

FOOD AROMAS

Aroma consists of 2 elements: taste and odor.

The compounds forming taste:

- (1) Percieved on the tounge
- (2) Generally not volatile at room (ambient) temperature
- (3) Polar and soluble in water

The compounds spreading odor:

- (1) Percieved directly by niose
- (2) Volatile at room temperature

Except these groups, the trigeminal senses that are also percieved on the tounge such as pungent, astringent and cooling (mint-like flavour) senses are also effective on the aroma. Hence:

Flavour = aroma + trigeminal senses.

*Some parts were summarized from the book of **Gıda Aromaları**, Bayrak A., 2006. Baran Ofset-Ankara, 497 pp*

Sensorial properties of a food consists of the following concepts:

- (1) Sight effect: Color, brightness, dimension, shape (Perception by EYE)
- (2) Odor: Volatile aromatic compounds (Perception by NOISE)
- (3) Taste: Sour, sweet, salty, bitter, ummami (Perception by TOUNGE)
- (4) Others:
 - Astringent, pungent, cooling, warm (Percept. by TOUNGE + ORAL (MOUTH) CAVITY)
 - Muscle and joint mobility (Percept. by TOUNGE + ORAL (MOUTH) CAVITY)
 - Konsistens (Percept. by TOUNGE + ORAL (MOUTH) CAVITY)
 - Noise (Perception by EAR)

Odor

- Odor compounds are volatile at ambient temperature. They directly reach to odor epithelium by air or from nasal cavity after becoming volatile by chewing, grinding or saliva effect.
- Odor epithelium has 5-10 cm² of nasal mucosa and contains 3-50 million odor receptors.
- Human can distinguish 2000-4000 different odors, however, this ability reduces by age.
- Now, there are more than 17.000 odor compounds. For better understanding, they can be classified by 7 groups as below:

ODOR	SOURCE	MAIN CONSTITUENT
Flowery	Rose	Phenylmethyl carbinol, geraniol
Volatile	Pear	Propanol, 1,2 dicloretan
Camphor	Eucalyptus	Camphor, (1, 8 sineol)
Musky	Musk	5-pentadecanolit (pentadecalakton)
Minty	Mint	Menthol
Rotten egg	Egg	Dimetylsulphur
Tangy	Vinegar	Acetic and formic acids

- Many compounds are effective on food aroma, while one of them, in general, is very important of the characteristic aroma. This is called as key odor substance. Some examples are below:

Compound	Odor	Food sample
Limonen	Citrus	Orange juice
1-p-menthen-8-tiol	Grapefruit	Grapefruit juice
Benzaldehyde	Bitter almond	Almond, cherry, plum
Neral/ geranial	Lemon	Lemon
1-octen-3-ol	mushroom	Mushroom, Camembert cheese
2,6-nonadienal	Cucumber	Cucumber
Geosmin	Earthy	Beet
Trans-5-methyl-2-hepten-4-on	Peanut	Hazelnut
2-furfuril tiol	Roasted	Coffee
4-hydroxy-2,5 dimethyl 3-furanon	Caramel	Biscuit, Brown beer, coffee
2-acetyl-1-pirrolin	Roasted	Fried White bread

Off-flavor

- Off-flavor means «foreign odor». A food may have a different odor; or key odor in the food may disappear; or ratios of odor compounds may change. For example: melon should smell like a melon, if its smell is like a cheese, it is off-flavor.
- Some samples are given in the Table:

Food	Off-flavor	Reason
Milk	Daylight odor	Methyonin converts to methyonate under light
Milk powder	Beany	Isolinoleic acid convert to 6-trans nonenal because of high oxygen concentration in the air
Butter	Metallic	Otoxidation of pentaen ve hekseen fatty acids to 1-cis-5-dien-3-one
Frozen pea	Fresh cut grass	Okra 3,5 dien-2 one and hexanal formations from aldehydes.
Orange juice	Grapefruit	Oxidation of valescen to nootkaon
	Terpenic	Oxidation of d-limonen to carvon
Bear	Daylight odor	3-methyl-2 buten-1-tiol formation from degradation of humulon
	Phenolic	Hydroxycinnamic acid decarboxilation due to incorrect fermentation.

- **Trigeminal (triple) perception:** They are important for formation of flavor;

1- Pungency, 2- Astringent ve 3-Cooling

These perceptions are associated with slight pain. Examples: Capsaisin and piperine in pepper give pungent-painful, menthol in mint give cooling sense, while ethanol and phenolic compounds give astringent effect in the mouth.

- **Pungency:** Some compounds in some spices and vegetables cause characteristic bitternes, sharpness and peppery perceptions. Pungent compounds in pepper and ginger are not volatile therefore they are percieved in mouth, not in nasal tissue. The others having relatively volatile such as mustard, radish and onion may effective both in nasal tissue and mouth.
- **Cooling effect:** Some chemicals create stimulant effect both in mouth and nasal tissue. The most important compounds in this group are menthol and camphor. This cooling effect is different form the effects of sugar alcohol. Effect of sugar alcohol is because of an endothermic reaction.
- **Astringent effect:** This perception can be defined as dryness in mouth and astringency in mouth tissue. This is derived from the sediments forming by meeting of phenolics and proteins with saliva in the mouth.