



HERBS AND SPICES



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Inneke Hantoro



Definition of Spices

- Vegetables products or mixtures thereof, free from extraneous matter, used for flavoring, seasoning and imparting aroma in foods (The Geneva-based ISO).
- Any various of aromatic vegetable productions used in cookery to season and to flavor; a vegetable condiments or relish, usually in the form of a powder, also as condiments collectively (Webster).
- The (dried) parts of aromatic plants with the exception of the leaves.



Definition of Herbs

- The dried leaves of aromatic plants used to impart flavor and odor to foods with, sometimes, the addition of color.



Conventional classification of spices

Classes	Spices
Hot spices	Chilies, black and white pepper, ginger, mustard
Mild spices	Paprika, coriander
Aromatic spices	Allspice, cardamom, cinnamon, dill, clove, cumin (jinten), mace, nutmeg
Herbs	Basil, bay leaves, dill leaves, marjoram, tarragon, thyme
Aromatic vegetables	Onion, garlic, shallot, celery

Source: Peter (2001)



Part used of herbs and spices

- Rhizome
 - Ginger, greater galangal (laos), galangal (kencur), turmeric
- Stem bark
 - Cinnamon
- Tubers
 - Galangal
- Root
 - Horseradish
- Leaf
 - Pandan wangi, mint, oregano, basil, parsley, coriander, celery



Part used of herbs and spices

- Flower bud
 - Clove
- Bulb
 - Garlic, onion
- Seed
 - Cumin, white mustard, cardamom, sesame
- Kernel/ fruit seed
 - Nutmeg
- Fruit/ fruit pulp
 - Tamarind, paprika, pepper, black pepper, cardamom, coriander, star anise

Herbs

Oregano



Marjoram



Bay leaves



Parsley



Spices

Cardamom



Coriander



Star anise



Yellow
mustard



Cumin

Spices

Ginger



Turmeric



Galangal



Greater galangal



Spices

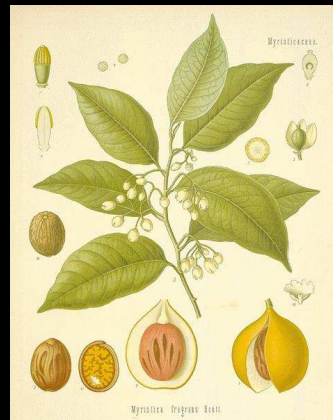
Cinnamon



Clove



Nutmeg



Peppercorns



Spices

saffron



White
sesame



Horseradish
plant



horseradish



Spices



Paprika



Chilli

Yellow &
Red Onions





The utilization of herbs and spices

- As ingredients in food --- to impart flavor, aroma, pungency and color
- Alcoholic beverages: coriander, ginger, cinnamon, etc.
- Medicine
- Perfumery
- Cosmetics
- Coloring
- Garden plants



Basic uses of herbs and spices

Basic Function	Herbs / Spices
Flavoring	Parsley, cinnamon, allspice, mint, cumin, marjoram, star anise, nutmeg, vanilla, cardamom, celery
Deodorizing/ masking	Garlic, bay leaves, clove, oregano, onion, coriander
Pungency	Garlic, bay leaves, oregano, onion, coriander, ginger, pepper, mustard
Coloring	Paprika, turmeric, saffron



Other properties of herbs and spices

- Antioxidant
 - Antimicrobial
- } delaying the spoilage
of the food
- Pharmaceutical properties --- medicinal uses
- All spices are medicinal and are used extensively in indigenous systems of medicine
- Nutritional properties



The main compounds of herbs and spices

- Volatile oils
 - Giving specific aroma
- Oleoresins
 - Mixture of oil and resin (sticky agent extracted from plant)
 - They are beneficial for cosmetics, perfume and pharmacy
- Colorants
- Flavor agents
- Active compounds

Color components in herbs and spices

Color component	Tint	Spices
Carotenoid		
β-carotene	Reddish orange	Red pepper, mustard, paprika, saffron
Cryptoxanthin	Red	Paprika, red pepper
Lutin	Dark red	Paprika
Zeaxanthin	Yellow	Paprika
Capsanthin	Purple red	Paprika, red pepper
Capsorbin	Dark red	Paprika, red pepper
Crocetin	Orange yellow	Saffron
Neoxanthin	Orange yellow	Parsley
Violaxanthin	Orange	Parsley, sweet pepper
Crocin	Yellowish orange	Saffron
Flavonoids	Yellow	Ginger
Curcumin	Orange yellow	Turmeric
Chlorophylls	Green	Herbs



Active plant constituents in herbs and spices

- Acids:
 - Sour, often antiseptic and cleansing
- Alkaloids:
 - Often based on alkaline nitrogenous compounds, bitter, many are toxic & addicted.
- Anthraquinones:
 - Bitter, irritant, acting also as dyes
- Tannins:
 - Astringent, often antiseptic
- Coumarines:
 - Antibacterial, anticoagulant



Active plant constituents in herbs and spices

- Resins:
 - Oleoresins --- acrid, astringent, antiseptic, healing
- Saponins:
 - Sweet, often anti-inflammatory
- Volatile oils
 - Aromatic, antiseptic, fungicidal
- Glycosides

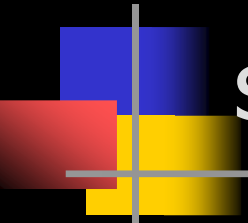


Flavor compounds

Spices and herbs contain essential oils and oleoresins, which give specific flavor.

Some important flavor compounds include:

- Eugenol (allspice, cinnamon, cloves)
- Piperine (black pepper)
- Gingerol (ginger)
- Myristicin (nutmeg)
- Turmerone (turmeric)
- Vanillin (vanilla)
- Etc.



Quality standard associations for spices

- The American Spice Trade Association (ASTA) --- endorsed by the United states Food & Drugs Administration (USDA)
- The European Spice Association (ESA)
- Standar Nasional Indonesia (SNI)



QUALITY SPECIFICATION

- *Cleanliness*
 - A measure of the amount of foreign and extraneous matter, for example insect contamination, excreta or foreign bodies.
- *Ash level*
 - A measure of the level of impurities in a product, obtained by burning off the organic matter and measuring the residue of ash.



QUALITY SPECIFICATION

- *Volatile oil (V/O) determination*
 - This measure helps to identify whether the herb or spice has been adulterated, perhaps by addition of foreign materials.
- *Moisture content*
 - This measure of the amount of moisture is important since moisture content determines weight and pricing. Maximum moisture contents are set based on the maximum allowable amount of moisture for the products to remain stable.



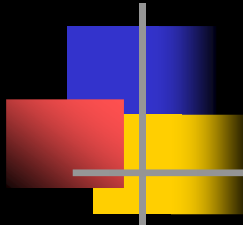
QUALITY SPECIFICATION

- *Water availability (A_w)*
 - The level of 0.6 A_w is accepted that microbial growth cannot occur. However, in some herbs and spices, which have anti-microbial agents, the A_w limit can be higher.
- *Microbiological measurements* (bacteria, yeast, mould)
- *Pesticide level*
- *Mycotoxin level*
 - Aflatoxin and Ochratoxin A have been a concern in the industry. EU have established the maximum aflatoxin content in some spices at 10 ppb, while the USA limit is 20 ppb.



QUALITY SPECIFICATION

- *Bulk density/ bulk index*
 - An important measure, especially in filling retail containers of herbs and spices. The products must be sifted or ground to give a certain density so that retail units appear satisfactorily full and comply with declared weight.
- *Mesh/ particle size*
 - Many spices and herbs are ground to give easier dispersion in the final product. Particle size is generally specified and is carried out using standardized sieves. The common method of measuring sieve sizes was mesh (number of holes per inch)



ESA

- Extraneous matter
- Foreign matter
- Ash, acid insoluble ash, moisture content, V/O, Aw
- Heavy metals
- Pesticides
- Treatments (fumigants, irradiation)
- Microbiology
- Off odors
- Infestation
- Mycotoxins
- Adulteration
- Bulk density



References

- Handbook of herbs and spices. (2001). CRC Press. Boca Raton.
- Handbook of herbs and spices vol. 2. (2004). CRC Press. Boca Raton.



Thank You...
