

## Frequently asked questions

3.1 Which are the basic tastes? The basic tastes are sweetness, sourness saltiness and bitterness and umami. These are derived from the nature of human perception. Generally it is stated that different tastes are perceived solely or most intensely in certain regions of the tongue, say, bitter in the back of the tongue, sweet in the front, salt at the edges and sour at the inner face of centre of the tongue.

3.2 Give a classification in brief on the genesis of taste.

The genesis of taste dates back to about 5000 years. In brief, this classification can be summarised as follows:

CLASSIFICATION OF BASIC TASTE			
	GENESIS	BASIC TASTES	PROPERTIES
1.	Ayurveda >5000 years old	Sweet Sour Salty Bitter	Heavy, moist, cooling Hot, light & moist Hot, heavy, moist Light, cooling, dry
2	West Aristotle period 384BC-322BC	Sweet Sour Salty Bitter	Sweetness of sugar, sugar derivatives Acidity Salt of cation & anion Sharp, unpleasant bitter products
3	Japanese 1908	Umami (Savoury)	Monosodium glutamate

3.3 How the basic taste sweetness is recognised?

sweetness is a pleasurable sensation and is largely associated with sugars and sugar derivatives, alcohols, glycols,  $\alpha$ -aminoacid, peptides, some proteins and they are usually associated with multiple hydroxyl groups and  $\alpha$ -aminoacids. In carbohydrates, the sweetness decrease with homologous series as sugars >oligosaccharides >polysaccharides. Generally, sucrose is taken as the reference standard and fructose is the sweetest among sugars. The sweetness is perceived by sweet taste receptor sites interaction and its transmittance to the brain for signalling. It imparts heaviness, moisture and cooling to the body and is a good source for building body's vital tissues of plasma, blood, fat, muscles, bones, marrows and reproductive fluids. Sweet taste increases saliva, soothe mucous membranes, and burning sensations, relieves thirst and has beneficial effects on skin, hair and voice. Sweetness is detected by a variety of G protein coupled receptors (IGPCR)

coupled to the sweetness receptors. TIR2+3 and TIR3 receptors account for sensing of sweetness. Natural sugars are more easily detected by the TIR 3 receptor than sugar substitutes. Synthetic sweetness such as saccharin activates different GPCR's and induces taste receptor cell depolarisation by an alternate pathway. Sweet taste in food refers mainly to sweetmeats, fruit and vegetable juices, sugar syrups, honey, chocolates, fruit bars and invisibly many ingredients rich in starch.

#### 3.4. How the basic taste sourness is recognised?

Sourness, though an aversive component, quite often exerts health benefits. For example curds or yoghurt which promotes digestion and aids in brain functioning. Basically sourness is a taste that detects acidity. Sourness increases with the increase in hydrogen ion concentration, however, the predictability changes with the source of acid either aliphatic or aromatic or mineral acids. For eg. weak acids such as acetic acid taste more sour than mineral acid at the same pH. Increase of carbon chain length in the aliphatic acid series may enhance the stimulating efficiency. The perception of sour taste is influenced not only by the activity of the proton, but also by the quality and character of the anion. Sour taste induces salivation, stimulates digestion, strengthens the heart, relieves thirst, maintains acidity and sharpens the senses. Sour taste nourishes the vital tissues except reproductive tissue. Sour taste in food is mainly connected with citric, malic, oxalic and tartaric acids in fruits and lactic acid in yoghurt, other dairy and meat products, propionic acid in cheese etc.

#### 3.5. How the basic taste saltiness is recognised?

Saltiness, practically an inseparable ingredient in foods and salt taste is produced primarily by the presence of sodium ions. Potassium and lithium ions most closely resemble to that of sodium in saltiness. Generally, low molecular weight salts are predominantly salty while those of higher molecular weight are bitter. Water retaining quality of salt imparts moist nature and it falls in between sweet and sour tastes in its moist qualities. In moderation levels in foods, salt improve the flavour of food, improves digestion, maintains mineral balance, liquefies mucous, aids in the elimination of water and calm the nerves. The most prominent role of salt is the management of electrolyte balance in the body, action on water requirements and more so this state is predominant in desert areas and hot humid zones. The salt taste in foods is predominant in pickles, electrolytes, salt topped up fried products and moderate in almost all the savoury dishes.

#### 3.6. How the basic taste bitterness is recognised?

Bitterness, though an unpleasant, taste, it is the most sensitive and sharp taste perceived. Bitterness quite often moves with the health concerns. Generally, bitterness is associated with alkaloids such as quinine, caffeine, strychnine, higher molecular weight salts and long carbon chain organic compounds. Though bitter compounds are unappealing,

they are closely linked to sweet taste. But the difference is that the ability to perceive bitterness has been related to their lipid solubility which can be changed by pH. Bitterness contributes for stimulation of appetite, reduces water retention, solvation to skin problems, burning sensations. Bitter taste is a powerful detoxifying agent and has antibiotic, antiparasitic and antiseptic qualities. The bitterness in foods is more predominant in bitter gourd, bitter melon products. In bitter gourd, the compound similar to insulin structure is present, thereby bitter gourd juice act as an anti-diabetic agent which on consumption reduces blood sugar levels. Bitter compounds moderately present in green leafy vegetables, spices such as fenugreek, turmeric, coffee and tea, olives, walnuts etc, is the causative factor for bitterness.

### 3.7. How the basic taste savouriness is recognised?

Savouriness called umami resembles to monosodium glutamate taste. Sometimes it is also called as meat like taste probably due to high content of glutamate in meat. However, it differs from the classical tastes and is connected with the L form of monosodium glutamate. Savouriness is considered as a fundamental taste in Chinese, Japanese, Thai and Korean cooking. But in India, savouriness is referred to spice-salt combination processed products based on not only meat but also cereals and legumes. The glutamate taste sensation is most intense in combination with sodium ions as found in table salt and the same concept is recognized in Indian foods.

### 3.8. What is taste sensation?

The tongue can also feel other sensations besides the basic tastes and are referred as **taste sensations**. These are largely detected by the somosensory system.

### 3.9. In humans, how does the taste sensation is conveyed?

In humans the sense of taste is conveyed via three of the twelve cranial nerves and are facial nerve, glossopharyngeal nerve and vagus nerve.

### 3.10. How does the taste sensation are related with the nerves action?

The facial nerve (VII) carries taste sensations from the anterior two thirds of the tongue. The glossopharyngeal nerve (IX) carries taste sensations from the posterior one third of the tongue. A branch of the vagus nerve (X) carries some taste sensations from the back of the oral cavity. The trigeminal nerve (V) provides taste related sensations of peppery or hot from spices, besides the textural information of the food.

### 3.11. Which are the most common sensations perceived by the humans?

The most common sensations perceived by the humans are astringency, pungency, metallic taste, alkaline taste, coolness and fattiness.

### 3.12. What factors affect the perception of taste?

The temperature is the most important factor which has an effect on perception of taste. The perceived sweetness of sucrose, fructose and glucose increased in intensity when the temperature of the solution increased from 20 to 36<sup>0</sup>C. The nutritional inadequacy in terms of vitamins, minerals deficiency and metabolic defects also affect the taste perception. The human's diseased condition also influence the taste perception.

### 3.13. What is astringency?

Astringency is a tactile taste felt as a dry, rough feeling in the mouth and contraction of tongue tissue. Some goods containing tannins, calcium oxalates, polyphenols cause an astringent sensation of mucous membrane of the mouth. Mostly found in beans, lentils, cranberries, pomegranates, peas, cauliflower, turnip, buckwheat, turmeric, marjoram, coffee and tea.

### 3.14. What is coolness?

Coolness is experienced when cold trigeminal receptors are activated by some of the compounds such as ethanol, menthol, camphor and is a perceived sensation by the nerve fibres.

### 3.15. Does all the natural products have the basic taste?

Though, all the natural products have the taste, the recognition, perception depends on the type and concentration or intensity of the basic taste. Sweetness is felt in honey, fruits, brown rice, sweet pumpkin, carrot etc. Similarly, sourness in all citrus fruits, gooseberry, tamarind, unripe mango etc., saltiness in table salt, sea salt, rock salt etc., bitterness in bitter gourd, bitter melon fenugreek, unripe pseudo lemon etc. And savouriness in meat, chicken, fish, fried spiced foods.