

Leading With Flavor: Creating A Love Of Vegetables Through Umami

Wednesday, November 18, 2020

Presented by:

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**PRODUCE FOR®
BETTER HEALTH**
FOUNDATION

Eat Well, Live Well.

Aj
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Moderator

Wendy Reinhardt Kapsak, MS, RDN

President & CEO

Produce for Better Health Foundation

have a
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A smiling woman with long dark hair is holding a tray with a plate of food and several glasses of smoothies. In the background, a man with a beard and suspenders is also visible. The scene is set outdoors at a wooden table with other plates of food.

Our Purpose

The Produce for Better Health Foundation (PBH), a 501(c)3, is the only national non-profit organization committed to helping people live happier, healthier lives by eating more fruits and vegetables in all their glorious forms every day.

Our Movement

Research shows, rather than a prescriptive recommendation to eat a certain amount of fruits and vegetables each day, consumers (particularly Gen Z and Millennials) want actionable, realistic and FUN approaches that make eating fruits and vegetables easy, helping them feel confident, happy and healthy.

That's where PBH's Have A Plant® movement comes in. It's a way to tap into the emotional connection consumers have to the fruit and vegetable eating experience while inspiring long-term, sustainable behavior change. And it does so with a no-nonsense approach that's simple, understandable, and, importantly for this audience, non-prescriptive.



Housekeeping

**1 CPEU available through
the Commission on Dietetic
Registration (CDR)**

**You will receive a link to
the certificate of
attendance, the webinar
recording and PDF of the
presentation!**

**Type your questions into
the Question box at the
bottom of your Control
Panel at any time during
the webinar.**



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A top-down view of a wooden bowl containing several vegetable spring rolls. Each roll is filled with shredded carrots, purple cabbage, and white cheese cubes, wrapped in green lettuce leaves. In the center of the bowl is a small bowl of orange-colored dipping sauce, garnished with chopped peanuts and red chili flakes. The background is dark, and some fresh vegetables like a red chili and purple cabbage are visible on the left side.

Eat Well, Live Well.



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DISCLOSURES

- Kathleen Zelman, MPH, RD, LD has the following disclosures:
 - Owner, No Nonsense Nutrition, LLC
 - Board of Directors, True Health Initiative, Inc.
- Advisory Boards
 - Sabra's Health and Wellness Advisory Board
 - Nutrition4Kids Medical Advisory Board
 - Member, Bayer Leaders Engaged in Advancing Dialogue Network
 - Ajinomoto Health & Nutrition, Nutrition Expert

WHAT AMERICANS EAT



Peter Menzel, from the book, "Hungry Planet: What the World Eats."

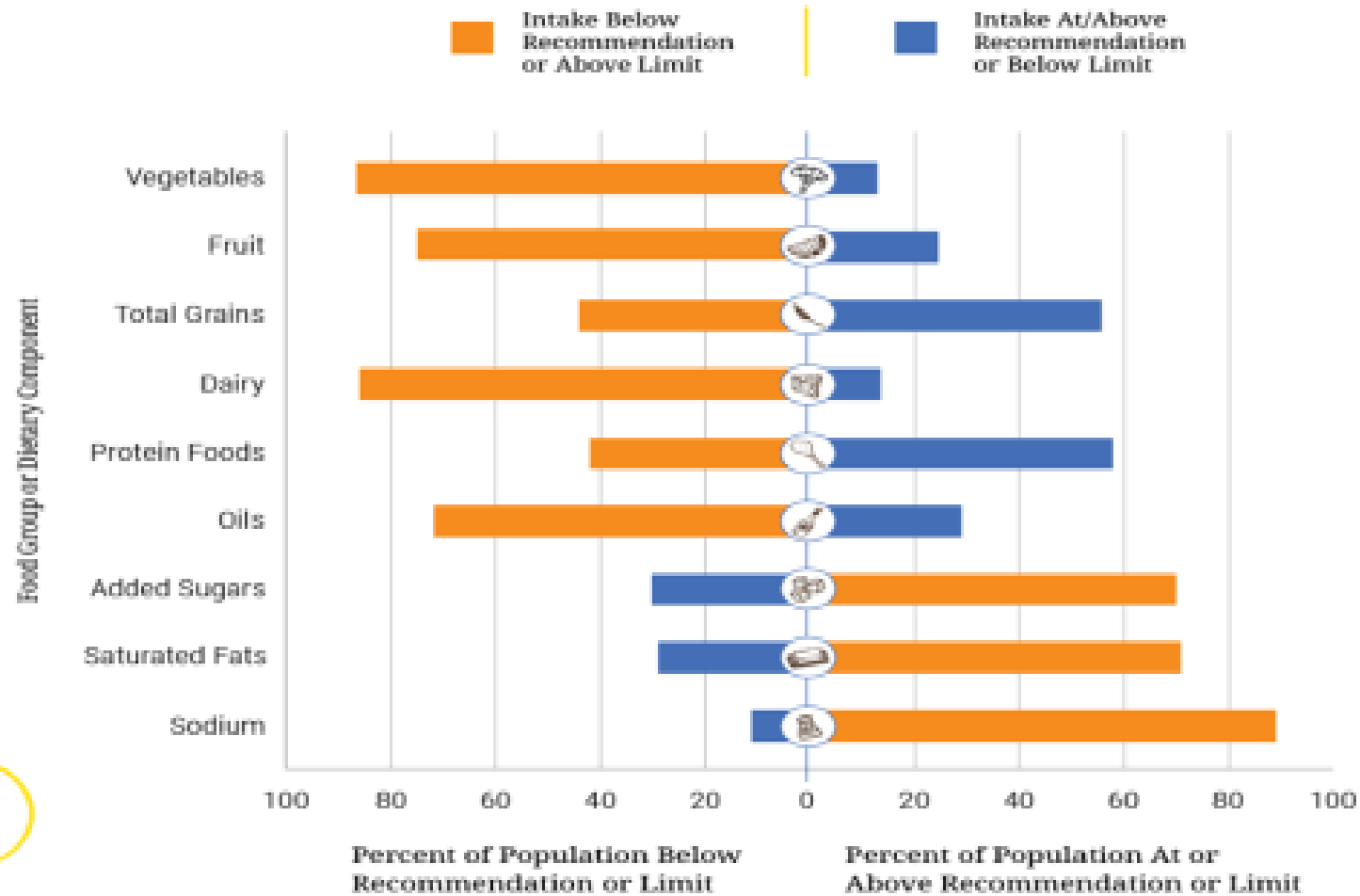
'I Just Need the Comfort': Processed Foods Make a Pandemic Comeback

Shoppers, moved by nostalgia and hunting for longer shelf lives, are returning to old standbys like Chef Boyardee and Campbell's soup.



Move Towards a Plant-Based Diet

Dietary Intakes Compared to Recommendations. Percent of the U.S. Population Ages 1 Year and Older Who Are Below, At, or Above Each Dietary Goal or Limit



Information adapted from the 2015-2020 Dietary Guidelines for Americans. Available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov).

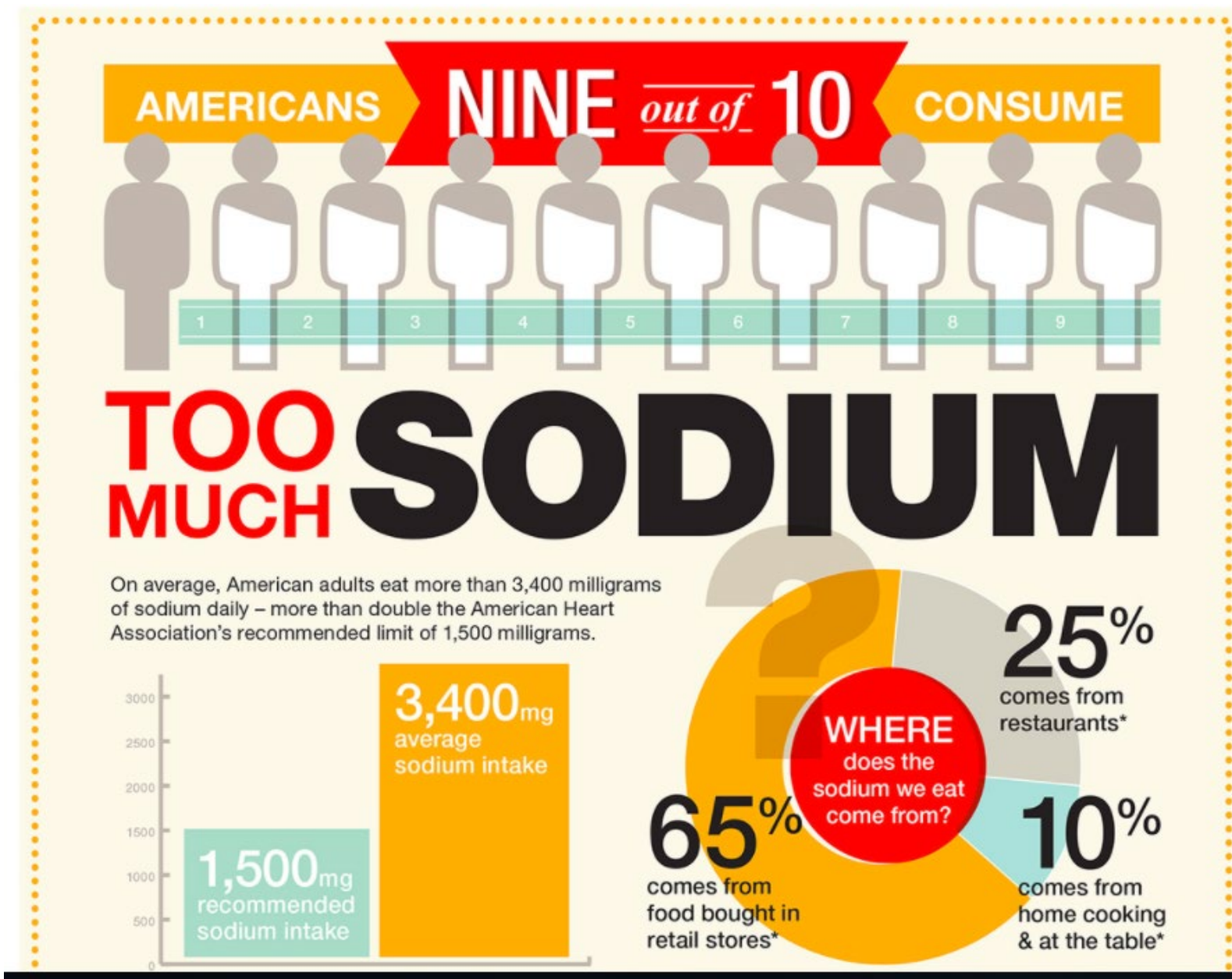
Critical Importance of Good Nutrition

“About half of all American adults—117 million individuals—have one or more preventable chronic diseases, many of which are related to poor eating and physical activity patterns.”

Our jobs matter because food is nourishment providing essential nutrients for health and wellness.

Trends have an enormous impact on behavior.





- Report confirms sodium intake continues to be at an all-time high in the U.S., with ~90% of Americans consuming ~3400mg per day.
- The report recommends a healthy diet pattern that is within the Chronic Disease Risk Reduction Intake (CDRR) – no more than 2300mg .



WHAT IF I TOLD YOU
THERE WAS A
SEASONING,
DISCOVERED MORE
THAN 100 YEARS AGO,
THAT CAN IMPROVE
THE PALATABILITY OF
PLANT-BASED FOODS
WHILE ALSO
SIGNIFICANTLY
REDUCING SODIUM?

...and what if I told you that
seasoning was monosodium
glutamate (MSG)?

Chick-fil-a, Popeyes and KFC all use MSG in their chicken

The *Salt Flip*: Sensory mitigation of salt (and sodium) reduction with monosodium glutamate (MSG) in “Better-for-You” foods

Jeremia Halim, Ali Bouzari, Dan Felder, Jean-Xavier Guinard 

First published: 10 August 2020 | <https://doi.org/10.1111/1750-3841.15354> | Citations: 1



MSG can significantly reduce sodium and promote the enjoyment of good-for-you foods via the substitution of MSG for some salt

In the study, supported by Ajinomoto Co., Inc., participants evaluated four different recipes in which sodium was reduced by **31 to 61%** through the addition of MSG, and described the dishes as "flavorful," "delicious," and "balanced."

Current Sodium Intakes in the United States and the Modeled Effects of Glutamate Incorporation into Select Savory Products

by  Taylor C. Wallace ^{1,2}  ,  Alexandra E. Cowan ³  and  Regan L. Bailey ^{3,*}  

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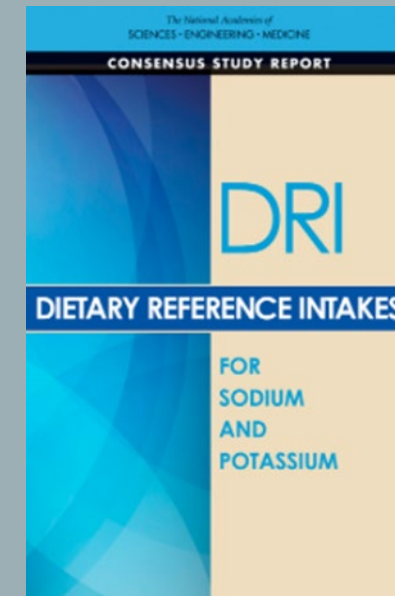
* Author to whom correspondence should be addressed.

Nutrients **2019**, *11*(11), 2691; <https://doi.org/10.3390/nu11112691>



Study published in *Nutrients* shows MSG can reduce sodium by 7-8% in the US population without sacrificing flavor.

Results consistent with DRIs which reference MSG as a sodium lowering tool.



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Glutamate Contributes to the Reduction of Dietary Sodium Intake

The World Health Organization (WHO) recommendation on sodium consumption for adults is 2 g sodium/day (equivalent to 5 g salt/day). However, most people consume much more with the current mean global sodium consumption estimated to be at 3.95 g sodium/day (Mozaffarian et al. 2014). Since high sodium intake is reported to be associated with various non-communicable diseases (NCDs) such as hypertension, cardiovascular disease and stroke, the reduction of sodium intake is a very important public health concern around the world (WHO, 2003).

While sodium reduction in the diet is an important objective, when salt (NaCl) levels are reduced in foods, its palatability is also generally decreased. Monosodium glutamate (MSG) is a flavour enhancer that contains about 12% sodium, which is less than half of that contained in regular table salt at about 39%. Therefore, by the addition of an appropriate amount of MSG, the palatability of low salt foods can be recovered with the overall sodium content of the food being substantially reduced.

Umami and salt reduction

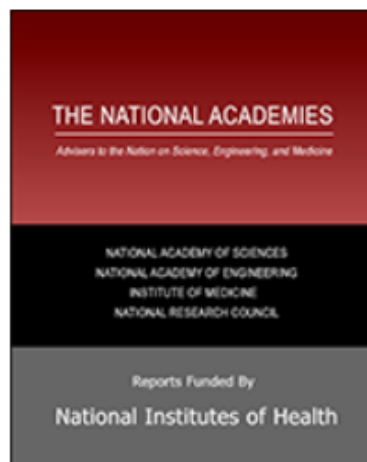
Katsuyuki Ando 

Hypertension Research **43**, 569–570(2020) | [Cite this article](#)

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“Some studies have shown that it is possible to maintain food palatability with a lowered overall sodium level in a food when MSG is substituted for some of the salt.”

FOOD AND NUTRITION BOARD / INSTITUTE OF MEDICINE



Strategies to Reduce Sodium Intake in the United States

Institute of Medicine (US) Committee on Strategies to Reduce Sodium Intake; Editors: Jane E Henney, Christine L Taylor, and Caitlin S Boon.

Washington (DC): [National Academies Press \(US\)](#); 2010.
ISBN-13: 978-0-309-14805-4 ISBN-13: 978-0-309-14806-1

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Published online 2017 Jul 13. doi: [10.1002/fsn3.499](https://doi.org/10.1002/fsn3.499)

PMCID: PMC5694874

PMID: [29188030](#)

Monosodium glutamate as a tool to reduce sodium in foodstuffs:
Technological and safety aspects

[Hellen D. B. Maluly](#),¹ [Adriana P. Ariseto-Bragotto](#),¹ and [Felix G. R. Reyes](#)¹

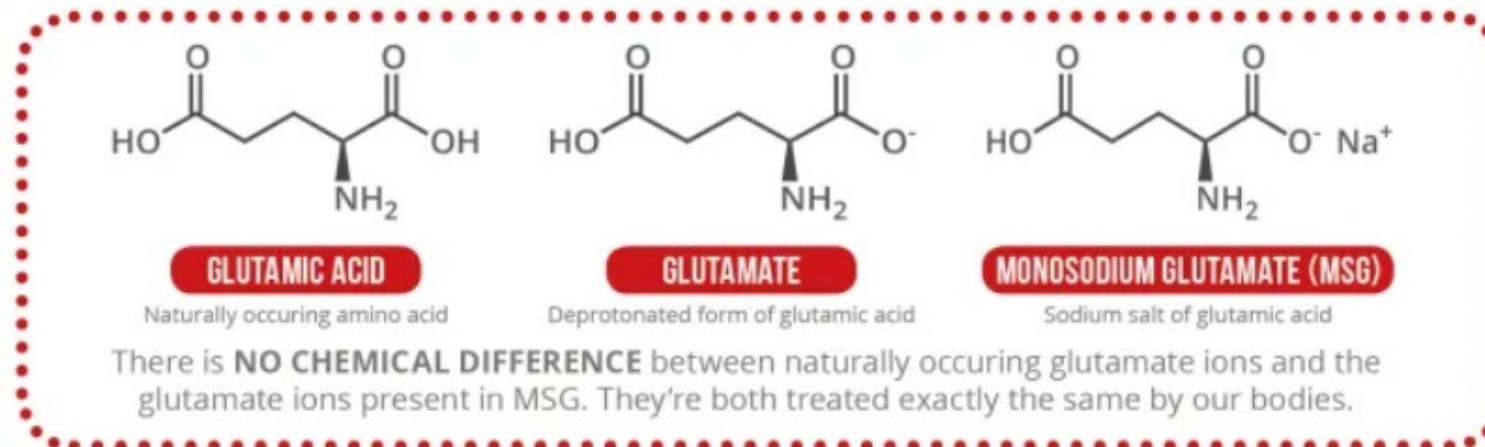
MSG Reduces Sodium by 30-50% in Packaged Foods

- Research has shown that MSG can be used to reduce sodium by 30%, and sometimes up to 50%, in packaged foods and snacks such as soups, broths, chips, and sausage - without compromising taste and consumer preference for the products.



MSG 101

- Has **2/3 less sodium than table salt** and can enhance the flavor of food while decreasing the need for salt.
- MSG is a completely safe, pure umami seasoning that combines sodium with glutamate, the most abundant amino acid in nature and one of 20 that make up protein.
- Glutamate is also naturally present in foods: tomatoes, aged cheeses, mushrooms, breast milk.
- MSG separates into sodium and glutamate when it's exposed to fluids
- The body cannot distinguish between the glutamate naturally present in foods and MSG.



Embrace Umami

- Savory deliciousness that adds dimension to flavor > Fifth taste (sweet, sour, bitter, salty)
- Created by a family of compounds called glutamates (L-glutamic acid and salts of amino acid glutamic acid)
- Experienced across the tongue
- Lingers in the mouth (noticeable mouthfeel)
- Promotes saliva production
 - Beneficial for people with dry mouth due to medications, aging, cancer rx, nerve damage, health conditions



TASTE IS THE TOP PURCHASE DRIVER FOR CONSUMERS¹

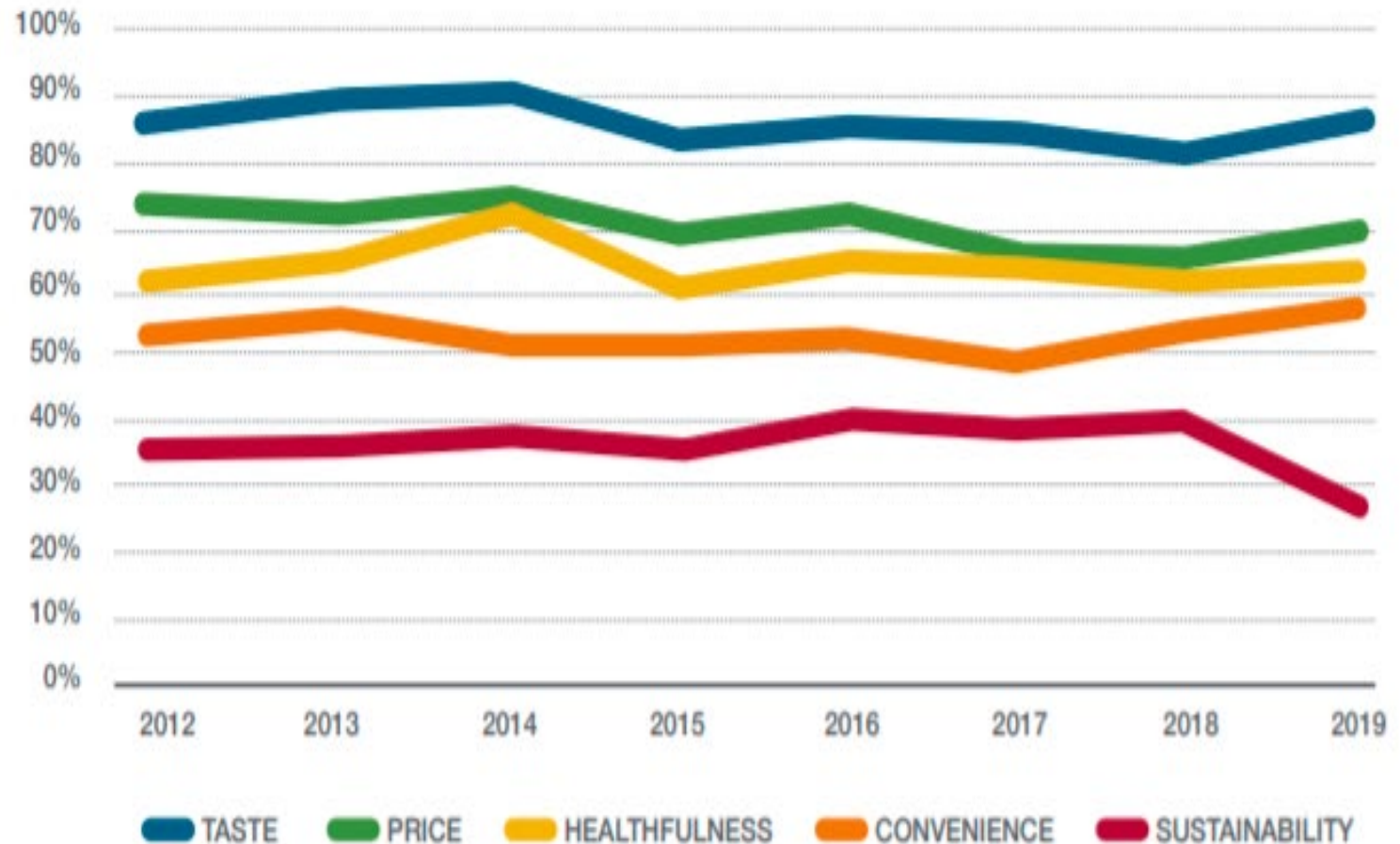
Taste, price, healthfulness reign supreme

Convenience relatively steady with half of consumers stating it as top driver

86%

of consumers say taste is a top (4-5 of 5) driver of purchases. Only 35% say the same for brand.

PURCHASE DRIVERS OVER TIME



Source: 2019 Food and Health Survey from the International Food Information Council Foundation

MSG Controversy

- MSG is one of the most beloved and demonized ingredients in American history
- A staple for many home cooks and world renown chefs like Hugu Acheson. “MSG is a flavor accelerator,” said award-winning chef Andrew Zimmern
- Yet “MSG free” is touted as clean eating

FOOD & DRINK

From MSG Scare to MVP Status: How We Learned to Love Umami

It's what makes miso mouthwatering and Doritos delectable. Some chefs have even taken this savory 'fifth flavor' to extremes. Now a more balanced approach is replacing umami bombs with newly nuanced recipes



Research: MSG is Safe



- Cleared of causing cancer, brain damage, headaches or asthma.
- FDA: MSG as “generally recognized as safe” since 1959, with frequent reviews of its safety in succeeding years. No limits set.
- European Food Safety Authority defines tolerable daily intake as 30 mg/kg of body weight.
- Academy of Nutrition and Dietetics Evidence Analysis Library (EAL) also summarizes that MSG is safe based on existing body of evidence.

Leading Health Organizations Confirm Safety of MSG

- Over the last 30 years, American scientists have independently verified that MSG is safe to consume using validated scientific methods.
 - FDA, Council on Scientific Affairs of the American Medical Association, and Joint FAO/WHO Expert Committee on Food Additives
- Extensive scientific research confirms MSG's safety in combination with a long history of use around the world.
- Studies showing adverse reactions have done so by using unrealistic, extremely high bolus dose on an empty stomach.

How much MIGHT it take to produce even *MILD* symptoms?

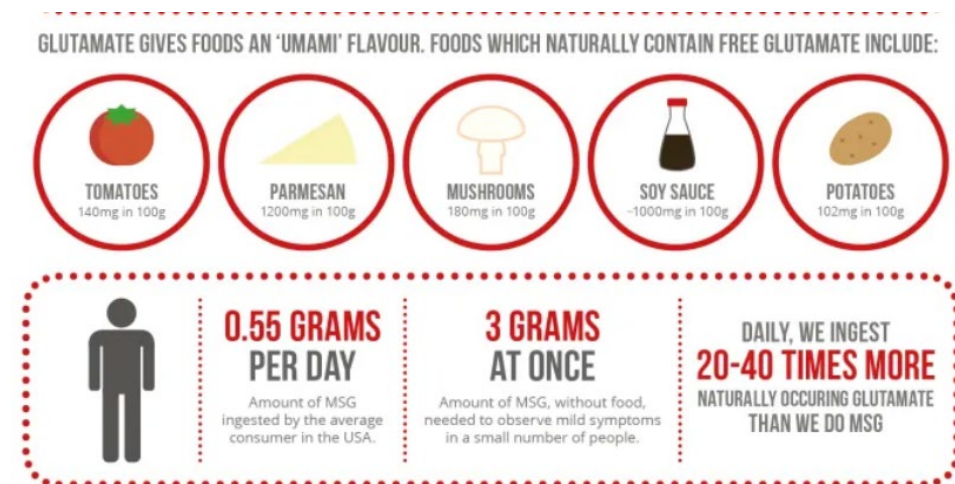
VERY SMALL number of people may exhibit symptoms, IF:

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

An average adult consumes ~13 grams of glutamate each day from protein-containing foods, while intake of added MSG is estimated at around 0.55 grams per day

Glutamate in foods:

- Parmesan cheese (1 tbsp) 60-85mg
- Soy sauce (1 tbsp) 65-200mg
- Tomatoes (1/2 cup) 220mg



MSG & Chinese Restaurant Syndrome: The Facts

- In 1968, a letter to the editor of The New England Journal of Medicine described the author's anecdotal account of generalized weakness, palpitations and numbness in the arms after eating at a Chinese restaurant.
- He speculated that it could have been sodium, alcohol, or MSG.
- Researchers concluded that Chinese restaurant syndrome isn't rooted in scientific evidence.

The New England
Journal of Medicine
April 4, 1968
CHINESE-RESTAURANT
SYNDROME

Headaches? Not from MSG

- FDA has never been able to confirm MSG as the cause.
- 1990s FDA worked with the FASEB to examine MSG's safety>they concluded MSG is safe
- International Headache Society removed MSG from its list of causative factors for headaches in January of 2018.

MSG Sensitivity???

- Some people identify themselves as sensitive to MSG, however reactions have not been consistently replicated in double-blind, placebo-controlled human trials or even in those who claim to be sensitive.
 - Henry-Unaeze HN. Update on food safety of monosodium l-glutamate (MSG). Pathophysiology. 2017 Dec;24(4):243-249.
- MSG is not considered an allergen.
- The Australian/New Zealand regulatory agency has previously stated that the percent of the population with a sensitivity “is not really known but is suggested to be between 1 and 2% of the general population.”

If MSG is Safe, Why the Aversion?

- Relationships with food are driven by physiological mechanisms and psychological influences
- Cultural and social norms, fears and cognitive biases all play a role
- People disbelieve science when it contradicts personal experiences – confirmation bias
- Erosion of trust in science



Promote Health and Clear Up Consumer Confusion

- Health experts have endorsed the safety of MSG based on extensive scientific research and a long history of use around the world
- As professionals, we need to set the record straight
- It's time to promote MSG as a helpful ingredient in the enjoyment of nutritious plant-based foods to help make healthy eating easier, likely leading to a positive impact on health
- Make Dietary Guidelines recommendations more achievable through craveability

By The Numbers

- 59% of consumers are not aware that MSG contains less sodium than table salt
- >50% of consumers are favorable to the idea of using MSG to reduce sodium while improving taste of food, especially vegetables and other plant-based dishes
- 67% of consumers would like to learn how to cook with MSG
- 46% of consumers actively avoid foods that contain MSG

Disclosures

Consultant for Ajinomoto

Culinary Perspective

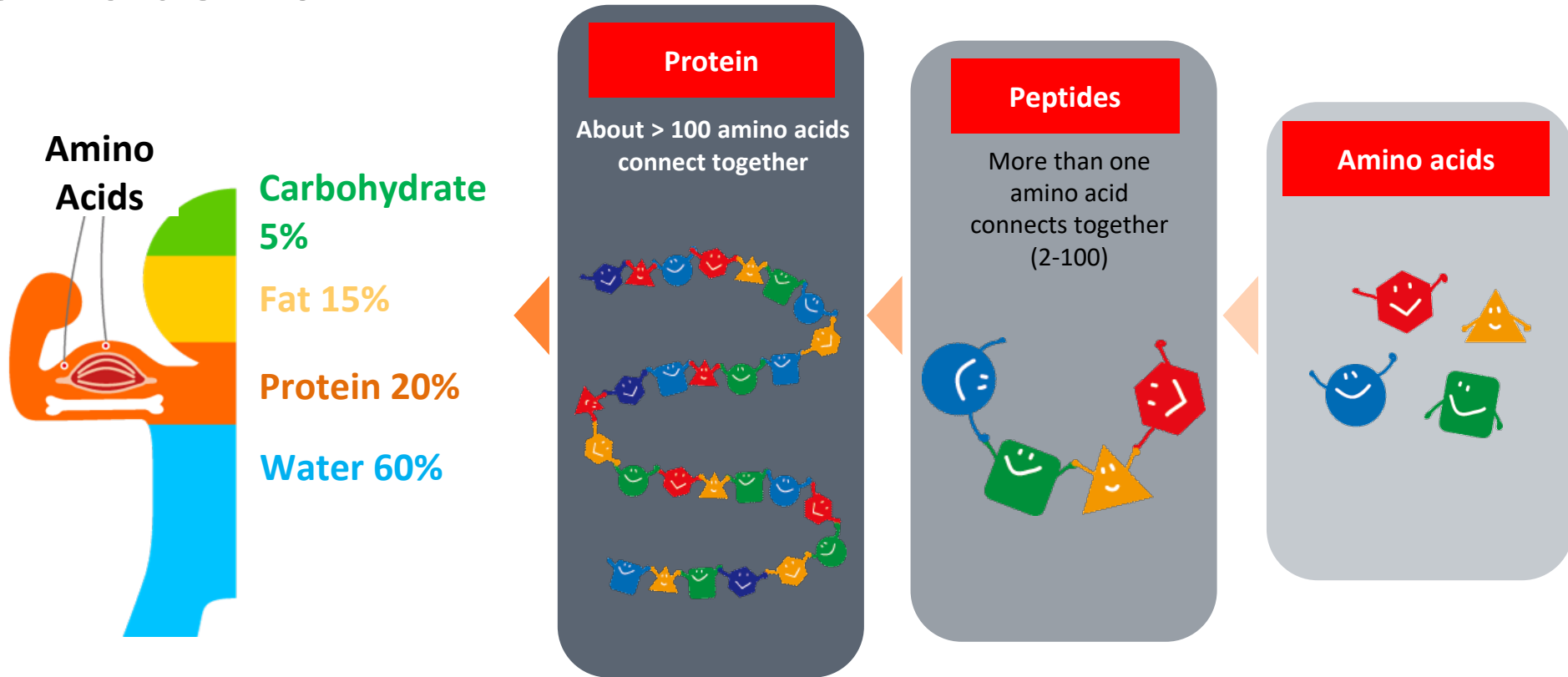
Christopher Koetke, CEC CCE HAAC

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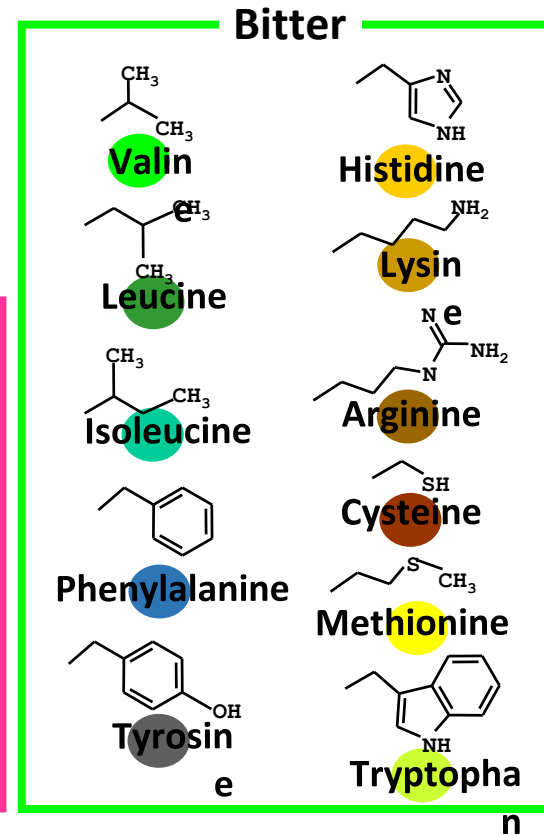
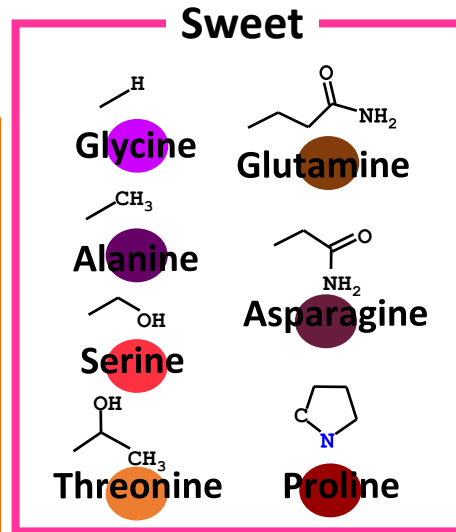
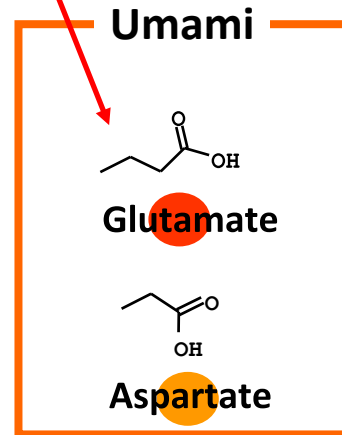
Amino Acids 101



20 amino acids result in ~100,000 different proteins

Taste of Amino Acids

Glutamate when not in a protein is what we perceive as umami.



Free vs. Total Glutamate (mg/100g)

Includes free glutamate plus
that "bound" to protein

Umami receptors detect
free glutamate.



	Total	Free*
Cheddar cheese	6090	600
Parmesan cheese	8210	1600
Tomato	310	246
Corn	650	106

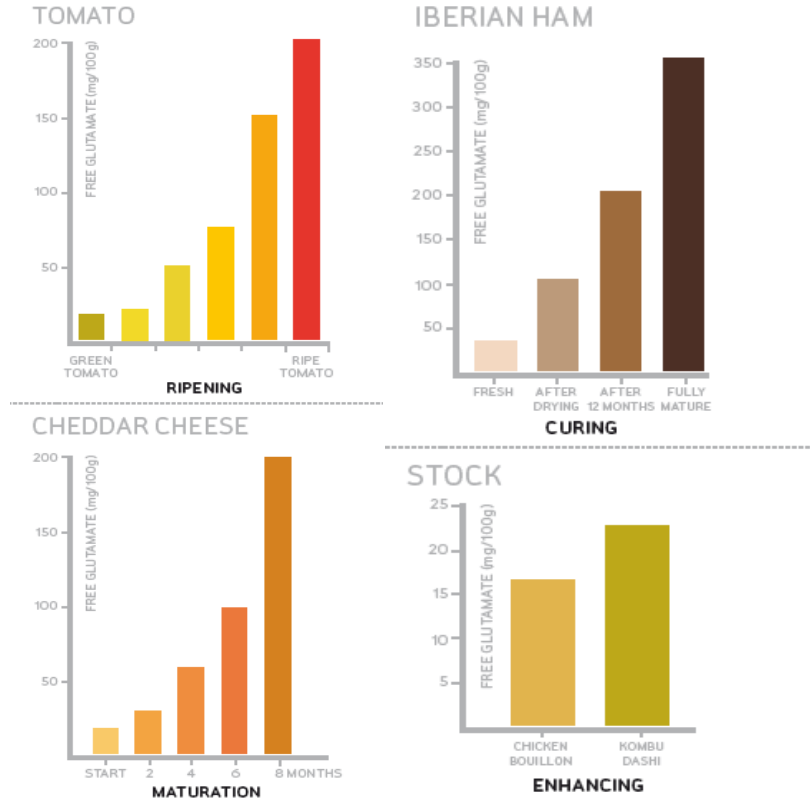


* Free glutamate in cheeses will vary based on degree of aging.

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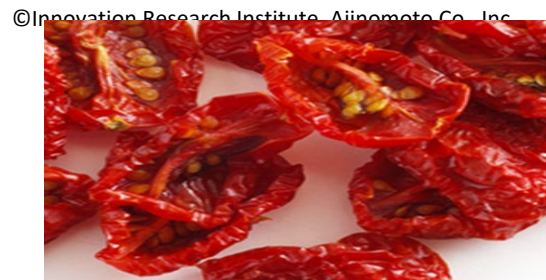
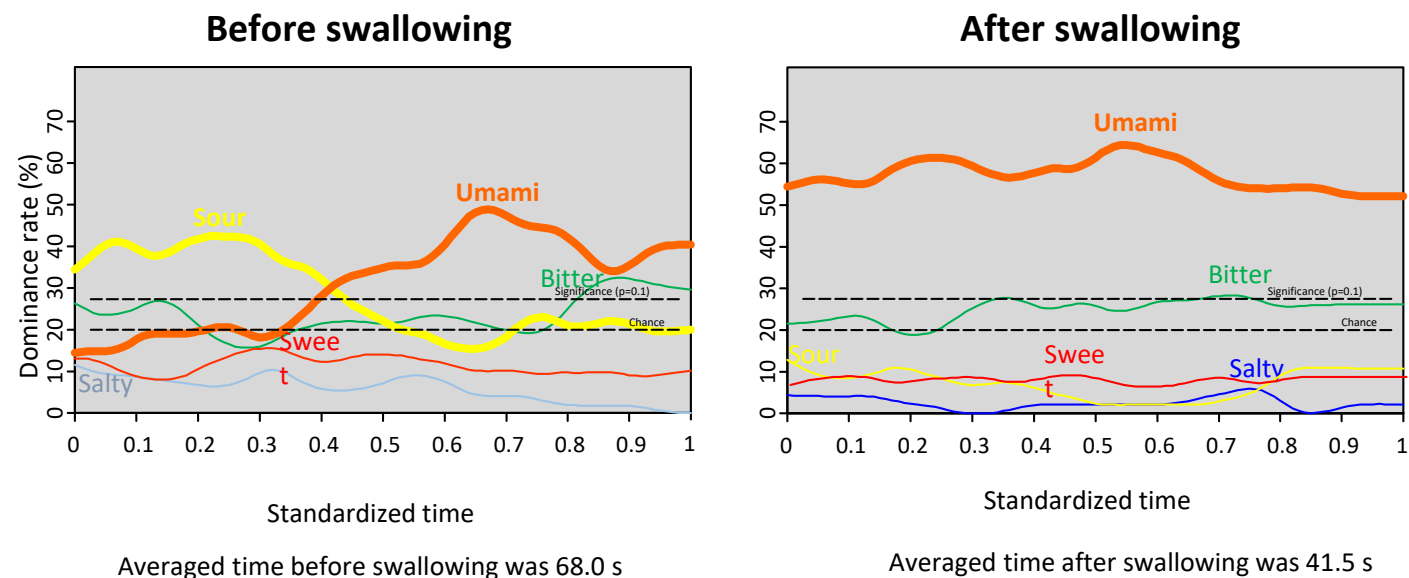
Enhancing Umami Taste Correlates with Increasing Free Glutamate Concentration



- Ripening
- Maturation
- Curing
- Cooking
- Drying
- Adding glutamate or glutamate-rich stock



Evaluation of the tastes in dried tomato by 50 experts

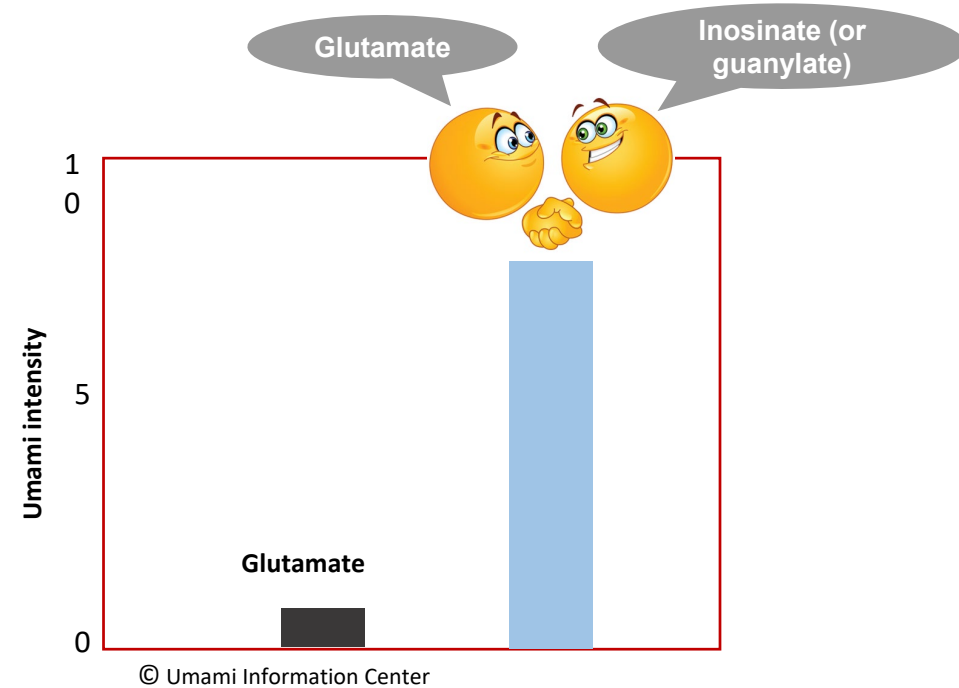


Glutamate: 650-1140mg/100g
Guanylate: 10mg/100g
(UIC database)

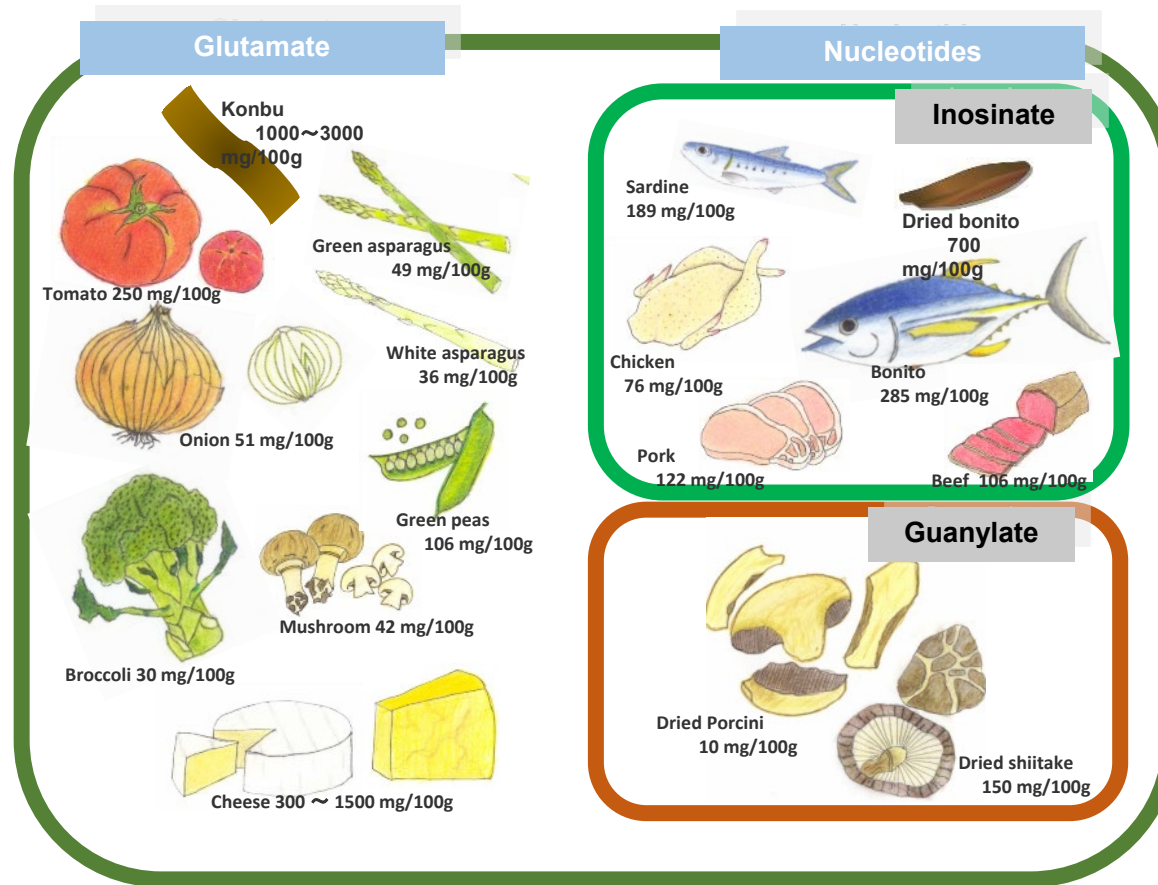
1 + 1 = 8: Gustatory Synergy

Taste of glutamate (umami) is enhanced by synergistic interactions with other substances:

- Inosinate
- Guanylate



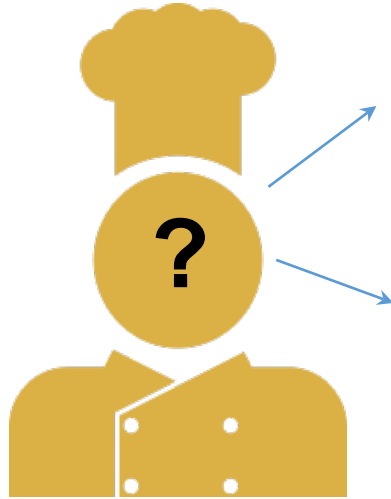
Examples in Everyday Foods



© Umami Information Center

Cooking with Umami

Culinary Umami Strategy



Umami plus:

- Som tom
- Miso soup
- Parmesan on pasta
- Kimchee with rice
- Sun-dried tomato butter

Pure Umami:

- Brussel sprouts
- Lentil salad
- Black bean soup
- Beef stew
- Egg based dishes
- Quinoa pilaf



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Recognizing Umami

So, why don't I recognize umami like other tastes if it is so essential?
Could it be social training?



We routinely analyze:

- salt
- sugar
- acid
- bitter

So, why do we neglect 20% of our basic taste profile when it is so powerful to the overall success of a dish?

How to train our palates to recognize umami through the use of comparative tastings incorporating MSG.



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Umami and Vegetables

Umami is a critical component in plant-based diets and vegetable preparations

- **Adds a savory note that is often missing**
- **Deepens the flavor profile**
- **Creates a complete flavor**

Spice Blends:

- Cruciferous vegetables: chile ancho, chipotle, garlic powder, MSG, cumin, salt, marjoram, smoked paprika
- Sweet potatoes: cocoa powder, salt, MSG, chile ancho, orange zest,
- Asparagus: 5-spice powder, toasted sesame seeds, MSG, salt

Grains



Salad Dressings



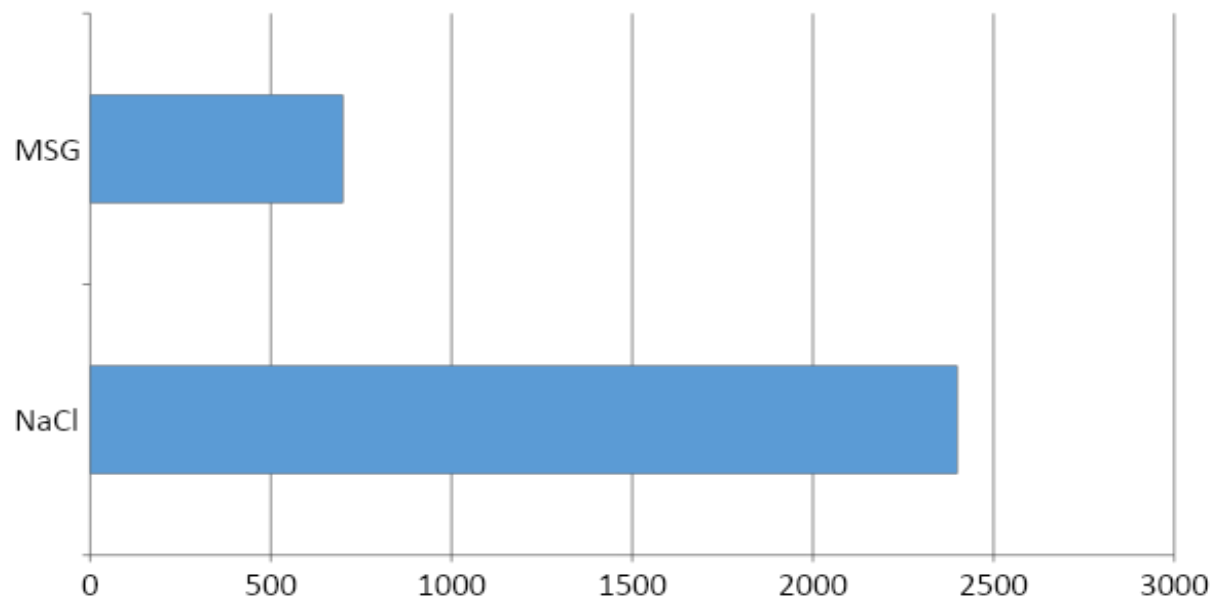
Soups



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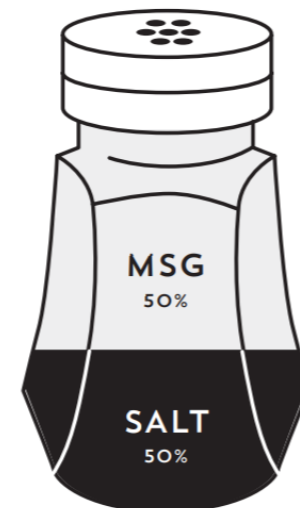
Sodium in Salt vs. MSG (1 tsp.)



1/2 MSG, 1/2 Salt Blend = 40% sodium reduction

The reason that this works so well is that

- both salt and MSG enhance taste overall
- 2 different sets of taste receptors are engaged to create a more complete flavor profile



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Key Takeaways



1. Umami is the taste of glutamate—the most abundant amino acid in nature.



2. MSG seasoning and other umami-rich foods can be used to promote the enjoyment of vegetables and other nutritious foods.



3. The safety of MSG has been repeatedly reviewed and subsequently verified by regulatory agencies around the world.



4. MSG has 2/3 less sodium than table salt and can be used in the place of some salt to reduce sodium by up to 40% without compromising flavor.



5. For an everyday seasoning, replace half of the salt in your salt shaker with MSG.



6. One way to help increase produce consumption is through flavor. The right seasonings and umami forward cooking techniques can help.



Eat Well, Live Well.

Aji
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Thank you!
Now, let's address
your questions (we
know you have
some).

Join The Movement



**SEPTEMBER IS NATIONAL
FRUITS & VEGGIES
MONTH** **#HAVEAPLANTPLEDGE**
#HAVEAPLANT #NFVM2020

Show your support by taking and sharing the Have A Plant® pledge at fruitsandveggies.org. While you're there, check out the useful resources to equip you with the tools you need to enhance your nutrition knowledge and empower consumers to enjoy more fruits and vegetables every day.

Follow PBH's social channels to keep up to date on all the insights and inspiration. **#haveaplant**



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Produce for Better Health Foundation

September is National Fruits & Veggies Month and each year we celebrate Have A Plant® during this monumental moment.

How can you help consumers enjoy more fruits and vegetables during the month of September and beyond to support greater health and happiness?

Start planning today for next year's celebration with our National Fruits & Veggies Month Toolkit!



<https://fruitsandveggies.org/nfvm-toolkit/>

A catalog of PBH's past webinars is available at fruitsandveggies.org/expert-professionals/webinars.

Continuing professional education units (CPEU) are available for live and pre-recorded webinars.





THANK YOU

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