

Table 2.5 Typical cocoa bean quality requirements for chocolate manufacturers.

Criteria	Specification or limits ^a	Reason/comment
Food safety		
Mouldy beans	<4–5% depending on contract (see Table 2.6)	Off-flavours, potential for mycotoxins, high levels of free fatty acids
Mycotoxins	Within limits (<20ppb in USA in foods)	Carcinogen
Infested or insect damaged	<2 or <1 ppb proposed	Some uncertainty regarding limits. Probable carcinogen
Pesticides	<3–5% depending on contract	Wholesomeness
	Absent or below maximum residue limits/import tolerances/ action levels	
Hydrocarbons	Within limits	Source is from mineral batching oils in jute sacks
	Within limits Proposed 2 ppb for benzo-a-pyrene in EU	Source is from combustion products, e.g. during drying of cocoa
	Within limits. US FDA guidance for lead is <0.1 ppm in chocolate usually consumed by children	Source is environmental contamination
	New proposal: 0.2–2.0 mg/kg in chocolate (CODEX and EU). No limits for cocoa beans	Source is from the soil
Economic or yield aspects		
Moisture	<7 or 8%	Prevents mould growth, reduces yield of edible material
Bean size and bean size distribution	Typically 100 beans/100 g or 110 beans/100 g. Percentage of beans retained on certain sized sieves	Operation of processing plant. Yield of edible material.
Shell	Typically 12–16%	Uniformity of whole bean roasting
Fat (cocoa butter)	Typically 50–57% in dry nib	Yield of cocoa nibs
		Economic (amount of added cocoa butter needed to make chocolate)
Foreign materials	Absent or <1.5% (FCC)	Purity, yield of edible material
Infested beans	<4–5% depending on contract (see Table 2.6)	Yield of edible material, purity, wholesomeness (see above)

(Continued)

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Criteria	Specification or limits ^a	Reason/comment
Qualitative aspects (flavour and eating quality of chocolate)		
Unfermented (slaty) beans	For example: <5% (FCC good fermented), <10% (FDA/CMAA Ghana main crop).	Excess slaty beans give an astringent taste and greyish colour to the chocolate. They also contain more antioxidants (polyphenols).
Cocoa flavour and desirable ancillary flavours	Various, often not specified	Flavour
Off-flavours (e.g. smoky, hammy)	Absent	Flavour
Cocoa butter hardness	Various	Eating quality (snap and melting properties) of chocolate. Heat resistance of chocolate.
Free fatty acids in cocoa butter	<1.75% in cocoa butter (EU maximum)	Eating quality (snap and melting properties) of chocolate. Shelf life of chocolate.

^a Frequently limits are specified for finished products not cocoa beans. Where they are specified for cocoa beans, they often apply to the whole bean (i.e., including the shell).