



Consortium for Educational Communication

Module on **Chocolate And Its History**

By

DR. SUSHMA APPAIAH

M.Sc., Ph.D

Founder & CEO, Gigglez of Livez (Golz)

Nutrition Counsellor

Roopanagar, Mysuru-570026

Karnataka, India



TEXT

Introduction:

Chocolate is a key ingredient in many foods such as milk shakes, candy bars, cookies and cereals. It is ranked as one of the most favorite in North America and Europe. The cocoa “beans” forms the basis of chocolate which are seeds from the fruit of the cacao tree. Cocoa trees primarily grows in tropical areas near the Equator. The seeds grow inside a pod-like fruit and are covered with a juicy white pulp.

To make chocolate, cocoa farmers crack open the pods, scoop out the seeds, ferment them and dry them. The beans are shipped to factories all over the world, where manufacturers roast and grind them into a dense liquid called chocolate liquor after inspection and cleaning. Based on the final requirement of the product, pressing, rolling, mixing with sugar and other ingredients are added. The mixture is further heated and cooled in the respective shapes.

History of chocolates:

Human’s liking for chocolate began at least 4,000 years ago in Mesoamerica, the present day southern Mexico and Central America, where cacao grew wild. *Olmecs* unlocked the secret of how to eat this bitter seed. Since then, people around the world have turned to chocolate to cure sickness, to please God, to show love, to enjoy holidays, to survive fast, to ward off scorpions and sustain warriors. It is believed that chocolate is derived from the Maya verb *chokola’j* which means, “to drink chocolate together” (Spadaccini, 23rd online edition). Chocolate is a product which requires complex procedures to get the final produce. Christopher Columbus was the first European to discover the existence of cacao tree. It is also believed that Columbus seized some cacao plants from the natives to bring back to Spain. Today, chocolate industry has evolved so large that 40 to 50 million people depend on cocoa for their livelihoods—and chocolate farmers produce 3.8 million tons of cocoa beans per year.

The process involves harvesting coca, refining coca to cocoa beans, and shipping the cocoa beans to the manufacturing factory for cleaning, coaching and grinding.

Harvesting and processing of cocoa seeds:

Chocolate production starts with harvesting coca in a forest. Cocoa comes from tropical evergreen Cocoa trees, such as *Theobroma cocoa*, which grows in the wet lowland tropics of Central and South America, West Africa and Southeast Asia (within 20 degree centigrade of the equator) Following are the steps involved in processing of cocoa seeds

Harvesting of the pods:



Cocoa pods that is borne on the trunk and branches of cocoa trees are harvested when the pods turn orange from green when they're ripe. The pods are taken to a processing house. Here they are split open and the cocoa beans are removed. Pods can contain upwards of 50 cocoa beans each.

Fermentation of beans:

The beans collected from the pods are heaped and the beans undergo the fermentation processing. During fermentation the beans turn brown. This process may take five or eight days.

Drying of fermented beans:

After fermentation, the cocoa seeds are dried. Drying can be mechanized or sun drying. The drying process usually takes about a week and results in seeds that are about half of their original weight. The dried beans are packed and sent to chocolate manufacturers.

Manufacturing of Chocolate:

The cocoa beans once reaches the machinery of chocolate factories, they are refined into chocolate. Generally, manufacturing processes differ slightly based on the species of cocoa trees, but most factories use similar machines to break down the cocoa beans into cocoa butter and chocolate (International Cocoa Organization, 1998). The fermented and dried cocoa beans is firstly, refined to a roasted nib by winnowing and roasting. Then, they are heated and melted further into chocolate liquor. Lastly, manufacturers blend chocolate liquor with sugar and milk to add flavor. After the blending process, the liquid chocolate is stored or delivered to the molding factory in tanks and will be poured into moulds. Finally, wrapping and packaging machines will pack the chocolates and then they will be ready to transport. The top twenty countries with highest cocoa production are depicted in **table 1**. Following are the steps involved in manufacturing of the chocolates and depicted in **fig 1**.

Step 1: Roasting and Winnowing the Cocoa

The first thing that chocolate manufacturers do with cocoa beans is roast them. This develops the colour and flavor of the beans into what our modern palates expect from fine chocolate. The outer shell of the beans is removed, and the inner cocoa bean is broken into small pieces called "cocoa nibs."

The roasting process makes the shells of the cocoa brittle, and cocoa nibs pass through a series of sieves, which strain and sort the nibs according to size in a process called "winnowing".

Step 2: Grinding the Cocoa Nibs

Grinding is the process by which cocoa nibs are ground into "cocoa liquor", which is also known as unsweetened chocolate or cocoa mass. The grinding process generates heat and



the dry granular consistency of the cocoa nib is then turned into a liquid as the high amount of fat contained in the nib melts. The cocoa liquor is mixed with cocoa butter and sugar. In the case of milk chocolate, fresh, sweetened condensed or roller-dry low-heat powdered whole milk is added, depending on the individual manufacturer's formula and manufacturing methods.

Step 3: Blending Cocoa liquor and molding Chocolate

After the mixing process, the blend is further refined to bring the particle size of the added milk and sugar down to the desired fineness. The Cocoa powder or 'mass' is blended back with the butter and liquor in varying quantities to make different types of chocolate or couverture. (Fig 2) The basic blends with ingredients roughly in order of highest quantity first are as follows:

- i) Milk chocolate: sugar, milk or milk powder, cocoa powder, cocoa liquor, cocoa butter, lethicin and vanilla.
- ii) White chocolate: sugar, milk or milk powder, cocoa liquor, cocoa butter, Lethicin and Vanilla.
- iii) Dark chocolate: cocoa powder, cocoa liquor, cocoa butter, sugar, Lethicin and Vanilla.

After the completion of blending, molding is the final procedure for chocolate processing. This step allows cocoa liquor to cool and harden into different shapes depending on the mold. (Fig 3) Finally, the chocolate is packaged and distributed around the world. General characteristics of quality chocolate are very important and they are as mentioned below.

Glossy shine: This indicates that chocolate has been stored properly. When chocolate melts and resolidifies, the cocoa butter rises to the top, causing "bloom." this imparts the taste and texture.

Texture: Texture in terms of food is referred as "mouth feel." The mouth feel of good chocolate should be smooth; it should not be grainy or waxy. A good chocolate should melt in mouth. Cocoa butter has a melting point lower than body temperature. Chocolate with vegetable fat retains its shape for longer duration in mouth. Melting temperature of chocolates with solid shortening is above body temperature and has waxy mouth feel.

Taste: Texture determines the final quality of chocolate. Every manufacturer's chocolate varies based on specific combinations. The factors which decide these combinations include origin of cacao beans, how they are roasted and the mixing of cocoa butter, sugar, and pure chocolate.

Types and specific characteristics of the commercially available chocolate:

Bittersweet Chocolate: This contains at least 35 percent pure chocolate with small amount of added sugar. This chocolate is also known as dark chocolate. Characteristically, they are



darker and less sweet than semisweet. Specific sweetness and color intensity varies based on manufacturer's recipes and source of cacao bean.

End Use: Baking and eating.

Semisweet Chocolate: This contains 35 percent pure chocolate with added cocoa butter and sugar. Characteristically these type of chocolate are most versatile. They are available in many forms (block, discs, squares, chips).

End Uses: Baking and eating.

Milk Chocolate: Milk chocolate contains at least 10 percent pure chocolate with added cocoa butter and sugar. Characteristically they contain less pure chocolate than semisweet or bittersweet chocolates. Flavour of these chocolates is milder than darker chocolates.

End uses: Eating

Sweet Baking Chocolate: Sweet chocolate has at least 15 percent pure chocolate with added cocoa butter and sugar. It tastes sweeter than semisweet chocolate.

End uses: Baking

Unsweetened Cocoa Powder: Unsweetened cocoa powder is pure chocolate with most of the cocoa butter removed. Characteristically cocoa powders are labeled as "Dutch-process" or "European-style". They are treated to neutralize the naturally occurring acids, thus giving them a mellowed flavor and dark red color.

End uses: Baking

White Chocolate: White chocolate is made by combining cocoa butter with sugar, milk solids, and flavoring is usually vanilla.

End uses: Eating

Premelted Chocolate: Premelted chocolate is a semi liquid, unsweetened product made of cocoa powder and vegetable oil.

End Uses: Exclusively used for baking.

Candy Coated chocolate: Also known as confectioners' coated chocolate and chocolate-flavored coated candy. This is a chocolate like product with most of the cocoa butter removed and replaced with vegetable fat. It is easier to work with this type of chocolate for dipping and molding as it requires special steps to get glossy appearance and melts at higher temperature. They are mainly available in assorted colors and flavors.



Mexican Chocolate:

Mexican sweet chocolate has cinnamon and sugar added to the pure chocolate. Sometimes ground almonds may also be added. Available at Mexican grocery stores and in specialty food stores. Ibarra brand is one of the most popular brands in Mexico

Worldwide Consumption of Chocolate:

All the countries does not enjoy the sweet taste of chocolate equally. There is profound difference between nations that extract the raw materials and those who indulge in the finished product. All, but one of the top twenty countries that consume chocolate are considered 'well-developed' or 'advanced'. Brazil is the only country, which actually considers chocolate to be a natural resource. Seventy percent of the worldwide profit from chocolate sales is concentrated in the western countries. 80% of the world chocolate market is accounted by just six company which includes Nestle, Mars and Cadbury. Europeans alone, consume around 40% of the world's cocoa per year, 85% of which is imported from west Africa. The statistics of top five countries chocolate consumption is depicted in **table-2**

Few interesting facts on chocolates: Sixteen of the top 20 chocolate consuming countries are European.

-66% of chocolate is consumed between meals.

-Chocolate manufacturers currently use 40% of the world's almonds and 20% of the world's peanuts. 71% of North American chocolate eaters prefer milk chocolate.

Nutritional Information of Chocolate:

The major components of manufactured chocolate are approximately 54% cocoa butter, 11.5% protein, 9% cellulose, 6% tannic acids and colour, 5% water, 2.6% salts, 1% sugars, 0.2% caffeine and 10% organic acids and aromas. Depending on an individual chocolate manufacturers recipes the amount of cocoa mass will range from 7-15% in milk chocolate and 30-70% in dark chocolates.

The excess consumption of chocolate and chocolate products have deleterious effect on health especially on long term. Obesity and poor dental health cannot be attributed to the chocolates alone. At the same time any celebration without chocolates is also hard to conceive. It is all the more important to understand the nutrients and their composition of chocolates.

Each Pound or 453 grams of milk chocolate contains: 2300 calories, 140 grams of fat, 100 milligrams of cholesterol, 370 milligrams of sodium, 270 grams of carbohydrates and 31 grams of protein. The detail on nutrition facts are given in **table-3**.

Let's learn about the leading chocolate brands of India



Cadbury is a British multinational chocolate major managed by Mondelez India (earlier Cadbury India). Cadbury was established in Birmingham, U.K. by John Cadbury in 1824. Cadbury entered India in 1948 and started its operations by importing chocolates. Today, Cadbury is the most loved and most widely sold chocolate in India. According to Euromonitor International, Cadbury accounted for 55.5% of the total chocolate sales in India during 2014. Dairy Milk is the flagship brand of Cadbury. Some of the most famous Cadbury variants are dairy milk, 5 star, gems, perk, silk, bournville, celebrations.



Founded in 1866, Nestle is a multinational beverage and consumer food items company based in Switzerland. Henry Nestle founded the company in Vevey, Switzerland. Nestle came to India in the late 1950s. Nestle was the second best selling chocolate brand in India in 2014 with 17% share of the total sales volume. Kit Kat, a bar of crisp wafer fingers covered with chocolate layer, is Nestle's flagship variant in India. Some of the widely consumed Nestle brands are: Extra Smooth, Kit Kat Senses, Kit Kat Dark Senses, Alpino, Kit Kat, and Bar-One&Munch.

Ferrero India



Ferrero is an Italian food and beverage company founded in 1946 by Michele Ferrero. The company started its business in India in 2004 and has gained a considerable ground in the Indian chocolate industry within a decade. It is famous for its unique taste defined by its main ingredients – creamy filling, a crunchy wafer and a hazelnut centre. Ferrero India was the third biggest chocolate brand in India as it held 5% market share in 2014. Ferrero Rocher is the flagship variant of Ferrero India. Some of the Ferrero variants: Ferrero Rocher, Nutella,



Kinder, Raffaello & Mon Cheri.



Amul is India's indigenous dairy cooperative primarily dealing in dairy products. It is also one of the biggest players involved in chocolate manufacturing industry of India. Amul is owned by Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF) and was founded in 1946 by Dr. Verghese Kurien. The credit of making India the largest producer of milk and dairy products by bringing about the 'White Revolution' goes to Amul. Milk chocolate is Amul's most trusted brand amongst Indians. Accounting for 1.1% of India's overall chocolate sales volume in 2014, Amul stands fourth. Some of its variants are: Milk Chocolate, Dark Chocolate, Fruit & Nut Chocolate, Tropical Orange Chocolate, Almond Bar.

Mars India International



Mars was established in 1911 by Franc C. Mars in Washington, U.S.A. The first recognized brand of Mars was Milky way, that was launched in 1920s. Recently, Mars has started its manufacturing in India. Snickers and Galaxy are the most popular chocolates in India that are made by Mars. The company was the fifth biggest seller of chocolates in India in 2014 as it got 1.1% share of the total sales. Some of its products are: Snickers, Galaxy, Mars, Milky Way, Skittles, M&M's, Twix

Campco



Campco (Central Are canut and Cocoa Marketing and Processing Cooperative Ltd.) is an Indian cooperative that was founded in 1973 in Mangalore, Karnataka. They are the largest processors of cocoa bean in the country. Which is mainly cultivated in Indian states of Kerala, Karnataka and Assam. Some of its products are: Bar, Krust, Fun Tan, Melto, Snack



Bar, Treat, Turbo&Dairy Cream.

ChocOn India



ChocOn started making chocolates in 1998, but it was founded in 1994 and started off with manufacturing bottled mineral water. The company's operations were stretched to a whole new manufacturing segment of sweet and the first brand was Milk N Nut, which was launched in 1998. Some of ChocOn's products are:Chocolaty Bar, Milcreme Choco Bar&ChocOn Coconut.

Parle



World's best-selling biscuit Parle-G is the flagship product of Parle, an Indian manufacturer of consumer goods, confectioneries and beverages. Parle was founded in 1929 by Vile Parle's Chauhan family. The company is the biggest biscuit manufacturer in India. It deals in confectionery items as well. Parle products are a rare combination of fine taste, nutrition and quality. Main products are Cuckles, Milky Punch, Eclairs&Kajoos.

Candyman





Candyman is owned by Indian conglomerate ITC founded in 1910 and based in Kolkata, West Bengal. ITC launched its confectionery brands in 2002. Within a little more than a decade of its existence, Candyman has launched a wide range of confectionery variants that have ruled over Indian masses. Their main products are: Choco Double Eclairs, Eclairs, Creme Lacto, Toffichoo & Cofitino.

Conclusion: chocolate is derived from the Maya verb chokola’j, which means, “to drink chocolate together” (Spadaccini, 23rd online edition). Chocolate is a product which requires complex procedures to produce. Harvesting and processing of cocoa seeds involves -- plucking, fermentation and drying of the cocoa seeds. Manufacturing of chocolate requires high specifications to ensure the final product with good quality. There are various types of chocolates based on the variation in their composition and origin of the cocoa beans. Chocolate consumption is high among western countries compared to the rest of the countries. India has various leading manufacturer of the chocolates like Cadbury, Amul, Nestle.

Table-1 Top Cocoa Producing Countries in the World

rank	Country	Production (tonnes)
	Cote d’Ivoire	1,448,992
	Ghana	835,466
	Indonesia	777,500
	Nigeria	367,000
	Cameroon	275,000
	Brazil	256,186
	Ecuador	128,446
	Mexico	82,000
	Peru	71,175
	Dominican Republic	68,021
18	India	13,000

Figure 1: Manufacturing process of chocolate



Table- 2 The Top Chocolate Loving Nations (kg/person/year)

Rank	Country	Quantity (kg/person/year)
1.	Switzerland	10.13
2	Austria	9.12
3	Ireland	8.82
4	Germany	8.18
5	Norway	8.12

Table - 3 Nutrition facts of dark chocolate (per 100 gms)

Calories ૦૬૬	
% Daily Value*	
Total Fat ૩૧ g	47%
Saturated fat 19 g	95%
Polyunsaturated fat 1.1 g	
Monounsaturated fat 10 g	
Trans fat 0.1 g	
Cholesterol ૧ mg	2%
Sodium ૧૬ mg	1%
Potassium ૦૦૧ mg	15%
Total Carbohydrate ૬૧ g	20%
Dietary fiber 7 g	28%
Sugar 48 g	
Protein ૬,૧ g	9%
Caffeine ૬૩ mg	

Vitamin A	1%	Vitamin B-12	3%
Calcium	5%	Iron	44%
		Magnesium	36%

*Per cent Daily Values are based on a 2,000 calorie diet.