



Flavors

- Flavors usually diluted in **carriers**:
- **Oil-soluble carriers**: soy- bean and other edible oils
- **Water-soluble carriers** : water, ethanol, propylene glycol, glycerin, and emulsifiers
- **Dry powders**: include maltodextrins, corn syrup solids, modified starches, gum arabic, salt, sugars, and whey protein.

29



Flavors stability

- Flavors can degrade as a result of exposure to:

- light,
- temperature,
- oxygen,
- water,
- enzymes,
- contaminants,

They must be carefully selected and checked for stability

30



Types of flavors

- Natural :
 - Examples: [oleoresin](#), [essential oil](#), fruit components
 - Chemical structure is not necessarily known.
 - Used within 1-2%
- Artificial:
 - Used within 0.1-0.2%
- The selection is based on:
 - desired flavor,
 - solubility characteristics,
 - chemical and physical compatibility

31



An “[electronic tongue](#)” is used to aid in providing a global “taste fingerprint” during formulation development.

It provides information on [bitterness levels](#) and the [stability](#) of flavors in terms of taste

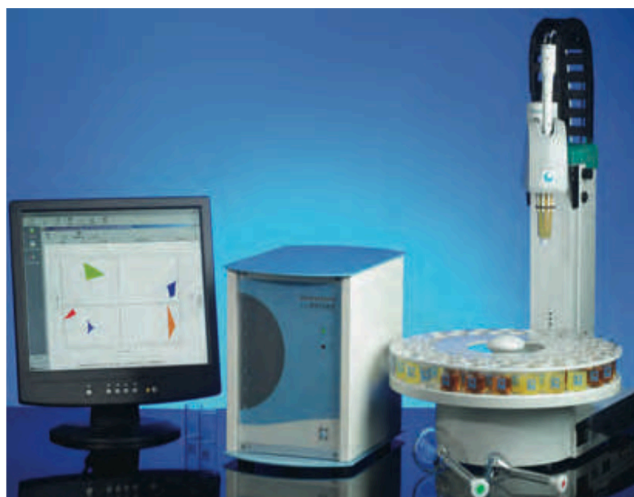


FIGURE 4.4 Electronic tongue to assist in formulation development. (Courtesy of Alpha MOS.)

32



Sweetening

- Sucrose → Natural
 - **Aspartame (~ 200)**
 - **Saccharine (~ 300)**
 - **Sucralose (~ 600)**
 - **Cyclamate (~ 200)**
- Artificial
- There are many safety issues regarding the artificial ones.

33



Sweetening, safety issues

- Diet soft drinks introduction in 1950
- Patients with DM.
- **Aspartame** metabolized, or processed, in the digestive tract.
- Breaks down in the body into three components:
 - Phenylalanine .
 - Aspartic acid.
 - Methanol.
- In patients with **phenylketonuria** (PKU), phenylalanine metabolism is defective.
- Use of aspartame by persons with phenylketonuria is discouraged

34



Aspartame safety issues

- Drinks or medicines containing aspartame should be labeled.
- Hyperphenylalaninemia can result in mental retardation and can affect the fetus of a pregnant woman who has PKU.

• Saccharine safety issues

- In November 1977, saccharine was permitted to be used in USA.
- But patients should be advised that it caused cancer in animals.

35



Cyclamate Safety Issues

- Introduced into beverages and foods in the 1950s and dominated the artificial sweetener market in the 1960s.
- Cyclamate is claimed to cause cancer and genetic change and testicular atrophy.
- In 1969, FDA banned cyclamates from use in the United States.

36



Stevia powder

- New sweetening agent
- The extract from the leaves of a plant.
- Natural, nontoxic, safe
- About 30 times as sweet as cane sugar, or sucrose. It can be used in both hot and cold preparations

37



Sweetening selection

- Most large pharmaceutical manufacturers have special laboratories for taste-testing proposed formulations of their products.
- Panels of employees or interested community participants participate in evaluating the various formulations, and their assessments become the basis for the firm's flavoring decisions.

38