Summary

Taste in the gustatory system allows humans to distinguish between safe and harmful food, liking and disliking of food, pleasurable and poisonous food. All these decisions are based on the basic tastes sensed by the receptor cells, recorded through cranial nerves in the brain. Besides this, the decision of what taste is, is dependent on pre-concept, hunger status, health condition, and desirability to eat food. The basic tastes derived mainly from the nature of human perception are sweet, sour, salty and bitter. In the recent decade, savoury called umami has been included in the list. The basic tastes are sweetness, sourness saltiness and bitterness and umami. 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. However, most of the taste buds, regardless of its location, show the receptiveness to varied taste qualities on various areas of the tongue. Rather it can be said that tongue is a promising instrument to detect all the types of tastes at a wide range of concentrations showing its differential behaviour on the particular taste, in sensitiveness at low or high concentration at a particular region. However, almost all the tastes can be perceived on the different parts of the tongue, of course in different concentrations. Gustducin and transducin are expressed as taste receptor cells where they are thought to mediate taste transduction which normally perceives the taste.

sweetness being a pleasurable sensation is largely associated with sugars and sugar derivatives, alcohols, glycols, α-aminoacid, peptides, some proteins and they are usually associated with multiple hydroxyl groups and α-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. Sweetness is detected by a variety of G protein coupled receptors (IGPCR) coupled to the sweetness receptors must be activated for the brain to register sweetness. 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.

Sourness, though an aversive component, quite often exerts health benefits, an example of 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 in food is mainly connected with citric, malic, oxalic and tartaric acids in fruits and lactic acid in yoghurt, other diary and meat products, propionic acid in cheese etc. The transfer of positive charge into the cell can itself trigger an electrical response. According to this mechanism, the intracellular hydrogen ions inhibhit potassium channels there by inhibhits hyperpolarising of cell, with the result release neurotransmitters.

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 bitterIn moderation levels in foods, salt improve the favour 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. A sodium channel in the taste cell wall allows sodium cations to enter the cell. This on its own depolarises the cell and opens voltage dependent calcium channels, flooding the cell with positive calcium ions and leading to neuro transmitter release.

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. 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 foe bitterness.

Savouriness called **umami** resembles to monosodium glutamate taste. 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. Some of the nucleotides, 5’-inosine monophosphate and 5’-guaonosine monophosphate has a synergistic effect with glutamate. Ayurveda do not have this class of taste. Savoury taste refers to meat and fish products, cheese, beans, sauces, mushrooms etc. It is thought that amino acid L- glutamate bonds to a type of GPCR Known as metabotropic glutamate receptor. This causes the G-protein complex to activate secondary messanger, there by leads to neurotransmitter release.

The tongue can also feel other sensations besides the basic tastes and are refered as **taste sensations**. These are largely detected by the somosensory system. In humans the sense of taste is conveyed via three of the twelve cranial nerves. 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. All sensations associated with the ingestion of foods derive from other sensory systems that innervate the oral and nasal cavities. The taste description as like chocolate, vanilla, strawberry, orange are actually odours detected retro-nasaly via the opening between the oro-pharynx and nasal cavity. Qualities such as creaminess and crunchiness derive from mechanical stimulation and thus are mediated by the sense of touch. The burn or heat of chilli, pepper, mustard, alcohol and other irritants is mediated at least in part by the pain and thermal senses. **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, polyplenols 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. **Pungency** also referred as Spiciness, hotness is associated with spices specifically, pepper, ginger and clove. Brassica vegetables such as cabbage, horse radish, mustard have a pungent taste. **Metallic taste** is due to the presence of metal salts and most commonly found in drinking water. **Alkaline taste** or soapy taste is associated with potassium carbonate. The distinctive taste of chalk has been referred to calcium component of that substance. **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. **Fattiness** is physiological response of taste bud cells when high fat foods, butter etc. are eaten. Recent research reveals a potential fat taste receptor called the CD36 receptorand is called **"oleogustus".** The **temperature**, the most important aspect 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 36^0C. Similarly, bitterness of caffeine grew stronger at warmer temperatures. But, the sourness of citric acid and saltiness of sodium chloride were not significantly altered. Capsaicin, a pungent compound in chilli pepper produces the burning sensation which increases directly with the increased temperature. The same is the effect with pipperine of black pepper, ethanol. In general, the temperature increase along with nutritional and metabolic effects on taste perception have usually found significant effects only when deficiencies of vitamins or minerals have been extreme as found in diseased state and associated with lesion or tissue atrophy. The changes in temperature also influence psychologically the acceptance, liking, hotness etc. Normally chilled beer is preferred, while warm coffee, soups are liked. Thus the product range, the concept of the product use and the practices have a bearing with reference to temperature.