MONOSODIUM GLUTAMATE:
Demystifying the Controversy & Discovering the Possibilities

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Disclosures

- Consultation
- Counsel
- Speaking
- Writing
- Development of education materials

- Florida Department of Citrus
- National Dairy Council/American Dairy Association Northeast
- National Cattlemen’s Beef Association
- Calorie Control Council
- Glutamate Association
- McCormick Science Institute
MSG Perception Among Dietitians

More than half are not favorable toward MSG.

The majority are interested in the science, safety, and sodium reduction benefits of MSG, & the global history and culinary applications.

Many are familiar with glutamate and umami but don’t understand the association with MSG.

Source: Ajinomoto Registered Dietitian Nutritionist (RDN) Survey of 800 RDNs, Edelman Intelligence, 2018.
MSG Perception Among Culinary Professionals / Students

Chefs are generally positive or neutral toward MSG, but only 58% know that MSG provides food with umami flavor.

While some believe MSG is generally unhealthy, they are unable to articulate precisely why this is.

Chefs are far more likely to get food information from their colleagues (78%) than from any other source.

Source: Ajinomoto Segmentation Survey of 255 chefs and 150 culinary instructors / students, Edelman Intelligence, 2018.
About half of consumers (48%) are not favorable toward MSG, but don’t know why.

While majority of registered dietitian nutritionists (87%) are familiar with the term umami, many consumers are not (only 25% are aware).

Some consumers mistakenly believe that glutamate is associated with gluten.

Consumers want to hear more about MSG’s health benefits, safety and the natural occurrence of glutamate.

Source: Ajinomoto Segmentation Survey of 1,500 general population consumers and 2,000 food forward consumers, Edelman Intelligence, 2018.
1 LTE in 1968, in the *New England Journal of Medicine* by a physician, Dr. RHM Kwok

Symptoms after eating a meal at a Chinese restaurant

He *speculated* that MSG was 1 possibility, but offered other possibilities as well.
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He SPECULATED that MSG was 1 possibility, but offered other possibilities as well.
MSG Ground Zero: The Power of Perception - & Research

Decades of research, mostly on animals

Huge amounts of MSG used in studies, far more than could ever be consumed in food.

Taken in other ways than humans would consume it (fed through a tube into the stomach or gut, injected into the bloodstream, etc.)
Free glutamate: “no longer bound to other amino acids, and may therefore be absorbed much more rapidly, causing spikes in the concentration of glutamate in the blood.”

FACT: 95% of glutamate, free or bound - is NEVER ABSORBED and stays in the gut.

SAFETY - The Basics

FDA: “Generally Recognized as Safe”

Average glutamate production by the body: 50 grams/day

Average adult consumption:
- Glutamate: 13.0 grams/day
- MSG: 0.55 grams/day

2-https://glutamate.org/basic/glutamate-and-the-human-body/
SAFETY: Conclusions of a 2017 Review & Update of MSG

- Human body does NOT discriminate between Glu in food and Glu as a seasoning.
- Compartmentalized in the human body
- Most glutamate does NOT cross biological membranes
- 95% of glutamate is metabolized by gut cells as an energy source; serves as a substrate for metabolites in the liver
- Normal food use does NOT elevate plasma levels
- ADI is NOT attainable when consumed in the diet

Henry-Unaeze HN. Pathophysiology 2017
SOME SIGNIFICANT FLAWS IN GLUTAMATE RESEARCH

- Studies often use MSG in isolation. We ALWAYS eat it in with food.
- Injected vs. oral? Injected = Irrelevant. We only take MSG orally.
- Neurotoxicity in mice? This has never been replicated in primates.
Among symptoms of “Chinese Restaurant Syndrome” are a “severe pulsing headache.”

There is no scientifically established link between monosodium glutamate and migraine headaches.

This has never been replicated in DB-PC trials. These symptoms were reported in similar numbers by subjects who received placebos. No credible, controlled research studies - over several decades -- have found a link between MSG and headaches.

2018: International Headache Society removes MSG from its list of factors that cause headache

SAFETY: Conclusions of a 2017 Review & Update of MSG

“But it’s different for me. I’m really sensitive to MSG.”

“Scientists have NOT been able to consistently elicit reactions in double-blind studies with ‘SENSITIVE’ individuals,” using MSG or a placebo in food.”

Henry-Unaeze HN. Pathophysiology, 2017
How much MIGHT it take to produce even MILD symptoms?

**VERY SMALL** number of people may exhibit symptoms, *IF*:

- 3 grams MSG are taken all at once, *AND*
- *Without* food, on an *empty* stomach

You’d have to eat these amounts of food:

- 250 gm (8.8 oz.) parmesan cheese
- 300 gm (~10.5-oz.) soy sauce
- 4.2 Kg (~9.2 lb.) of tomatoes
**WHY MSG is safe...and DESIRABLE**

2 components:

- Sodium & Glutamate
  - Separates into a sodium molecule and the glutamate molecule in the presence of aqueous solutions (any time water is present)

Glutamate:

- An amino acid humans ALREADY MAKE internally
- Glutamate is part of EVERY protein food, both plant- and animal-based.

Sodium & glutamate are absorbed separately, same as with food
Human breast milk contains 10x the free glutamate as cow’s milk

Food Technol 41(5):143-145, 1987
The Guts of Glutamate

>95% of glutamate is NEVER ABSORBED

Stays in the lower GI tract (colon)

Glutamate is the most prevalent amino acid in the gut - most of the dietary glutamate we eat is used as fuel by the cells in the digestive tract.
Umami taste receptors

Family of protein receptors responsible for discriminating between sweet, bitter, and umami tastes. Each taste bud has 50-100 “receptor” cells.

Recognition of a specific taste, like umami, by the receptor, triggers a cascade of signals. This causes the release of neurotransmitters that activate areas of the brain where taste is processed.

Umami receptors also help trigger the neurotransmitters involved in mediating the satiety response.

Because glutamate is present in so many essential foods, it’s felt that this ability to detect the presence of glutamate as “umami” was essential for survival.

San Gabriel et al. AJCN 2009, 90(3):743S-746S
Umami “taste receptor” cells are present in other organs than the tongue (especially the gut & pancreas).

Instead of transmitting signals directly to the brain, they send signals that trigger the release of hormones that influence & regulate blood glucose levels, insulin levels, appetite, & satiety.

San Gabriel et al. AJCN 2009, 90(3):743S-746S
GLUTAMATE BENEFITS
The Fun Stuff
MSG Helps Increase Satiety

Carrot soup:

- Plain
- With added whey protein
- Both soups offered WITH and WITHOUT additional MSG (5 gm)

Meal given 2 hours after the soup

RESULTS:

- Food intake was similar for all groups, BUT, subjective appetite was significantly lower only after the soup with added protein AND MSG.
- Soup with *added protein AND MSG*: reduced blood glucose levels and increased post-treatment insulin level, even though food intake was the same.

Anderson et al, Appetite, 2017
How Does MSG Work to Increase Satiety?

Anderson et al 2017 Appetite: “MSG increased fullness and reduced desire to eat, as well as subjective appetite, and when added to protein decreased blood glucose and increased insulin.”

Protein has long been known to promote satiety. The ability to taste glutamate (umami) may be a way of detecting the presence of protein in foods, and this may contribute to satiety. E.g. glutamate may be a “proxy” for the presence of protein.

Anderson et al, Appetite, 2017
2019 Dietary Reference Intakes for Sodium

**All ages, male and female:**
- 2,300 mg/day, maximum, for chronic disease risk reduction

**Children 9-13 years:**
- “Reduce intake if above 1,800 mg/day.”

**Children 4-8 years:**
- “Reduce intake if above 1,500 mg/day.”

**Children 1-3 years:**
- “Reduce intake if above 1,200 mg/day.”

Current sodium intake: >3,400 mg/day

According to the report, consumers:

• “have gradually grown accustomed to saltier foods…but research indicates that this trend can be reversed as well. People's tastes can be reset to prefer less salty flavor through subtle reductions over time, studies show.”

SODIUM:
With MSG, Less IS More

MSG is LOWER in sodium than regular salt:

- 1 gm table salt: approx. **390** mg sodium
- 1 gm MSG: approx. **120** mg. sodium

Has **2/3 LESS** sodium than regular salt

Useful tool for reducing dietary sodium while *improving* taste

MSG can help people achieve dietary goals

- Increases the palatability of vegetables & legumes
Sodium in Salt vs. MSG (1 tsp.)

1/2 MSG, 1/2 Salt = 40% sodium reduction
Summary: Why Use MSG

• Safety of MSG:
  • Repeatedly reviewed & verified by global regulatory agencies
  • GRAS status in the US.
  • REMOVED AS A HEADACHE TRIGGER by the International Headache Society
Glutamate is naturally present in numerous foods (cheese, tomatoes, mushrooms, meat, breast milk)

It’s added as a seasoning to many dishes and savory snacks.

Glutamate ENHANCES the flavor of foods because it adds UMAMI, one of the 5 basic tastes.

MSG has 2/3 LESS sodium than table salt, while ENHANCING FLAVOR & decreasing the need for salt by up to 40%
Summary: Why Use MSG

- Glutamate: present in numerous common foods
- Used as a seasoning in savory foods
- ENHANCES flavor by adding umami
- Contains 2/3 LESS sodium
- ENHANCES flavor while REDUCING sodium
WHERE CAN YOU FIND PURE MSG?

“Anywhere fine foods are sold”
ADDITIONAL RESOURCES

WhyUseMSG.com

MSGFacts.com