

## Sugar Overload: A Comparative Study of Modern Chocolate Formulations

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### Abstract

The issue of increased sugar in the ingredient of chocolate bars and other processed food products is a serious concern that should be a priority for India, since the incidence of diabetes there is at the alarming level. This matter is exacerbated by the literal aspect of cocoa production throughout the world, where even if Africa produces 70% of world cocoa, the share is less than 20%. The chocolate industry is totally controlled by several European countries that are backed by their huge financial resources and the infrastructure they already have. The longer duration of time and climatic changes like desertification have been exacerbated by the invention of climate change mostly in Africa. The company experiments by not putting cocoa in the product and add more sugar inside to make consumers satisfy due to its sweeter taste on a smaller chocolate bar right after the price goes up as a result of rising cocoa prices. This practice is not only a threat to the health of all, but the excessive sugar in these treats also blunts the tempo of the entire body, particularly in India where there is less regulatory control on sugar. India, being long-suffering and rich in natural resources, has very favorable weather conditions for the cultivation of cocoa plants, and it can be a good alternative to other conventional crops such as cotton and sugarcane and this could result in economic growth and partly solve some of these problems. In any case, there are several stakeholders involved in dealing with the issue, including the Government of India, FSSAI and the manufacturers.

### Introduction

Similar to the fuel that is powering the engines, carbohydrates are omnipresent in our diet, they constitute the larger part of what we eat, they are a fundamental ingredient in foods such as rice and wheat which we take at almost each meal. Instead, the snacks commonly known as chocolates, cold beverages, or sweetened tea, etc. are what people mostly buy to eat. Actually, they are not aware that the sugar content of these snacks is very high. Actually, these

cool ones can contain up to 40% of their sugar content, being rather almost a syrup than a drink. Chocolates, which are basically popular for their cocoa — the main component — are in fact, another issue. Many of the popular brands in India are offering cocoa-deficient products with low-quality sugar, and is setting a stage for people to come up with diabetes. This is the most important question that should be answered: Is this a unique issue in India, or is it happening in other countries as well? If it is only in India, then who is to be blamed? Guys like the administration, food (FSSAI), and the manufacturers themselves? These questions will be discussed and based on that there will be a comprehensive evaluation of the potential cocoa farming in India as the one solution for both public health and economic improvement.

### **Ingredient of Chocolate Bars**

Children as well as adults, people of every age love to eat chocolate but often they don't know what are the ingredient of chocolate. A solid chocolate bar contain sum of 4 main components like cocoa solids, cocoa butter, sugar and milk. The relative quantity or ratio of those ingredients defines different types of chocolate bar made of dark chocolate, milk chocolate and white chocolate. In addition, during the production of other chocolate products, along with main ingredients, contains flavoring such as cheese, emulsifiers, vanilla essence, caramel etc.

According to Indian standards for chocolate, the name of the ingredients used in the product shall be listed in the descending order of their composition by weight or volume, as the case may be at the time of its manufacture. In India there are different ingredient list in dark chocolate, milk chocolate.

**Sugar:** In every milk chocolate in India sugar is the main and first ingredient in different proportion. Generally, sugar is added to balance the bitterness of the cocoa solids in different ratio with another ingredient.

**Cocoa solid:** Cocoa solid or cocoa mass is the non-fat part of the cocoa bean. They are the solid particles extracted from the cocoa bean. It gives the antioxidants which provides chocolate its characteristic flavour and aroma and theobromine which stimulates nervous system.

30% (low percentage) cocoa solid: sweeter, milder, flavour

50%(medium) cocoa solid: balanced flavour, slightly sweet

70% or higher (high): intense, rice and bitter flavour

**Cocoa butter:** The magical ingredient which gives chocolate a smooth melt texture and rich flavour and can also use in cosmetic. It helps to increase the self-life of chocolate by preventing the growth of bacteria and fungi.

**Milk:** It is the main ingredient of milk chocolate and also used to maintain the natural sweetness in the chocolate. It improves the flavour and smooth texture, provide bright colour and acts as emulsifier.

**Additive flavours:** Many additives like Vanilla, Nuts, Fruit, Spices, Coffee, Caramel and other ingredient which generally used to enhance the taste experience for chocolate lovers.

**Added sugar in various chocolates (under Nutritional Information)**

Sr No	Name of the chocolate	Sugar in grams (per 100 gms)	Net Weight	Added Sugar (g) calculated	% proportion of sugar to actual weight
1	Bournville 70%	23	80.0	18.6	23%
2	Amul Dark chocolate - 55 % cocoa	43	150.0	63.8	43%
3	Amul Milk Chocolate	39	150.0	58.1	39%
4	Nestle KitKat	29	38.5	11.1	29%
5	Cadbury 5Star	57	40.0	22.8	57%
6	Cadbury gems	68	3.2	2.1	68%
7	Cadbury Chocolairs	43	5.2	2.2	43%
8	Galaxy milk chocolate	47	110.0	52.1	47%
9	Galaxy Dark chocolate - 70%	27	110.0	29.6	27%
10	Dairy Milk	47	134.0	63.5	47%



**Cadbury Eclairs**



**Galaxy milk**



**Kitkat**



**Cadbury 5 star**



**Cadbury gems**



**Cadbury Dairy milk**

**The Great Chocolate Farce: India's 2.5% Cocoa Standard**

All this part of the ₹11.6 lakh crore global chocolate industry, India enjoys some curiously low standards for cocoa. If European regulations insist on at least 20% cocoa in chocolate, India's FSSAI allows a mere 2.5%. That is not only lenient; that is a sham standard. More often than not, what passes for "chocolate" in India is mere sugary confectionery with a whiff of cocoa, a travesty of what true chocolate is supposed to be.

Sr. No.	Characteristics	Requirements for					
		Milk Chocolate	Milk Covering Chocolate	Plain Chocolate	Plain Covering Chocolate	White Chocolate	Blended chocolate
1	Total Fat (on dry basis) per cent by weight. Not less than	25	25	25	25	25	25
2	Milk fat (on dry basis) Per cent by weight. Not less than	<b>2</b>	<b>2</b>	-	-	2	-
3	Cocoa solids (on Moisture-free and free basis) per cent weight	<b>2.5</b>	<b>2.5</b>	12	12	-	3
4	Milk Solids (on Moisture-Free and Fat-Free Basis) Percent By weight (Minimum)	10.5	10.5	-	-	10.5	1-9 (Range)
5	Acid insoluble Ash (on moisture fat and sugar free basis) percent by weight, Not more than	0.2	0.2	0.2	0.2	0.2	0.2

In case of chocolate which contain vegetable fats other than cocoa butter, it shall have the following label declaration in bold: "CONTAINS VEGETABLE FAT IN ADDITION TO COCOA BITTER" 1

A deep-seated cultural love for sweets-barfi, jalebi, laddu-had conditioned the chocolate market in India. The 2.5% rule spoke of more than regulatory leniency-it spoke to the national palate, which likes its foods sugary more than complex and rich in flavor, as genuine chocolate is. Sweetness translates into indulgence in this country, and these low-cocoa "chocolates" fitted right in there, even if they were quite far from the real thing.

### The Business of Mediocrity

For Indian chocolate manufacturers, this low FSSAI standard on cocoa is something of a blessing in disguise: it means they are able to create cheaply made, sugar-laden products that pass as "chocolate" while keeping costs minimal. Such leniency has led to a market flooded with mediocre products at the cost of true, high-quality chocolate being an afterthought. The focus remains on maximizing profits rather than elevating the standard of chocolate available to consumers.

### Global Cocoa Politics and Strategic Location of India

The global industry of cocoa today is bound to geopolitical and economic circles. While Africa produces 70%, particularly because of Ivory Coast and Ghana, it captures only a small percentage in profit, 7%, while the major chunk of value addition happens in Europe along with the revenue. During the decades, European countries have dominated the chocolate industry with much more infrastructure and capital investment, further exploiting economic disparities.

Climate change has worsened the problems facing cocoa producers in Africa, reducing yields by as much as 30%, thereby pushing prices higher. Mostly due swollen shoot disease, the production of both Ivory coast and Ghana is reduced in recent years.

Being a country with a cocoa-suitable climate, India is well-positioned to take on such challenges. Therefore, the rich prospect leveraging across the varied agro-climatic zones—essentially South-India can apt opportunity. In fact, utilization of such a potential would help in reducing the dependence of India on West Africa-sourced cocoa beans and

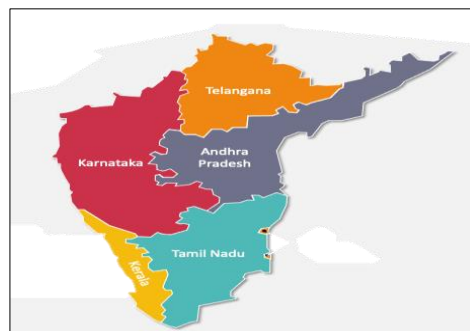


embedding a shot in the arm of the rural economy to supply the rising demand for chocolate within and outside the country.

### **Benefits of Cocoa Cultivation in India**

#### **Suitable climate and soil conditions:**

Only subtropical conditions with temperatures ranging from 21°C to 32°C and satisfactory rainfall favour the crop. Kerala, Tamil Nadu, Telangana, Andhra Pradesh and Karnataka—presents are the only state that fits the bill for cocoa growing, with the optimum quantum at around 2,800 mm of annual rain.



#### **Economic Opportunity:**

The Indian chocolate market is estimated to be valued at approximately 20,000 crore in 2021 and is forecast to jump up to 34,000 crore in 2026. In such a scenario, wherein the per capita chocolate consumption is only 0.3 kg, the scope for increased domestic production of cocoa products is great.

#### **Governmental Support:**

These include the Cocoa Development Programme that integrates a subsidy, training, and infrastructure support. The Government of India has invested over ₹200 crores to improve the quantity and quality of cocoa.

#### **Research and Innovation:**

Indian agricultural research developed high yielding and diseases resistant cocoa varieties. The former, for example, ICS-1 and ICCP-2, yielded an improvement from 300 kg/ha to 800 kg/ha during the last decade.

**Processing plants:** that adds values to the domestically grown cocoa for fostering the development of India Chocolate industry.

#### **Export Potential:**

During 2022, cocoa export earnings of India were to the tune of ₹800 crore; it was considered satisfactory enough for improvement. Specialty cocoa is in increasing demand in international markets, giving Indian producers an opportunity to get into the premium markets for organic and single-origin products.



Improving India's standing in the world chocolate arena will need a few necessary changes. First, increasing the minimum cocoa content to international standards would be a crucial step. Educating the customer about the richness and the health benefits of real chocolate might perhaps change the current consumer preference for low-sugar-content and high-cocoa-content chocolate. Lastly, investing in local cocoa production and supporting premium brands would also help develop a robust high-quality chocolate industry. Till then, chocolate sold as such in India will be little else than a sugary parody: sweet treat, maybe, but far from the rich indulgence any true chocolate lover expects.

### **Conclusion**

**Cocoa Future in India** It has the potential to be one of the largest producing countries for cocoa, with a favorable climate and growing domestic market. Indeed, with an enabling regulatory environment coupled with enhanced processing infrastructure and continuing investment in research and innovation, it can emerge globally competitive in the Indian sector. But even as climate change and economic challenges batter traditional cocoa-growing regions, the blossoming cocoa industry in India becomes an emerging resource both threatening and offering an opportunity to redefine global chocolate production by qualitatively changing the face of the industry from sustainability to economic development.

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