

## How are monosodium glutamate and the other ingredients that contain MSG manufactured?

Processed free glutamic acid (MSG) is created when protein is either partially or fully broken apart into its constituent amino acids, or glutamic acid is secreted from selected bacteria. A protein can be broken into its constituent amino acids in a number of ways (autolysis, hydrolysis, enzymolysis, and/or fermentation). When a protein is broken down, the amino acid chains in the protein are broken, and individual amino acids are freed. These processes are discussed in some detail in food encyclopedias -- wherein articles on glutamic acid and "monosodium glutamate" are generally written by persons who work for Ajinomoto, Co., Inc., the world's largest producer of the food ingredient "monosodium glutamate."

Today, **the glutamic acid component of the food additive "monosodium glutamate"** is generally made by bacterial or microbial fermentation wherein bacteria used are often, if not always, genetically engineered. In this method, bacteria are grown aerobically in a liquid nutrient medium. The bacteria have the ability to excrete glutamic acid they synthesize outside of their cell membrane into the liquid nutrient medium in which they are grown. The glutamic acid is then separated from the fermentation broth by filtration, concentration, acidification, and crystallization, and, through the addition of sodium, converted to its monosodium salt.

According to *The Encyclopedia of Common Natural Ingredients*:

"Monosodium glutamate can generally be produced by three methods: (1) hydrolysis of proteins such as gluten or proteins present in sugar beet wastes, (2) synthesis, and (3) microbial fermentation. In the hydrolysis method, the protein is hydrolyzed with a strong mineral acid to free amino acids, and the glutamic acid is then separated from the mixture, purified, and converted to its monosodium salt, [monosodium glutamate]. This used to be the major method of [monosodium glutamate] manufacture. Currently most of the world production of [monosodium glutamate] is by bacterial fermentation. In this method bacteria (especially strains of *Micrococcus glutamicus*) are grown aerobically in a liquid nutrient medium containing a carbon source (e.g., dextrose or citrate), a nitrogen source such as ammonium ions or urea, and mineral ions and growth factors. The bacteria selected for this process have the ability to excrete glutamic acid they synthesize outside of their cell membrane into the medium and accumulate there. The glutamic acid is separated from the fermentation broth by filtration, concentration, acidification, and crystallization, followed by conversion to its monosodium salt [monosodium glutamate]."

-- Leung, A. and Foster, S. *Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics*. New York: Wiley, 1996. pp 373-375.

Creating processed free glutamic acid (MSG) by bacterial fermentation is not openly discussed by the glutamate industry, and it is not generally discussed in detail in food encyclopedias. It seems strange to us that when Ajinomoto discusses the way in which "monosodium glutamate" is manufactured, they talk about it being made from beets, corn, or some other crop, instead of describing their use of bacteria (which may be genetically engineered) and their process of bacterial fermentation.

It used to be that when any ingredient contained 78%-79% processed free glutamic acid (MSG), and the balance was made up of salt, moisture, and up to 1 per cent impurities, the FDA required that the product be called "monosodium glutamate", and required that the product be labeled as such. The FDA required that other MSG-containing ingredients be identified by names other than "monosodium glutamate." Never has the FDA required mention of the fact that an ingredient contains processed free glutamic acid (MSG). The last time we inquired, the FDA referred to the 6th edition of the *Food Chemical Codex* for their definition of "monosodium glutamate."

While the glutamic acid in "monosodium glutamate" is generally produced through bacterial fermentation, **the glutamic acid in the other MSG-containing ingredients** is made through use of chemicals (hydrolysis or autolysis), enzymes (enzymolysis), fermentation, or a complex cooking process

wherein reaction flavors are produced from a combination of specific amino acids, reducing sugars, animal or vegetable fats or oils, and optional ingredients including hydrolyzed vegetable protein. In **acid hydrolysis**, crude gluten or other proteinaceous starting materials are generally hydrolyzed by heating with hydrochloric acid. The chemical hydrolysis with hydrochloric acid is said to be efficient, but almost any organic substance in the raw material is hydrolyzed, resulting in **desired reactions** such as hydrolysis of proteins, carbohydrates, and/or fats (triglycerides), and **the unwanted formation** of mono and dichloro propanols, which are carcinogenic.

-- *Food Chemical News*, December 2, 1996. Pp.24-25.

**Enzymolysis** is the splitting or cleavage of a substance into smaller parts by means of enzymatic action. (<http://www.biology-online.org/dictionary/Enzymolysis>). By and large, acids, not enzymes, are used to hydrolyze proteins for use in food.

**Reaction flavors** are produced from a combination of specific amino acids, reducing sugars, and animal or vegetable fats or oils, and optional ingredients including hydrolyzed vegetable protein.

Reaction flavors contain carcinogenic heterocyclic amines.

-- Lin, L.J. Regulatory status of Maillard reaction flavors. Division of Food and Color Additives, Center for Food Safety and Applied Nutrition, FDA. August 24, 1992; *Food Chemical News*. May 31, 1993, p 16.

Processed free glutamic acid (MSG) carries with it material that is not found with the unprocessed glutamic acid found in intact/unadulterated/ unfermented protein. Unadulterated glutamic acid found in higher organisms is L-glutamic acid, only. In contrast, processed free glutamic acid (MSG) contains both L-glutamic acid and D-glutamic acid, and is also accompanied by pyroglutamic acid and other impurities. The impurities differ according to the starting materials and methods used to produce the glutamic acid (MSG). It is only acid hydrolyzed proteins that contain mono and dichloro propanols (which are carcinogenic), and it is only reaction flavors that contain heterocyclic amines (which are also carcinogenic).

By FDA definition, processed free glutamic acid (MSG) is "naturally occurring," because the basic ingredients are found in nature. "Naturally occurring" does not mean that a food additive is being used in its natural state. "Naturally occurring" only means that the food additive began with something found in nature. By FDA definition, the ingredient "monosodium glutamate" is natural. So is hydrochloric acid. So is arsenic. "Natural" doesn't mean "safe."

There are a number of straightforward bold faced lies used by the glutamate industry in defending its contention that exposure to free glutamic acid found in processed food does not cause adverse reactions including hives, asthma, seizures, and migraine headache; could not possibly cause brain damage, learning disorders, or endocrine disturbances; and could not possibly be relevant to diverse diseases of the central nervous system such as addiction, stroke, epilepsy, schizophrenia, anxiety, depression, and degenerative disorders such as ALS, Parkinson's disease, and Alzheimer's disease. Central to their argument is the lie that the processed free glutamic acid used in processed food is identical to the glutamic acid found in unprocessed, unadulterated food and in the human body.

## **On the Subject of Manufactured vs Natural Glutamic Acid**

### **OVERVIEW –**

There are a number of straightforward bold faced lies used by the glutamate industry in defending its contention that exposure to free glutamic acid found in processed food does not cause adverse reactions, could not possibly cause brain damage, learning disorders, or endocrine disturbances; and could not possibly be relevant to diverse diseases of the central nervous system such as addiction, stroke, epilepsy, schizophrenia, anxiety, depression, and degenerative disorders such as ALS, Parkinson's disease, and Alzheimer's disease.

Central to their argument is the lie that the processed free glutamic acid used in processed food is identical to the glutamic acid found in unprocessed, unadulterated food and in the human body.

The truth of the matter is that the glutamic acid found in unprocessed, unadulterated, and/or unfermented food and in the human body is composed of one form of a single amino acid, L-glutamic acid, and nothing more. In contrast, the glutamic acid that is freed from protein through a manufacturing process or through fermentation (i.e., processed free glutamic acid), is always accompanied by a variety of impurities -- i.e., byproducts of manufacture. Thus, the glutamic acid that is used as a flavor enhancer in processed food is **always** composed of L-glutamic acid **and** impurities that inevitably appear during fermentation or other modes of glutamic acid manufacture or processing. In addition to the inevitable production of D-glutamic acid, impurities may include, but are not limited to, pyroglutamic acid, mono and dichloro propanols, and heterocyclic amines. Mono and dichloro propanols and heterocyclic amines are carcinogenic. The consequences of the interactions of these various chemicals with other chemicals and/or with the digestive processes are unknown.

Make no mistake. Since processed free glutamic acid (MSG) used in processed food and in plant "growth enhancers" is **not** identical to glutamic acid found in unprocessed, unadulterated food and in the human body, there is no reason to believe that the product called "glutamic acid" by the glutamate industry will be functionally equivalent to pure L-glutamic acid. There is no reason to believe that their excitotoxic effects will be identical.

Closely associated with this boldfaced lie are a number of deceptive statements. The first states that all glutamic acid is metabolized identically. From that statement, the reader might be encouraged to conclude that processed free glutamic acid (MSG) and the L-glutamic acid found in unprocessed, unadulterated, unfermented protein are metabolized identically. The truth of the matter is that while the L-glutamic acid portion of processed free glutamic acid (MSG), and the L-glutamic acid found in unadulterated protein may be metabolized identically, metabolism of processed free glutamic acid (MSG) cannot be disassociated from metabolism of **all** of the impurities associated with processed free glutamic acid (MSG). The fact that L-glutamic acid found in unprocessed, unadulterated, unfermented protein and L-glutamic acid bound in processed free glutamic acid are metabolized identically becomes irrelevant.

There is also the issue of amino acid balance. Metabolism of amino acids, regardless of the source from which they come, is followed by uptake of those amino acids by the body's amino acid transport system. One might think of individual amino acids waiting at the side of a river of blood for "vehicles" that will transport them to parts of the body where they will be put to work. However, the "vehicles" on which the various amino acids are transported out of the stomach and intestines have a limited capacity. So when unusually or relatively large amounts of one or a small group of amino acids present themselves for transport, there will be competition for the available space, and not all of the amino acids will be accommodated. The possible deleterious effects of this phenomenon, including too much of one amino acid or too little of another, have been ignored by the proponents of the safety of processed free glutamic acid (MSG).

Deceptive, also, is the often repeated excuse that both processed free glutamic acid (MSG) itself, and the components of processed free glutamic acid (MSG) are "naturally occurring." By FDA definition, any ingredient or constituent of an ingredient that comes from a plant or animal source is "naturally occurring." Thus, arsenic and hydrochloric acid are both naturally occurring. You will not, however, find them used as food ingredients. Similarly, hydrochloric acid in the human body is essential to normal body function. We don't, however, ingest hydrochloric acid.

Then there is the claim that "just a little won't hurt anyone." Yet, in truth, a little arsenic will, over time, harm people. The peanut residue left on a knife that had been wiped "clean" with a paper towel was enough to kill a child who was allergic to peanuts. The corn starch or maltodextrin used as binders and fillers in some vitamins, minerals, and medications will cause MSG reactions in acutely MSG-sensitive people. Indeed, no study to determine the least amount of processed free glutamic acid (MSG) needed to trigger an MSG reaction in MSG-sensitive people has ever been done.

Again. Any small amounts of free glutamic acid that might be found in unprocessed, unadulterated, and/or unfermented, food will be L-glutamic acid, only, and will not typically cause adverse reactions in MSG-sensitive people. This should not be confused with the glutamic acid that occurs in or on food as a consequence of manufacture or fermentation, which typically causes adverse reactions in MSG-sensitive people providing that they ingest amounts that exceed their tolerances for MSG. The fact that there may be some unadulterated, unfermented free glutamic acid in processed food or in produce is irrelevant to the fact that processed free glutamic acid (MSG) causes adverse reactions in MSG-sensitive people.

**GLUTAMIC ACID** (often referred to as glutamate) is an amino acid found in all protein.

Following ingestion of protein, and during the course of normal digestion, glutamic acid is released from ingested protein, becoming "free glutamic acid." If sufficient amounts of free glutamic acid are not available for normal body function, the body can create glutamic acid from other amino acids. Humans do not need to eat glutamic acid or eat protein that contains glutamic acid in order to supply the body with the glutamic acid that it needs. For that reason, glutamic acid is referred to as a "non essential" amino acid.

Because humans do not need to eat glutamic acid in order to supply the body with the glutamic acid that it needs, glutamic acid is called a "nonessential" amino acid.

Glutamic acid can also be freed from protein by fermentation, enzymolysis, use of acids, or other manufacturing processes, prior to ingestion.

**FREE GLUTAMIC ACID** is glutamic acid that has been released from protein. Just as humans have two hands, glutamic acid has two enantiomers (chemically identical molecules with the L-enantiomer being the mirror image of the D-enantiomer). Just like most other alpha-amino acids, glutamic acid contains a stereogenic center and exists as the L- and D-enantiomers.

"The word chiral, from the Greek word for hand, alludes to molecules that exist in mirror-image versions -- right-handed or left-handed. Although they appear to be identical twins, chiral molecules are fundamentally different. One molecular twin cannot be substituted for the other because they are asymmetrical. The difference is comparable to asymmetry between your right and left hand: One is a mirror image of the other, but you cannot fit your right hand into a left-hand glove."(1)

"Although it has been generally accepted that the free amino acids and proteins found in higher organisms are composed exclusively of the L-enantiomers of amino acids, the mirror image D-forms are known to be present in some naturally occurring peptide antibiotics and in the cell walls of bacteria." (2)

**NATURAL FREE GLUTAMIC ACID** is glutamic acid that has been freed from ingested protein during digestion, or glutamic acid that has been transaminated (created) from other amino acids. It is also possible that there are some minute amounts of natural free glutamic acid associated with some intact, unadulterated, unprocessed, unfermented protein. NATURAL FREE GLUTAMIC ACID found in higher organisms is made of L-glutamic acid only. "Natural food protein, as well as protein in the human body, contains only L-forms of amino acids." (3)

"Unlike amino acids derived from natural protein, which possess only the structure (S)-12, synthetic amino acids are composed of equal mixtures of (S)-12 and (R)-12." (4) Note: In this paper, (S)-12 refers to the L- amino acids and (R)-12 refers to the D-amino acids.

"There were contrasting views expressed on the use of the various isometric forms (the natural L-form or the commercially available mixtures of DL-forms) of amino acids." (5)

"The chemical structure of L-glutamic acid and related compounds and the chemical composition of MSG are represented in Figure 1....Two possible stereoisomeric forms of glutamic acid exist, D and L. According to Maga (1983) the L form (dextrorotary form with the L-configuration) is the predominant natural form...." (6) (7)

"Because D-amino acids are rare in higher animals..." (8)

**MANUFACTURED FREE GLUTAMIC ACID** (MSG) is glutamic acid that has been freed from protein through a manufacturing process or fermentation prior to ingestion, or glutamic acid that has been grown from selected bacteria that secrete glutamic acid through their cell walls. **There are over 40 ingredients in which MSG will be found. (See list on the last page of this document)** "Monosodium glutamate," "autolyzed yeast," and "natural flavoring" are names of some of those ingredients. (In the first FDA classification of such ingredients, the FDA called them "monosodium glutamate and other hydrolyzed proteins.") The amount of free glutamic acid (MSG) that will be found in each is dependent on the method used to produce it, the protein source used (if bacterial fermentation was not used), and the extent of the processing.

**MANUFACTURED FREE GLUTAMIC ACID** is made up of L-glutamic acid and D-glutamic acid, and may bring with it pyroglutamic acid, mono and dichloro propanols (which are carcinogenic), heterocyclic amines (which are carcinogenic), and other unwanted byproducts (impurities).

"Foods contain a large assortment of xenobiotics (foreign, unnatural substances) that can have both positive and negative nutritional implications. One example is the occurrence of the uncommon D-stereoisomers of amino acids in some dietary proteins. These D-amino acids are produced from the common L-stereoisomers during food preparation and processing." (9)

In table 1 of a research report by Rundlett and Armstrong, the authors present a list of all of the processed foods analyzed by them for L and D-glutamate (glutamic acid) content. Every one of the 38 processed foods evaluated contained D-glutamate. Three of those analyzed and found to have D-glutamate content were three brands of monosodium glutamate, including Ac'cent Flavor Enhancer, once marketed by Pet Incorporated. (10)

"Hydrolysis of proteins in 6 N HCl at 110 degrees centigrade for 24 h inevitably causes racemization of amino acids....Even under milder conditions of hydrolysis using lower temperatures and shorter exposure time, racemization of amino acids occurs." (11)"Savory ingredients like hydrolyzed vegetable protein... have...been produced by....extreme conditions....[that] promote a variety of chemical reactions, thus a range of unwanted by-products are produced as well." (12)

"The chemical hydrolysis with hydrochloric acid is efficient, but almost any organic substance in the raw material is hydrolyzed, resulting in desired reactions such as hydrolysis of proteins, carbohydrates, fats (triglycerides), and the unwanted formation of mono and dichloro propanols (MCP and DCP)." (12)

"Pyroglutamic acid...occurs as a breakdown product of glutamate that can accumulate in foods during storage and processing." (13)

"I have been asked to give testimony on the chemical nature of glutamates in food. The parent compound in the glutamate family is glutamic acid, an amino acid and normal component of the human body....Glutamic acid exists in two forms: (L)-glutamic acid and (D)-glutamic acid. The

L and D designations indicate different spatial arrangements of the atoms of the two forms. (D)- and (L)- glutamic acid molecules are mirror images, relating to each other in the same way as a glove for the right hand relates to its mate for the left hand. Just as certain properties of the left-hand glove differ from those of the right-hand glove (e.g., the left-hand glove cannot be worn on the right hand, and vice versa), so (L)-glutamic acid and (D)-glutamic acid differ from each other in certain other properties. For example, in the body, (D)-glutamic acid is not broken down (metabolized) in the same way as the (L) form because the enzymes that recognize and work on the (L) form do not recognize, and, therefore, 'ignore,' the (D) form. Nearly all naturally occurring glutamic acid is in the (L) form." (14)

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**[www.truthinlabeling.org](http://www.truthinlabeling.org)**

# Hidden names for MSG and free glutamic acid:

## Names of ingredients that always contain processed free glutamic acid:

- Glutamic Acid (E 620)
- Glutamate (E 620)
- Monosodium Glutamate (E 621)
- Monopotassium Glutamate (E 622)
- Calcium Glutamate (E 623)
- Monoammonium Glutamate (E 624)
- Magnesium Glutamate (E 625)
- Natrium Glutamate
- Yeast Extract
- Anything “hydrolyzed”
- Any “hydrolyzed protein”
- Calcium Caseinate
- Sodium Caseinate
- Yeast Food
- Yeast Nutrient
- Autolyzed Yeast
- Gelatin
- Textured Protein
- Umami
- Whey Protein
- Whey Protein Concentrate
- Whey Protein Isolate
- Anything “...protein”
- Vetsin
- Ajinomoto
- Soy Protein
- Soy Protein Concentrate
- Soy Protein Isolate

## Names of ingredients that *often* contain or produce processed free glutamic acid:

- Carrageenan (E 407)
- Bouillon and broth
- Stock
- Any “flavors” or “flavoring”
- Maltodextrin
- Citric acid, Citrate (E 330)
- Anything “ultra-pasteurized”
- Barley malt
- Pectin (E 440)
- Protease
- Anything “enzyme modified”
- Anything containing “enzymes”
- Malt extract
- Soy sauce
- Soy sauce extract
- Anything “protein fortified”
- Anything “fermented”
- Seasonings

## The following are ingredients suspected of containing or creating sufficient processed free glutamic acid to serve as MSG-reaction triggers in HIGHLY SENSITIVE people:

- Corn starch
- Corn syrup
- Modified food starch
- Lipolyzed butter fat
- Dextrose
- Rice syrup
- Anything labeled “vitamin enriched”
- Brown rice syrup
- Milk powder
- Reduced fat milk (skim; 1%; 2%)
- Most things labeled “Low Fat” or “No Fat”

- Anything labeled “Enriched”

**The following work synergistically with MSG to enhance flavor. If they are present for flavoring, so is MSG.**

- Disodium 5'-guanylate (E 627)
- Disodium 5'-inosinate (E-631)
- Disodium 5'-ribonucleotides (E 635)

## **Types of products that contain MSG**

### **In general...**

MSG can be used (and hidden) in processed foods, dietary supplements, cosmetics, personal care products, pharmaceuticals, and the food that is given to pets and other animals. It can be used in waxes applied to fresh fruits and vegetables. It can be used as ingredients in pesticides, fungicides, fertilizers, and plant growth enhancers -- remaining **in** the edible portion of the plant or **on** the edible portion of the plant when its leaves, fruits, nuts, grains, seeds, and other edible parts are brought to market.

There are over 40 food ingredients besides "monosodium glutamate" that contain processed free glutamic acid (MSG). Each, according to the FDA, must be called by its own, unique, "common or usual name." "Autolyzed yeast," "maltodextrin," "hydrolyzed pea protein", and "sodium caseinate" are the common or usual names of some ingredients that contain MSG. Unlike the ingredient called "monosodium glutamate," they give the consumer no clue that there is MSG in the ingredient.

In addition to ingredients that contain MSG, some acids and enzymes when combined with a food that contains protein will produce MSG. The words “enzyme” and “protease” (which is a type of enzyme) signal the presence of enzymes capable of causing the production of MSG.

### **In particular...**

- Low fat and no fat milk products often contain milk solids that contain MSG. Other dairy products often contain carrageenan, guar gum, and/or locust bean gum. Low fat and no fat versions of ice cream and cheese may not be as obvious as yogurt, milk, cream, cream cheese, cottage cheese, etc., but they are not exceptions.

- Protein powders and protein drinks contain glutamic acid, and the glutamic acid in the protein powders and drinks will always be processed (manufactured) free glutamic acid (MSG). Individual amino acids are not always listed on labels of protein powders and drinks.

- At present, there is an FDA requirement to give the name of the protein source when listing hydrolyzed protein products on labels of processed foods. Examples are hydrolyzed soy protein, hydrolyzed wheat protein, hydrolyzed pea protein, hydrolyzed whey protein, hydrolyzed, corn protein. If a tomato, for example, were whole, it would be identified as a tomato. Naming an ingredient “tomato protein” indicates that the tomato has been hydrolyzed, at least in part, and that processed free glutamic acid (MSG) is present.

- At present, the FDA requires the disclosure of ingredients labeled “monosodium glutamate” and “hydrolyzed...protein” when, as ingredients, they are used in a “flavor” or “flavoring” (whether or not the “flavor” or “flavoring” is preceded by the words “natural” or “artificial”). However, “flavors” and “flavorings” can contain MSG in ingredients other than “monosodium glutamate” and “hydrolyzed...Protein” without the MSG being disclosed.

- Disodium guanylate and disodium inosinate are relatively expensive food additives that work synergistically with inexpensive processed free glutamic acid (MSG). We believe that they would only be used if there was MSG in a product.

- MSG will be found in some soaps, shampoos, hair conditioners, and cosmetics, where MSG is hidden in ingredients with names that include the words "hydrolyzed," "amino acids," and/or "protein."



- Binders and fillers for prescription and non-prescription medications, nutrients, and supplements, may contain MSG.
- Enteral feeding materials, and some fluids administered intravenously in hospitals, may contain MSG.
- According to the manufacturer, Varivax–Merck chicken pox vaccine (Varicella Virus Live), contains L-monosodium glutamate and hydrolyzed gelatin, both of which contain processed free glutamic acid (MSG). It would appear that most, if not all, live virus vaccines contain some ingredient(s) that contains MSG.
- There are a number of ingredients identified as organic that, organic or not, will contain processed free glutamic acid (MSG). Autolyzed yeast, yeast extract, textured soy protein, and anything hydrolyzed are examples of ingredients that may be made from organic produce, but will never- the-less contain MSG.
- Drinks, candy, and chewing gum are potential sources of hidden MSG. They may also contain aspartame, neotame, or AminoSweet (the new name for aspartame). We mention aspartame, neotame, and AminoSweet here because they, like MSG, contain a neurotoxic amino acid, and can cause the same reactions that MSG causes.
- Aspartame will be found in some medications, including children's medications.
- Anything that breaks down the protein in a product can produce MSG as it breaks down that protein. There have been reports of people reacting to meat wrapped in Cryovac. Cryovac is a registered trademark for a thick plastic in which meat is sealed with the air removed by a vacuum pump. The word Cryovac is also used for the thermoplastic resin wrapping film which can be heat-shrunk onto foods.
- Some waxes used on fruits and vegetables contain MSG.
- Produce may have been produced using fertilizer or pesticide products that contain MSG. Some of these fertilizers may be organic. It is impossible to know from looking at produce whether or not it has been treated with an MSG-containing fertilizer or pesticide product that leaves residue in or on the produce.
- Some non-organic waxes used on some fruits and vegetables contain MSG.
- Additional sources of MSG include infant formula, kosher food, enteral feeding products (tube feeding products), dietary supplements, pharmaceuticals, protein drinks often recommended for seniors, protein bars and protein powders, vaccines, personal care products, protein powders sold in health food stores, food that is labeled “organic”, wine, food with labels that say "No Added MSG," "No MSG Added," or "No MSG" , food that is falsely advertised as containing no MSG, and in food whose manufacturers claim, in response to questions, that their products contain no MSG.
- MSG can be hidden by restaurateurs who claim that the food they serve contains no MSG

### **About “organic” products...**

Where MSG is concerned, "organic" doesn't mean "safe". Ingredients like organic autolyzed yeast and organic natural flavoring have just as much processed (manufactured) free glutamic acid (MSG) in them as those not called "organic." Following are products labeled "organic" that have come to our attention as containing processed free glutamic acid (MSG). There are others.

Product: Vegetable Bouillon

By: Morgia

Ingredients include: Yeast extract; Maltodextrin

Product: macaroni & cheese dinner

By: Simply Organic

Ingredients include: Natural flavors; Autolyzed yeast extract

Also listed as organic are fertilizer products that contain hydrolyzed fish protein and hydrolyzed chicken feathers. All hydrolyzed ingredients contain MSG.

### **About “Health Food” stores...**

Health food stores are mine fields for MSG. Protein powders are generally nothing more or less than hydrolyzed proteins –and will contain all three manufactured neurotoxic amino acids: glutamic acid, aspartic acid, and L-cysteine. Food labeled “organic” cannot legitimately contain monosodium glutamate, but can contain other ingredients that contain MSG. Dietary supplements will often contain individual amino acids (because they can be absorbed by the body more quickly than amino acids found in protein which have to be digested before they can be absorbed); and if dietary supplements contain individual amino acids, those amino acids may be neurotoxic glutamic acid, aspartic acid, and/or L-cysteine, all manufactured in food and/or chemical plants.

These are the names of some of the MSG-containing ingredients often found in Health Food stores:

amino acids (They almost invariably contain glutamic acid.) autolyzed yeast

citric acid

glutamate

glutamic acid

hydrolyzed protein

monopotassium glutamate

monosodium glutamate protein

whey

protein concentrate

There are also chelates. Minerals found individually and in some multi-vitamins, are usually joined to amino acids for better absorption, i.e., the minerals or multi-vitamins are chelated.

The following are names used for chelates that will contain MSG and/or aspartic acid and phenylalanine which are two of the main ingredients in MSG’s toxic cousin aspartame:

amino acid chelate (chelated with amino acids) potassium (or any other mineral ) citrate

potassium (or any other mineral) aspartate potassium (or any other mineral) glutamate

chelated with hydrolyzed protein,

chelated with protein chelated with amino acids

Some supplement manufacturers place asterisks after the names of minerals. Below the list of ingredients, the asterisk is often followed by a note that explains that the mineral is "chelated with hydrolyzed protein," "chelated with protein," or "chelated with amino acids."

Protein powders are all the rage for body builders and older people. The main ingredient is typically a hydrolyzed protein -- and hydrolyzed proteins contain MSG, excitotoxic aspartic acid (found also in aspartame), and excitotoxic L-cysteine (found in some dough

conditioners). We have concern for anyone who ingests any form of MSG in his or her diet.

We have extreme concern for athletes who ingest MSG just prior to, just following, or in the course of vigorous exercise, because there is evidence that the adverse effects of MSG may be intensified by vigorous exercise. Heart irregularities have been known to be caused by ingestion of MSG and/or aspartame. Heart irregularities can result in cardiac arrest.

### **About hospitals, nursing homes, and extended care facilities...**

The most common sources of MSG in hospitals, nursing homes, and extended care facilities will be:

Soups – even if the institution purchases soups and/or soup bases that claim to be MSG-free

Protein drinks such as Boost and Ensure

Enteral care products – used when tube feeding

Gelatin

Gravies

Salad dressings

Intravenous solutions. Reactions have been reported to saline solution and solutions containing dextrose. Ringers solution appears to be MSG-free.

Anything no fat or low fat

Anything made with a sugar substitute likely contains neurotoxic aspartame, Equal, or AminoSweet.

People with extreme intolerance to MSG have difficulty with pharmaceuticals that contain MSG in the binders and/or fillers. They may also react to the starch on powdered gloves and/or the contacts that are glued to a patient's chest for heart monitoring. The contact points that touch the body may contain guar gum which, after several days' exposure, may cause adverse reactions.

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