tastants, like glutamic acid, appear to work synergistically with salt to produce an enhancing effect that is greater than the sum of its parts.

At Kikkoman, our dedication to traditional brewing has made us a leader not only in producing premium-quality soy sauce, but also in advancing the state of natural flavor enhancement. Our NFE (Natural Flavor Enhancer) starts with Kikkoman Soy Sauce in which, through a proprietary brewing process, we reduce the characterizing soy sauce flavor, aroma and color while keeping the umami-generating amino acid profile intact. The result is a product that noticeably boosts savory flavor in the same way that soy sauce can, but leaves a neutral taste impression.

Boosting savory flavor cleanly and naturally is more important than ever, as consumers search for products full of flavor but free of excess sodium and “artificial” flavor enhancers like MSG and HVP. Traditionally brewed Kikkoman Soy Sauce, NFE and our less-sodium products designed with higher levels of glutamic acid and total nitrogen let you boost flavor without compromising your ingredient or nutritional statement. And the more you can build flavor into your application naturally, the more you can shift away from using ingredients that are coming under scrutiny.
WE’RE HERE FOR YOU.
With state-of-the-art production facilities in Walworth, Wisconsin, and Folsom, California, and more than 10 distribution centers throughout North America, Kikkoman can assure prompt service and product availability. And that’s just the beginning. Behind our products lies a long-standing commitment to the prepared foods industry. So whether you need product samples, a custom blend, technical support or a creative partner in new product development, visit our website or contact us.

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