

NOURISHING OUR TASTE BUDS UNDERSTANDING FLAVOR PROFILES FOR BETTER FOOD CHOICES

Why do we eat? We eat to support our everyday activities and ultimately for survival. We all know that eating nutrient-dense foods has a huge impact on our health and wellness. Scientific evidence has become more exact in figuring out what we should eat to reduce the risk of developing chronic disease.

There are many reasons we choose the foods we eat though. Personal and family preferences; health concerns; cultural, societal, and emotional influences; food accessibility; convenience; cost; and variety all play a role in what we choose to eat. And don't forget that the food industry is expert at engineering highly processed combinations of ingredients and chemicals to be both tasty and inexpensive. But many times, the reason we eat has less to do with nourishment and more to do with the taste or flavor of foods. Let's explore why it might be harder to choose nutrient-dense foods by understanding how our taste buds work.

HOW OUR TASTE BUDS WORK

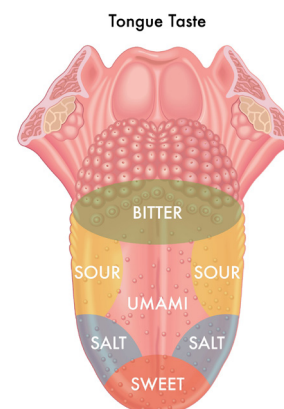
We don't eat blueberries because they are an excellent source of antioxidants. We choose them because they taste good to us. Taste is the most popular reason that individuals choose many of the foods they eat. Then why doesn't everyone like all foods? It turns out sensitivity to taste may be as unique as our fingerprints.

Research has discovered that our genes influence our taste. For example, cruciferous vegetables, such as kale, broccoli, cabbage, and cauliflower have phenylthiocarbamide (PTC). PTC is a substance that tastes bitter to individuals who

have a specific predominant gene but is tasteless to others. This translates into the fact that the taste buds of some people don't pick up on the bitter flavor of these foods, while others find them highly unsavory. Experts have also found that we have anywhere from 500 to 10,000 taste buds. Therefore, the number of taste buds on your tongue may make you partial to choosing certain foods and beverages. This may not change the actual taste, but it may cause you to be more sensitive to some flavors than others, and some flavors will be more intense than others.

THE SENSE OF TASTE

Taste buds are found all over the tongue and in the mouth and throat. All your taste buds are filled with taste receptors that your body rejuvenates each week. Most of these cells are more sensitive to one of five flavors: sweet, sour, salty, bitter, or umami. But all taste receptors may perceive all these flavors in varying degrees. As these flavors are perceived, the taste receptors send a signal to the brain. But the perception of flavor is also influenced by the smell, texture, and temperature of the food, and even our mood or memories of past tastings. Taste and



emotions are closely linked because both senses are connected to the involuntary nervous system. Your favorite flavors actually evoke an increase in saliva production and gastric juices, making some meals mouthwatering events! Let's explore the five basic tastes, sweet, sour, salty, bitter, and umami, to see how we can incorporate healthful recipes in our diet.

SWEET

Sweet is often described as a taste that is desirable or pleasurable. Just about everyone likes sweet treats, but what one person thinks tastes too sugary, another might think is just right. Sweetness is usually linked with snacks and desserts but also with nutrient-dense foods such as fruits. These foods are high in sugars, such as fructose or lactose. Because fructose is sweeter than other sugars, fruits with more fructose taste sweeter. The sweetest fruits are grapes, cherries, mangos, bananas, and apples.

Of all the basic taste profiles, sweetness is the most studied. New research shows that one of the reasons you may crave sugar or have a sweet tooth could be found in your genes. There is a hormone produced by the liver that regulates sugar cravings. In the future, medicine might control these cravings to prevent the overeating of sugar which can lead to obesity and other chronic disease, as well as dental cavities. But training yourself to reach for a fresh bowl of berries may be your best healthy choice when fulfilling your sweet tooth.

HONEY GLAZED PEACHES

Yield: 6 servings

Preparation time: 30 minutes

Cooking time: 20 minutes

Nutritional analysis per 2 peach halves: 170cal, 6g fat, 100mg sodium, 31g carbohydrates, 2g protein



Ingredients

6 ripe, firm peaches, peeled, halved, and pitted

2 tablespoons lemon juice

1 tablespoon sugar

¼ teaspoon salt

⅓ cup water

¼ cup honey

1 tablespoon extra-virgin olive oil

¼ cup hazelnuts, toasted and chopped

Instructions

1. In a large bowl, combine lemon juice, sugar, and salt. Add peaches and toss, coating all sides of the peaches.
2. On a baking pan with sides, add peaches, cut side up, and spoon remaining sugar mixture into the peach cavities.
3. Adjust the oven rack 6 inches from the broiler element. Broil the peaches until they just begin to brown, about 10 to 12 minutes.
4. In a microwave-safe bowl, combine water, honey, and oil. Place in the microwave and heat until warm, about 20 seconds. Stir before brushing on peaches.
5. Remove peaches from under the broiler when slightly brown and brush the honey mixture onto the peaches. Return pan under the broiler and broil until brown spots begin to appear, about 5 to 7 minutes more. Do not overbrown.
6. Carefully remove the peaches from the oven and brush with the honey mixture. Transfer syrup to a small pan and cook on medium heat until the syrup comes to a simmer, whisking to prevent sticking.
7. Pour syrup over peaches and sprinkle with hazelnuts before serving.



SOUR

The taste of sourness is a result of high amounts of acids in foods. Citrus fruits, such as lemons and oranges, tamarind, and some leafy greens will cause your mouth to pucker because of their citric acid content. Lactic acid gives fermented foods, such as sauerkraut and yogurt, their distinctive sour flavor. The addition of vinegar in salad dressings awakens sour notes in the mouth with acetic acid. There are many delicious vinaigrettes that are lower in calories and higher in flavor. Maybe these dressings will motivate you to eat more healthful salads. And don't forget that they can be used as marinades as well.

BALSAMIC VINAIGRETTE

Yield: 12 servings

Preparation time: 15 minutes

*Nutritional analysis per 2 tablespoon serving:
180cal, 18g fat, 220mg sodium, 3g carbohydrates*

Ingredients

*¼ cup sweet onion, roughly chopped
½ cup balsamic vinegar
1 teaspoon salt
½ teaspoon ground black pepper
2 tablespoons Dijon mustard
1 cup fresh basil, or 2 tablespoons dried basil, or 2
tablespoons dried Italian herbs
1 cup olive oil, regular*

Instructions

1. In a blender, combine all ingredients, except oil. Pulse a few times.
2. With blender running, add oil in a steady, thin stream.
3. Serve over salad greens or store in the refrigerator for up to 1 week.

Note: This is also a great marinade for beef, pork, and chicken.

SALTY

Table salt is made of sodium chloride and naturally enhances the flavor of food. Traditionally, you will find salt in every sweet dish because salt amplifies the sweetness of food. Our taste buds can adjust to being satisfied with less salt, so we can cut back on sodium in our diet. Since the average American consumes two to three times more than the recommended daily limit, all of us can probably do without the saltshaker at the table. But many nuts and seeds are a flavorful and healthful snack.

NUTTY GRANOLA BARS

Yield: 16 bars

Preparation time: 30 minutes

Cook time: 40 minutes

Nutritional analysis per bar: 190cal, 10g fat, 5mg cholesterol, 65mg sodium, 24g carbohydrates, 4g protein

Ingredients

1½ cups old fashioned rolled oats

1 cup chopped walnuts

½ cup sliced almonds

⅔ cup shredded unsweetened coconut

½ cup honey

3 tablespoons packed brown sugar

2 tablespoons unsalted butter

1½ teaspoons vanilla extract

¼ teaspoon salt + 1/8 teaspoon salt

1 cup rice cereal

¾ cup dried fruit, such as cranberries, raisins, blueberries, or apricots

Instructions

1. Preheat the oven to 350 degrees F.
2. Line a baking pan with parchment paper or spray with nonstick cooking spray. Sprinkle the oats, walnuts, and almonds on the baking pan. Place in the oven, and toast for about 5 to 7 minutes. Stir occasionally. Watch carefully, as it is easy to burn nuts.
3. Remove from oven and carefully add the coconut to the oat mixture. Return to the oven to bake for about 4 to 5 minutes more or until the coconut turns golden but does not burn.



4. Remove from the oven and reduce heat to 300 degrees F.
5. In a small saucepan, over medium-high heat, combine the honey, brown sugar, butter, vanilla extract, and salt. Bring to a rapid boil, stirring constantly. Remove from heat and set aside to mix with other ingredients.
6. In a large mixing bowl, combine the oat mixture, honey mixture, rice cereal, and dried fruit. Make sure it is mixed well.
7. Line a 9-inch-by-13-inch baking dish with heavy duty aluminum foil or parchment paper, overlapping on the sides. Evenly spread the granola mixture in the baking dish. Return it to the reduced-temperature oven and bake until lightly golden, about 20 minutes.
8. Remove the granola from the oven and cool completely, about 2 hours.
9. Remove the granola from the baking dish by grabbing the foil or parchment paper overhang. Turn out onto a cutting board and cut into rectangles.
10. In an airtight container, store the bars in a single layer or wrap individually for up to 1 week at room temperature. Freeze up to 3 months.

Note: You can use any nuts or seeds and whole-wheat cereal, if you keep the proportions the same.



BITTER

The back of the tongue is more sensitive to bitter flavors. Over time, we may have developed this taste sensation to prevent us from eating something spoiled or poisonous. A bitter taste sensation is usually acrid, astringent, and often disagreeable. These are characteristics of citrus peels, unsweetened cocoa, black coffee, and mature leafy greens, such as kale or Brussels sprouts. Roasting vegetables is an excellent way to use more healthful cooking methods to improve your vegetable intake.

ROASTED BRUSSELS SPROUTS

Yield: 6 servings

Preparation time: 20 minutes

Cook time: 30 minutes

Nutritional analysis per ½ cup serving: 210cal, 17g fat, 10mg cholesterol, 350mg sodium, 10g carbohydrates, 6g protein

Ingredients

1½ pounds Brussels sprouts, trimmed and cut in half through the core

4 ounces bacon, ¼-inch-diced

¼ cup extra-virgin olive oil

¼ teaspoon salt

⅛ teaspoon ground black pepper

1 tablespoon balsamic vinegar

Instructions

1. Preheat the oven to 400 degrees F.
2. On a baking sheet, combine all ingredients except the balsamic vinegar. Once combined, layer the sprouts in a single layer.
3. Place sheet in the oven, stirring the sprouts once during roasting. Roast for 20 to 30 minutes, until sprouts are tender and browned, and bacon is cooked.
4. Remove from the oven and drizzle immediately with the balsamic vinegar. Toss lightly and serve immediately.

Note: If you don't have balsamic vinegar, you can substitute by combining 1½ teaspoons molasses, 1½ teaspoons lemon juice, and a drop of soy sauce.

UMAMI

Umami is a savory or meaty taste caused by the amino acids, glutamic or aspartic acid. Glutamic acid is present in mushrooms, tomatoes, milk, cheese, meats, fish, soy sauce, and other vegetables. Aspartic acid is found in asparagus, avocado, peaches, apricots, cherries, plums, and bananas. The tiny salt crystals found in country ham and Parmesan cheese are examples of glutamate formed in foods. Mushrooms, especially shiitakes, give any simple dish a complex flavor profile. Adding country ham to green beans, sprinkling pasta with Parmesan cheese, or adding a tomato to a sandwich add a high umami content. Recently, charcuterie trays have become very popular. Pair a sampling of cured meats and cheeses, both high in umami, with pickled vegetables or sweet vegetable jams, and you are sure to have a successful appetizer.



PARMESAN MUSHROOM RISOTTO

Yield: 4 servings or 8 servings as a side dish

Preparation time: 15 minutes

Cook time: 30 minutes

Nutritional analysis per 1 cup serving: 460cal, 15g fat, 15mg cholesterol, 440mg sodium, 63g carbohydrates, 16g protein

Ingredients

6 cups low-sodium chicken broth
2 tablespoons extra-virgin olive oil, divided
8 ounces thinly sliced cremini or shiitake mushrooms
¼ teaspoon salt
⅛ teaspoon ground black pepper
2 cloves garlic, minced
1½ cups Arborio rice
½ cup dry white wine or additional broth
½ cup grated Parmesan cheese
1 tablespoon unsalted butter

Instructions

1. In a medium pan over medium-high heat, add broth and bring to a simmer.
2. In a large pan over medium-low heat, add 2 tablespoons of oil and heat until it

sizzles. Add mushrooms, salt, and pepper. Cook, stirring often to prevent sticking, about 5 minutes. Add garlic and cook 1 more minute, until mushrooms are tender, and garlic has not started to turn brown. Transfer the mushrooms to a clean plate to be added back to the rice once it is cooked.

3. Add the rice and cook, stirring constantly, until glossy and translucent around the edges, about 2 minutes.
4. Add the wine and cook until completely absorbed, about 1 minute.
5. Carefully add 1 cup of hot broth into the rice and cook, stirring occasionally, until absorbed. Continue adding the broth, 1 cup at a time and stirring often until it is absorbed, until the rice is al dente and creamy, about 25 minutes. Be careful not to let the rice stick to the bottom of the pan.
6. Stir in the mushrooms, Parmesan cheese, and butter. Serve immediately.

Note: If the risotto is too thick, add 2 tablespoons of milk at a time to thin.

UNDERSTANDING FLAVOR PROFILES FOR BETTER FOOD CHOICES

Now that you understand the way taste and the sensations of quality food flavors work, you can begin to make more healthful food choices. Besides the recipes in this publication, there are many healthful suggestions available at your local library or from government websites that will help you identify our five flavors of taste.

While calories do matter, focusing on food quality is equally important. It's best to choose a variety of nutrient-dense foods every day. Nutrient-dense foods have crucial vitamins, minerals, complex carbohydrates, lean protein, and healthy fat. Nutrient-dense foods are usually fresh and minimally processed. Fewer nutrients and higher calories are found in highly processed foods, sugar-sweetened beverages, refined (white) grains, refined sugar, fried foods, and foods high in saturated and trans fats.

There isn't one "perfect" way to choose what we eat, but our choices are important for health. Exploring flavor-enhancing foods will help you enjoy healthier foods. With time, perseverance, and the use of healthy cooking techniques, it is possible to teach ourselves to love all the flavors our taste buds offer us.

REFERENCES

Anthony, M., Martinez, V., Blumenthal, H., Bourdas, A., & Kinch, D. (2014). *Umami: The fifth taste*. Tokyo: Japan Publications Trading. ISBN-10: 488996391x.

Informed Health. How does our sense of taste work? U.S. National Library of Medicine. 2016 Aug 17. <https://www.ncbi.nlm.nih.gov/books/NBK279408/>, accessed August 2022.

Kuhn, M.E. (May 1, 2016) Decoding the Science of Taste. *Food Technology Magazine*, [https://www.ift.org/news-and-publications/food-technology-magazine/issues/2016/may/features/science-of-taste#f:type=\[Article\]](https://www.ift.org/news-and-publications/food-technology-magazine/issues/2016/may/features/science-of-taste#f:type=[Article]), accessed August 2022.

Ren Z., Liu Z. Receptor, signal transduction and evolution of sweet, umami and bitter taste. *Marine Life Science & Technology*. 2020 Feb;2(1):6-15.

Spahn, J.M., Callahan, E.H., Spill, M.K., Wong, Y.P., Benjamin-Neelon, S.E., Birch, L., Black, M.M., Cook, J.T., Faith, M.S., Mennella, J.A., Casavale, K.O. Influence of maternal diet on flavor transfer to amniotic fluid and breast milk and children's responses: a systematic review. *Am J Clin Nutr*. 2019 Mar 1;109(Suppl_7):1003S-1026S.

Written by Sandra Bastin, Extension food and nutrition specialist, and
Bob Perry, chef in residence, Dietetics and Human Nutrition

October 2022

Copyright © 2022 for materials developed by University of Kentucky Cooperative Extension. This publication may be reproduced in portions or its entirety for educational or nonprofit purposes only. Permitted users shall give credit to the author(s) and include this copyright notice.

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, or physical or mental disability.