

# Monosodium Glutamate (MSG): From A to Umami

Has there ever been a taste that you enjoyed, but couldn't quite explain? Perhaps you are noticing what has been coined as the fifth taste, "umami"; a taste attributed to foods containing glutamate, an amino acid that is one of the building blocks of protein. Think about a bowl of hot pasta with tomato sauce and Parmesan cheese, a freshly grilled steak with a rich mushroom sauce, or stir-fried seafood and chicken with crisp vegetables in a savory soy sauce. In all of these dishes, there is a common flavor denominator that may be surprising to many: monosodium glutamate, also called MSG.

## Is Umami a Fifth Taste?

Recent research shows that in addition to the four basic tastes of sweet, sour, salty, and bitter, there is a fifth basic taste called "umami" (in Japanese) that Americans describe as "savory."



## What is the History of Umami?

Although valued in ancient world cuisines for more than 2,000 years, the taste of umami was not identified until about 100 years ago. In 1908, Professor Kikunae Ikeda of Tokyo Imperial University discovered that a simple molecule gives foods a distinctive savory taste. He was studying a seaweed broth called kombu, a traditional food in Japanese culture, and identified sodium glutamate as the compound responsible for the savory umami taste.

## What is glutamate?

Glutamate is an amino acid (the building blocks of proteins) that is naturally abundant in both plant and animal proteins. Hence, protein-rich foods contain sizeable amounts of glutamate as part of the protein. In addition, many foods also contain small amounts of "free" glutamate, usually in the form of sodium glutamate (monosodium glutamate or MSG). This free glutamate gives an umami taste to such foods (e.g., ripe tomatoes and Parmesan cheese).

## How is glutamate used by the body?

Almost all of the glutamate present in food is used to produce energy by the intestinal cells, never making it past the intestinal lining. The small remaining amount is used by these same cells, along with other amino acids, to make proteins and the antioxidant glutathione, both essential for optimal intestinal function.

## What are some of the foods and ingredients that contain glutamate?

Glutamate is found naturally in many plant and animal-based foods. Notable examples are tomatoes, Parmesan cheese, walnuts, sardines, mushrooms, clams, meat, and asparagus. Glutamate is also present in many food ingredients, such as soy sauce, hydrolyzed vegetable protein, autolyzed yeast extract, and monosodium glutamate (MSG).



## DID YOU KNOW?

- Research has identified "umami" as a fifth taste, commonly referred to as savory.
- Glutamate, an amino acid found in protein foods, is responsible for the umami flavor.
- Tomatoes, Parmesan cheese, and walnuts naturally contain glutamate.
- Monosodium glutamate (MSG) is composed of two ingredients: sodium and glutamate.
- A natural fermentation process is used to produce MSG.
- MSG contains only one-third the amount of sodium as table salt.
- Glutamate and MSG are gluten-free.



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### How is Monosodium glutamate (MSG) made?

MSG is comprised simply of sodium and glutamate, and is produced by natural fermentation. Natural fermentation is a process that has been used for centuries to make common foods such as beer, vinegar, and yogurt. MSG is often produced through the fermentation of sugar cane or tapioca, but in the U.S., it is primarily produced through the fermentation of corn.

### To what types of foods is MSG commonly added?

A wide variety of packaged and prepared foods may contain MSG, such as some soups, instant noodles, cold cuts, hot dogs, and vegetarian soy-based products. (For more examples, see “Common Foods that may contain MSG”.)

### Does MSG improve the flavor of foods?

MSG amplifies the flavor of a variety of foods in which it is naturally present, including meat, poultry, seafood, and many vegetables. It is also used as an added ingredient that enhances the flavor of many prepared foods, such as soups, stews, meat-based sauces, and snack foods. The glutamate in MSG interacts with our taste buds, giving foods an umami flavor. MSG harmonizes well with salty, sour and sweet tasting foods.

### Is it possible for people to be sensitive to MSG?

According to the American College of Allergy, Asthma and Immunology, MSG is not an allergen.

Some individuals have reported symptoms resembling some of those experienced with a food allergy after consuming MSG, but no scientific research has been able to reliably show that consuming MSG causes these symptoms. For example, a clinical study conducted in people who had reported a perceived sensitivity to MSG found no clear, reproducible reactions to MSG.

Nonetheless, individuals who are still concerned about food allergies or sensitivities to MSG can consult their healthcare professional or a certified allergist, who can evaluate symptoms and, in cooperation with a Registered Dietitian Nutritionist (RDN), recommend any appropriate dietary changes.



### COMMON FOODS THAT MAY CONTAIN MSG INCLUDE SOME:

- Packaged foods (flavored crackers and chips, canned soups)
- Condiments (salad dressings, soy sauce, pre-made gravies and mixes, dip mixes)
- Seasonings (bouillon cubes, seasoned salt)
- Savory restaurant and store-bought foods (stir-fry, pasta with meat sauce, cheese sauce, toppings, soups)

### Does MSG or glutamate contain gluten?

No, both MSG and glutamate are gluten-free. However, those who have Celiac Disease or Non-Celiac Gluten Sensitivity must avoid gluten-containing foods and should check food labels for other ingredients (e.g. wheat, barley, rye, and other grains) that may add gluten to the product.

### Does MSG ingested in the diet affect the nervous system?

No. A large body of scientific research has shown that MSG consumed in the diet has no effect on the nervous system. Some studies conducted in mice suggested adverse effects of MSG on the nervous system. However, these studies either used amounts of MSG that were much higher than would be consumed in a normal diet or the MSG was given to the mice in a form other than food (for example, injected into their bloodstream). As a result, these studies have little or no relevance to people.

### Can MSG help to reduce salt intake?

Yes. Substitution of MSG for a portion of table salt can help reduce the total amount of sodium in the diet, which may be useful for those with high blood pressure or others who wish to reduce their sodium intake for other reasons. The umami taste of MSG improves the flavor of the foods, despite containing less salt. Therefore, glutamate and MSG provide a savory component to our favorite foods and may be consumed as part of a healthful diet.

### How is the safety and use of MSG determined in the U.S.?

MSG has been designated as Generally Recognized as Safe (GRAS) by the U.S. Food & Drug Administration (FDA), as have other common food ingredients such as salt and baking powder. For a GRAS ingredient to be used in foods and beverages, it must have either (1) A proven history of safe use prior to 1958, when the Food Additive Amendment was passed; or (2) A body of publicly-available scientific research demonstrating its safety, along with the agreement of qualified scientific experts that the intended use of the ingredient does not cause harm to human health.

### What do credible health and scientific authorities have to say about MSG?

In the U.S., the FDA has reaffirmed the safety of MSG, based upon a report from the Federation of American Societies for Experimental Biology, of which the American Society for Nutrition is a member.

Globally, the Joint Expert Committee on Food Additives (JECFA) of the United Nations World Health Organization (WHO) and the Food & Agricultural Organization (FAO) designate MSG as safe and place it in their safest category of food ingredients. Likewise, the European Community's Scientific Committee for Food, as well as Food Standards Australia New Zealand (FSANZ) have reviewed and confirmed the safety of MSG.

For more information about umami, glutamate, or MSG, visit [www.foodinsight.org](http://www.foodinsight.org)