Flavors

- Flavor = sensation produced by a material taken in the mouth.
- Taste (sour, salty, bitter, sweet), smell, general pain, tactile (texture) and temperature receptors
- Sum of the characteristics of the material which produce that sensation

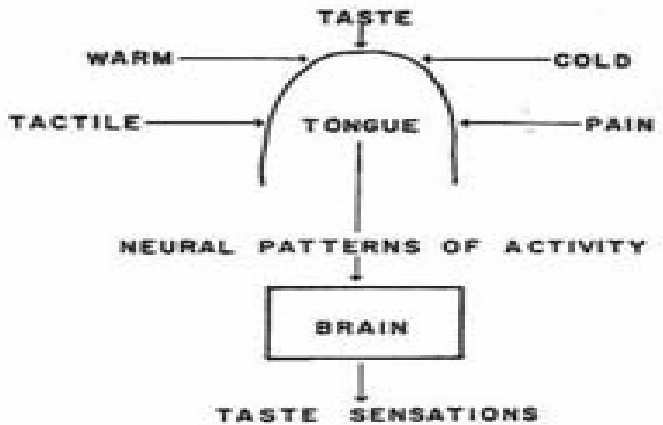

Figure 7–1 Schematic Representation of the Taste Process. *Source*: From L.M. Beidler, Facts and Theory on the Mechanism of Taste and Odor Perception, in *Chemistry of Natural Food Flavors*, 1957, Quartermaster Food and Container Institute for the Armed Forces.

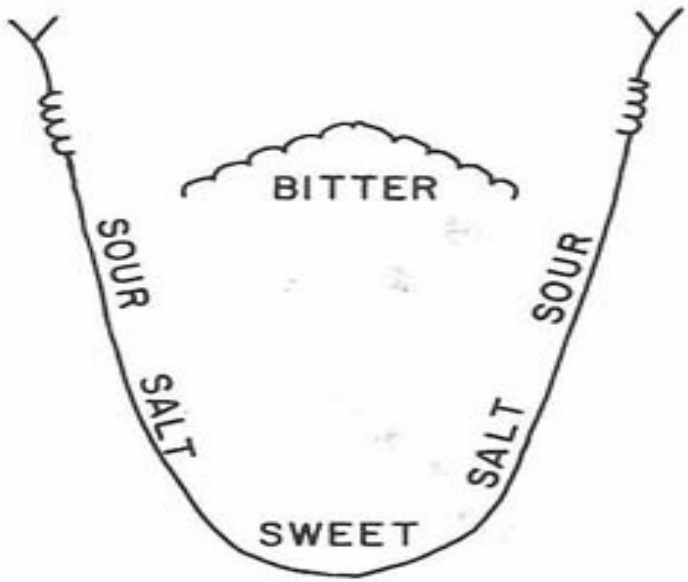

Figure 7–2 Areas of Taste Sensitivity of the Tongue

Taste receptors

- Nerve activity from taste cells
- Receptor membranes have voltage dependent calcium channels. Ca triggers norepinephrine release
- Mechanism of interaction between food and (protein?) receptors not well understood

Taste receptors

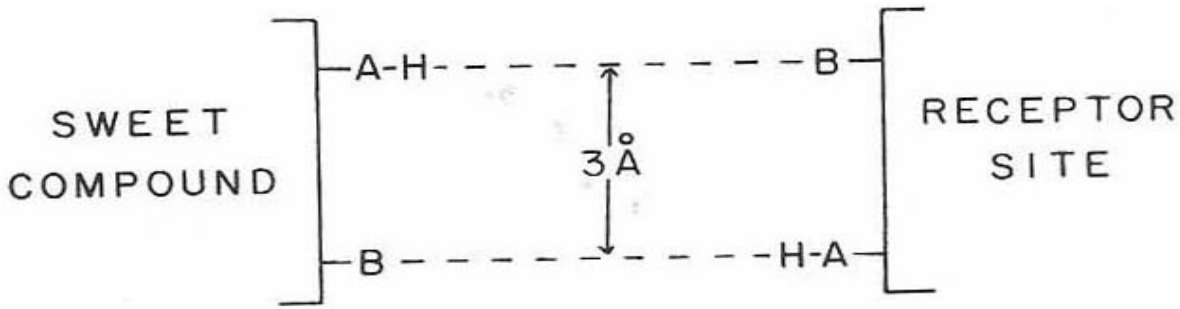

Figure 7–11 The AH,B Theory of Sweet Taste Perception

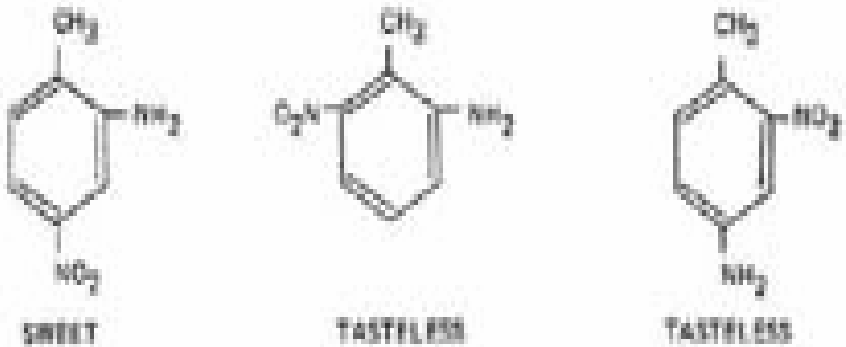

Figure 7–6 Taste of Nitrotoluidine Isomers

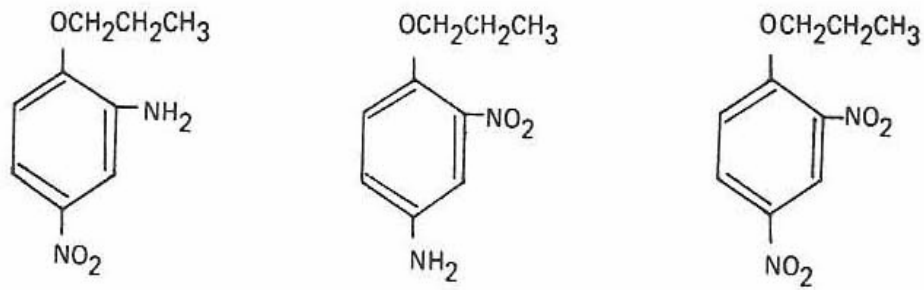

Figure 7–7 Taste of Substituted Propoxybenzenes

Table 7–1 Difference in Taste Between the L- and D-Forms of Amino Acids

Amino Acid	*Taste of L Isomer*	*Taste of D Isomer*
Asparagine	Insipid	Sweet
Glutamic acid	Unique	Almost tasteless
Phenylalanine	Faintly bitter	Sweet, bitter aftertaste
Leucine	Flat, faintly bitter	Strikingly sweet
Valine	Slightly sweet, bitter	Strikingly sweet
Serine	Faintly sweet, stale aftertaste	Strikingly sweet
Histidine	Tasteless to bitter	Sweet
Isoleucine	Bitter	Sweet
Methionine	Flat	Sweet
Tryptophane	Bitter	Very sweet

Table 7–5 Taste of Some Selected Peptides

Taste	*Composition of Peptides*
Flat	L-Lys-L-Glu, L-PhE-L-Phe, Gly-Gly-Gly-Gly
Sour	L-Ala-L-Asp, γ-L-Glu-L-Glu, Gly-L-Asp-L-Ser-Gly
Bitter	L-Leu-L-Leu, L-Arg-L-Pro, L-Val-L-Val-L-Val
Sweet	L-Asp-L-Phe-OMe, L-Asp-L-Met-OMe
Biting	γ-L-Glutamyl-S-(prop-1-enyl)-L-cystein

Source: From J. Solms, Nonvolatile Compounds and the Flavor of Foods, in *Gustation and Olfaction*, G. Ohloff and A.F. Thomas, eds., 1971, Academic Press.

Salt taste

Salt taste – main role is flavor enhancer, mouthfeel and balance

Dependent upon cation/anion

Increase MW -> bitter

Low sodium diets – KCl – bitter, metallic

Table 7–4 Taste Sensations of Salts

Taste	*Salts*
Salty	LiCl, LiBr, LiI, $NaNO_3$, NaCl, NaBr, NaI, KNO_3, KCl
Salty and bitter	KBr, NH_4I
Bitter	CsCl, CsBr, KI, $MgSO_4$
Sweet	Lead acetate,[1] beryllium acetate[1]

[1]Extremely toxic

Sour Taste

- Property of H+
- No simple relationship between concentration and taste
- Dependent on nature of acid group, pH (degree of ionization), titratable acidity, buffering capacity (solution, saliva), sugar
- Organic acids (citric, tartaric) – greater ‘taste’ than inorganic at same pH

Table 7–12 Flavor Character of Some N-Carboxylic Acids

Acid	*Flavor Character*
Formic	Acid, pungent
Acetic	Acid, vinegary, pungent
Propionic	Acid, pungent, rancid, cheesy
Butyric	Acid, rancid
Hexanoic	Sweaty, goaty
Octanoic	Rancid
Decanoic	Waxy
Lauric	Tallowy
Myristic	Soapy, cardboard
Palmitic	Soapy

Bitter compounds

- Many inorganic and organic compounds
- Plant origin
- Component of foods that are sweet or sour
- Bitter peptides – hydrolysis of protein (cheese ripening)
- Alkaloids and glycosides. Quinine.
- Naringin and hesperidin (fruit and citrus antioxidants)

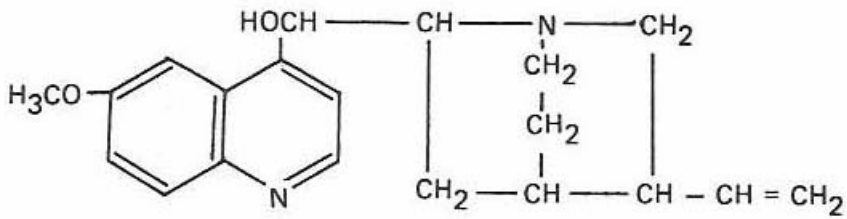

Figure 7–13 Structure of Quinine. This has an intensely bitter taste.

Figure 7–14 (A) Caffeine and (B) Theobromine

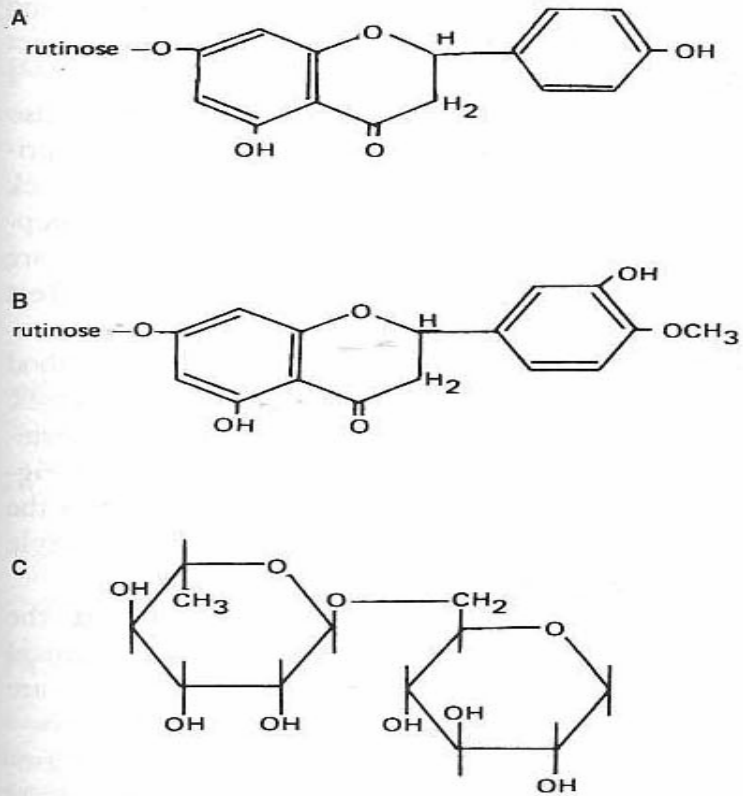

Figure 7–15 (A) Naringin; (B) Hesperidin; (C) Rutinose, 6-*O*-α-L-Rhamnopyranosyl-D-Glucopyranose