

Technical Considerations

for Cocoa Powder Reduction



Rebecca Genovise | Kaylind Cook | Gina Maioriello

With cocoa powder prices rising, it has become not only beneficial but necessary to explore creative ways of reducing cocoa powder levels in finished application while maintaining the integrity and quality of a final product. Reference this technical guide when optimizing existing or new formulas. Cocoa powder is the dry solids after the processing of cacao beans and removal of cocoa butter. Cocoa powder is used to enhance chocolate taste, mouthfeel and texture, provides rich color, and has historically been a cheap bulking ingredient in finalized formulas.

INTRODUCE COCOA POWDER ALTERNATIVES

Explore using carob powder, chicory root powder and malt extracts to build back flavor, color, and texture. Caution should be taken with these as they are not one-to-one replacements of cocoa powder. If cocoa powder alternatives are used too high the finished product could develop earthy musty off notes and undesirable texture. Additionally, inclusion of these powders has the potential to change nutritional facts and ingredient declaration.

INCLUDE FLAVOR ENHANCERS AND MASKING AGENTS

There are hundreds of materials found in cacao beans and cocoa powder that contribute to its complex flavor, aroma, and mouthfeel. By utilizing organoleptic and analytical expertise, a flavor house can create solutions to build back brown, roasted, nutty, caramel, vanilla, floral, and fruity notes plus secondary and tertiary attributes that are naturally found in cocoa. Top noted liquid and spray dry flavors might focus on the more volatile esters, aldehydes, alcohols, acids, furans, and pyrazines that are lost with a reduction in cocoa while processed or reaction flavors will mimic the roasting and fermentation of cocoa beans to develop Maillard reaction by-products.

Materials that provide depth and heaviness can also be utilized to build back mouthfeel that is lost with the reduction in fat from cocoa butter.

Technical considerations a flavor house might start with is understanding country of origin or what kind of cocoa powder is used. Variations in powders can lead to different flavor attributes, color and fat content.

TYPE OF COCOA POWDER	DESCRIPTORS
Natural	Acidic, bitter, mild brown, slight nutty and slight roasted
Alkalized	Sweet brown, earthy, caramel with a darker richer color; less acidic; higher fat content
Red	Deeper fudgy notes; alkalized for less acidity; red hue and higher fat content
Jet Black	Bitter, dark, and burnt notes



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COCOA REGIONALITY

Our scientists evaluated the different cocoa regionalities in finished chocolate bars. The chart below shows common cocoa regions but does not encompass all sources offered on the market.

REGION	COUNTRY	DESCRIPTORS
Africa	Ivory Coast	Brown Fruit, Prune, Earthy, Bitter, Pyrazine, Coffee, Musty
	Ghana	Brown Spice, Roasted Nut, Burnt, Fruity, Cereal, Semi-Sweet
	Madagascar	Creamy, Red Berry, Astringent, Mild Brown Fruit
Caribbean	Dominican Republic	Citrus, Smokey, Fruity, Astringent, Creamy, Earthy
Central & South America	Peru	Earthy, Warm Spice, Wine, Cooked Sugar, Citrus, Berry, Acidic
	Ecuador	Semi-Sweet, Chocolate Liquor, Berry, Tangy, Brown Fruit, Raisin
	Colombia	Dark Roast, Fatty, Creamy, Bitter

STARTING FLAVOR SOLUTIONS

The flavor solutions below have been developed to have flavor characteristics similar to Russet 10/12 cocoa powder. Flavors screened across multiple applications, baked goods, ready to mix nutrition beverages, and dairy products.

CODE	NAME	SOLUBILITY	STARTING USAGE	NOTES
10AS843116	NAT CHOCOLATE TYPE FLAVOR	OS	0.10%	Utilizing natural flavor components found in cocoa powder to deliver in oil-soluble applications
10AS843149	NAT CHOCOLATE FLAVOR WONF	WS	0.20%	Utilizing natural flavor components found in cocoa powder to deliver in water-soluble applications
10MS842924	NAT CHOCOLATE FLAVOR WONF	SD	0.20%	Spray dried version to be utilized in a dry mix or high heat application
1186973	NATURAL FLAVOR CHOCOLATE TYPE SD	SD	0.15%	Spray dried option that incorporates reaction chemistry to mimic the processing of cocoa powder