

# Chocolate

week 9

- Product of both fermentation and roasting
- Hard & dry @ room temp
- Creamy in mouth
- Generalized origin (brazil, africa --)
- Tropical climate
- Cacao bean  $\cong$  cocoa
- Mostly Western African countries (Ghana, Ivory Coast) 90%
- Child labor  $\approx$
- Demand  $\uparrow$
- Trees will die due to climate.
- Diseased cocoa plant  $\rightarrow$  red veins in leaf  
 $\rightarrow$  swollen shoot
- Cocoa Swollen Shoot virus (CSSV)

## Cacao vs Cocoa

- Bildigimɛ cikolaba  $\rightarrow$  Theobroma cacao tree.

harvest seeds, crack them  $\rightarrow$  cacao beans  
look like coffee beans

- You can eat cacao beans raw  $\rightarrow$  bitter  
 $\rightarrow$  depending on soil, sunlight
- Beans are fermented & dried before processed
- Raw is the healthiest, bitter.
- Next, will determine cacao or cocoa

# Cacao Beans

- Raw or minimally processed

- antioxidant effects
- mood ↑
- blood pressure ↓
- heart ↑
- insulin regulation

rich in magnesium

## Cocoa

- Harvest

- Process

↳ ~~higher~~ higher temp

- Sweet in flavor
- different health effects

2 types of cocoa powder

### Dutch Processed

- Dark
- additional chemical → less acidic
- further process decrease antioxidants and nutrients

### Natural

- More acidic
- Tariflerde baking soda ekler, asitliği giderir diye

- Cocoa powder: genelde şeker veya başka tatlandırıcı ekleniyor.
- Cocoa, cacao'den daha ucuz. Ama katkısız olmanı bulmak zor.
- Katkı → cost ↓

Cacao  $\xrightarrow{\text{heat}}$  cocoa (different structure)

## Cocoa nibs

- Cacao beans that chop up to small pieces.
- Like chocolate chips but less sweet

## Cocoa butter

- Fattest part of cacao bean
- White.
- Look and taste like a chocolate.

## CACAO

- cacao beans are dried
- fermented
- heated at low temp.

cacao nibs → replacement for chocolate chips

cacao butter → moisturizer


- not so sweet

toz gibi

## COCOA

- Harvested in same way
- Heated in high temp.
- Sweeter
- More process decrease antioxidants & nutrients

toz gibi

- Olgunlaşma topu  → içinde 20-30 cacao bean var.

- Ayıklama

- Fermentasyonu bırak (5-7 gün)

- Güneş altında kurut (6 gün)

- Fabrikada kalitesizleri (kötü vs) ayıklama

- Boyutlarına göre ayır.

- Nibs'e dönüştür (kır)

- Roasted → ground into cocoa liquor

can be further processed into cocoa powder + cocoa butter

1- Pods grow

2- Harvest

3- Ferment

4- Dry

1- Roast

2- Crack & winnow (takes shells of the beans)

↳ ayıklamak

3- Grind with sugar for sweetness & flavor

4- Temper & mold

↳ sertleştirme

# Fermentation

Pods are broken  $\rightarrow$  beans + sugary pulp  
@ ambient temp

$\rightarrow$  microbes grow  $\rightarrow$  fermentation

## Tree to bar

- Harvest
- Break the pods (pulp + beans) (white)
- Fermentation (sugar + yeasts)
  - $\downarrow$
  - brownish, richer flavor
- Drying (in sunlight)  $\nearrow$   $H_2O$
- Roast, Maillard reactions  $\uparrow$   
astringency, bitterness  $\downarrow$   
cocoa flavors  $\uparrow$
- Winnowing (ayıklamak)  $\longrightarrow$  cocoa nibs
- Grinding (şeker, milk powder eklemek)  
(ajütör)
- Conching  $\rightarrow$  kristallizasyon. Smooth texture
- Kaka koy. Temper  $\rightarrow 45^\circ C \rightarrow 28^\circ C \rightarrow 32^\circ C$   
(\*)  
kristallite düzeyine getirmek için.

Chocolate bar  $\swarrow$

## Drying

Water

- Beans are resistant to further microbial spoilage

After drying

0.5% water

0.54% fat

## Roasting

- Dried and fermented beans are less astringent more flavorful
- However, their flavor is still unbalanced, undeveloped
- After selection & sorting → roasting
- 30-60 min 120-160°C
- Since aa and sugars + heat → Maillard browning.
- Gentle roasting helps preserve some of flavors of coffee beans  
intrinsically

## Winnowing

After winnowing → nibs are obtained

Beyers' Cacao

Cocoa butter

emulsifier

Sugar

PGPR

→ + Cocoa mass → sugar rebar

→ + Cocoa mass + milk powder → sugar cacao



# Grinding & Refining

Nibs are passed between rollers → dark fluid  
→ ~~cocoa~~ liquor.

→ Breaks beans → release cocoa butter  
→ too small for tongue to detect particles

## Cocoa Butter

- Liquor is pressed through fine filter  
→ cocoa butter presses  
→ cocoa powder is retained

## Conching

- Pure cocoa liquor is concentrated.  
- may be used for in baked goods  
- flavor is rough, bitter, astringent, acidic  
- To make it more delicious + sugar  
+ milk  
+ cocoa butter  
+ vanilla

→ Conching

- Conches rub mixture of cocoa liquor, sugar, milk.

- Friction + heat → 45-80°C

↳ in milky chocolate (43-57°C)

- 8-36 hours

- Conching sirasinda haska maddeler de ebleriyon.  
→ when chocolate melts, flows smoothly  
→ mellow (yungat) taste

- Heat → moisture ↓

also undesirable volatiles (acidity etc) ↓ ⇒

## Cooling & Solidifying

- After conching  $\rightarrow$  warm fluid mass of cocoa butter + suspended particles + sugar.

- Direkt soğutma ile gerektirir. Direkt soğutulursa buzluk girintisi

$45 \rightarrow 28 \rightarrow 32^\circ\text{C}$

- Cocoa butter can solidify into 6 different kinds of fat crystals

2 are stable böyle soğuluyor.

## Tempering

- Heat chocolate to melt all fat crystals

- cool it to form a new set of crystals

- heat again (carefully) to melt unstable crystals.

- Stable crystals will form a crystal network

- Unstable cocoa butter crystals melt easily ( $15-28^\circ\text{C}$ ).

- desirable melt only at  $32-34^\circ\text{C}$   
chocolate forms ✓

- unstable cry form when molten chocolate is cooled rapidly,

hızlı soğutuyumuz için  $32-34^\circ\text{C}$ 'de olusan kristaller isini tutmazlar. Unstabil olur.

2 tür temper

1  $\rightarrow$  create stable crystals from scratch

2  $\rightarrow$  add tempered chocolate

## Storing

15-18°C, without fluctuations

- Sometimes white powder on the surface

fat bloom, cocoa butter erimis ve yüzeye çıkmış.

- Sağlık açısından sıkıntı yok

## Sugar Bloom

- Below 15°C or excess humidity

- When chocolate is taken out of refrigerator and moisture forms upon it.  
dissolves sugar

- Then, when water evaporates, sugar remains on the surface.

- Unpleasant appearance

- Taşınma esnasında sıcak - soğuk değişimi olmazsa engellenir.

- Soğuk ortamlardan alıyorsa paketi açılmadan sıcak ortama durnak.

- Direct condensation will be avoided.

- Gay kasıgı heeler su ekleyince katı-sıvı arası bir şey

- fazla su eklersen geri döndürürsün. Daha fazla su ekleyip  
chocolate syrup olur enak.

## Health

- Antioxidant

- higher cocoa solids of chocolate, higher antioxidant

- any added sugar / milk / butter → dilute cocoa solids

- contains theobromine & caffeine

weaker stimulation  
nervesys-

→ toxic  
to dogs



# Addiction

- contains both → cannabinoid (active ingredient in marijuana)  
↳ other molecules that cause brain cells to accumulate cannabinoid ~~chems.~~

extremely small amounts

- chocolate does not contain any drug like substance
- eating chocolate is appealing

## Ruby Chocolate

- ~ Berry taste
- fruity
- Boga yok. Eikoketain rengi bu.

## Özet

