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### Everest Cocoa and Chocolate 101

- I. There are 4 main factors that affect the flavor of chocolate and cocoa products.
  - a. Types of beans
  - b. Where the beans are grown
  - c. How they are harvested/fermented/dried
  - d. Processing parameters when the beans are converted from bean to powder or bean to chocolate
- II. Types of Cocoa Beans
  - a. Forestero
    - i. Represents just under 80% of global production
    - ii. Including Africa / Brazil
    - iii. strong taste, bitter and slightly acidic
  - b. Trinاريو
    - i. Less than 20% of global production
    - ii. found everywhere
    - iii. Fine cocoa, slightly aromatic similar to Criollo
  - c. Criollo
    - i. Represent only 5% to 8% of total global production
    - ii. Central America / Asia
    - iii. Mild nutty flavor, very aromatic, low bitterness
- III. Cocoa Flavor is influenced by **local** growing factors (Where beans are grown)
  - a. Variety & age of cocoa tree
  - b. Soil content & quality
    - i. Ecuador (Arriba) -- Distinctively fruity, with a floral bouquet
    - ii. Mexico — Robust, earthy natural flavor
  - c. Altitude & climate
  - d. Cultivation and processing methods: bean storage, drying and fermentation
- IV. How beans are harvested/fermented/dried in different regions of the world
  - a. Africa (Ghana and Tanzania) -- Gold standard of cocoa, combination of strong chocolate with sour & fruity flavors
    - i. Longer fermentation process (~7 days)
    - ii. Sun dried beans
  - b. Latin-America – smoky, hammy
    - i. Rainy season requires forced heat drying with fires
  - c. Malaysia – sour, green
    - i. Short fermentation period

Conclusion: the flavor profile of cocoa beans is partially and very importantly developed before the cocoa bean comes anywhere close to a cocoa or chocolate factory.

V. Sensory Evaluation of chocolate and cocoa products

- a. How to Taste Chocolate
  - i. Use all 5 senses
    - 1. Sight
    - 2. Texture
    - 3. Flavour
    - 4. Smell
    - 5. Listen to the snap
- b. Taste in relation to smell – go ahead and choose a small piece of choco for demo
  - i. Close your nose with two fingers, Taste a piece of chocolate, Wait a few moments, Release your nose. Did you feel the difference? (demo)
  - ii. Initial bite for initial aromas and flavors
  - iii. Let the chocolate melt slowly on your tongue
  - iv. Use of tactile nerves on the surface of soft tissue in the mouth
    - 1. Particles, Fat
    - 2. Resistance to applied forces
    - 3. Hardness, chewiness
- c. Before tasting remember...
  - i. No spicy foods, coffee, cigarettes for at least 1 h, preferably 1 day
  - ii. Generally no eating or drinking
- d. Cocoa and Chocolate Descriptors
  - i. Fruity – brown fruits, red fruits, winey
  - ii. Charcoal – carbon, burned notes
  - iii. Spicy – brown spices, peppery
  - iv. Floral – perfumey
  - v. Creamy – like milk or cream
  - vi. Bitter
  - vii. Etc.

VI. Processing parameters affecting chocolate flavor

- a. Origin, as discussed
- b. Amount of chocolate liquor in recipe
  - i. No liquor- white chocolate
  - ii. Semi-Sweet chocolate – 35% generally to around 80%
  - iii. Milk chocolate – 10% generally to around 50%
- c. Addition of other ingredients (Milk, sugar, dextrose, whey)
  - i. Different types of milk powder (roller v spray dried)
  - ii. Amount of sugar/sweetener in recipe
  - iii. Dextrose can contribute to mouthfeel, added to help chips hold shape (hygroscopic)
- d. Fineness
  - i. Particle size of cocoa powder and other ingredients
  - ii. Contributes to mouthfeel as well as fat holding capacity/release of flavor
- e. Conching
  - i. Vary time and temperature
  - ii. Evaporating off bitter and “sharp” tasting compounds
  - iii. Contribute to “smooth” flavor profile
  - iv. Contribute cooked flavors, caramelization, maillard rxn... particularly in milk choco

## VII. Chocolate tasting

- a. 1<sup>st</sup> tasting Different types of Choco ( light to dark – like wine!)
  - i. White - CHW-CI-2010602-014 Ultimate White
  - ii. Milk - CHM-P40GHA-529
    1. Fruity notes of banana, red fruit, and hints of sweet tobacco and liquorice.
  - iii. Semi Sweet
    1. 56.8% Dark #815NV-554
    2. 60% Dark #60-40-38NV-595
    3. 70% Dark #70-30-38NV-595
  - iv. Compound
    1. Main fat is vegetable fat
    2. Great for dipping, no need to temper, enrobing baked goods and confections
- b. Origine Rare – Beans sourced from a single region
  - i. Venezuela – Origine Dark Chocolate • 66.1%
    1. Fresh and slightly sour taste with a touch of grapes
  - ii. Origine Sao Thomé • 70% cocoa
    1. Bitter with refreshing acidity with only slight sweet touches. In contrast, it reveals very subtle aromatic notes of olives, peas, spices and fruits.
- c. Beans sourced from a single plantation
  - i. Crop to crop variation makes for a very unique product from order to order
    1. Alto Del Sol 65% (Peru) # CHD-P65ALTOBIO-528
    2. Madirofolo 65% (Madagascar) CHS\_Q65MADINOP-528
- d. Controlled fermentation
  - i. Selection of preferred microflora to produce cocoa and chocolate with maximized cocoa flavor and smooth, less bitter taste
    1. Inaya 65% # CHD-S65INAY-587
    2. Ocoa 70% CHD-N70OCA-587

## VIII. Processing parameters that affect the flavor profile of cocoa powder

- a. Origin, as discussed
- b. Alkalizing (“Dutching”)
  - i. good way to maintain consistency with varying bean inputs
  - ii. Addition of basic salts to nibs during a controlled cooking process (heat, time, temperature, oxygen levels)
  - iii. Changes the color, pH, and flavor of finished cocoa powder product
    1. Color
      - a. Light brown to dark brown/red to dark black
      - b. Can be blended to achieve a specific profile
    2. Flavor
      - a. Reduces acidity
      - b. Reduces delicate flavor profile (floral fruity)
      - c. Can enhance strong origin noted (smoky)
      - d. Development of fudgy/alkaline flavor notes
    3. pH
      - a. increases with the addition of alkaline salt
      - b. increases with deepening of color
  - iv. More alk = darker color = higher pH

- c. Roasting parameters
  - i. High roast –
    - 1. more cooked notes, roasted flavor, burn notes
    - 2. good for consistency
    - 3. Reduce volatile acids
  - ii. Low roast
    - 1. retain fruity/floral origin flavors
    - 2. Not as many volatile acids burned off, acetic flavor can remain
- d. Fat availability
  - i. Cocoa can be 0% low (10-12%) or high fat
    - 1.

## IX. Cocoa tasting

- a. Brownie tasting – different levels of alkalization
  - i. Natural
    - 1. Bitter upfront, spicy notes sometimes, more cakey texture
  - ii. Medium
    - 1. Fudgier, more lingering chocolatey notes, darker color
  - iii. Red
    - 1. Densest brownie, darkest color, sometimes greasier, different kind of chocolatey/ alkaline note than the medium dutch powder
      - a. Alk affects water absorption/Aw
- b. Ice Cream – Fat levels
  - i. Less cocoa solids in high fat powders- sometimes lighter color of finished product
    - 1. More cocoa particles in the lower fat IC – so it can actually taste more chocolatey than the high fat
  - ii. Cocoa butter has higher melt point than milk fat – coats mouth
    - 1. Gives a more high-end/luxurious mouthfeel
  - iii. Typically recommend hi fat powders for a more gourmet type product, particularly dairy
    - 1. Also good for baked goods for a softer, less crumbly texture.