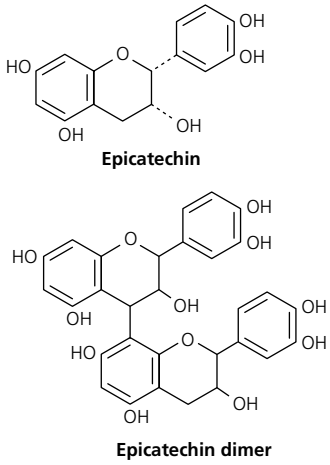

Figure 3.10 Epicatechin and dimeric form.

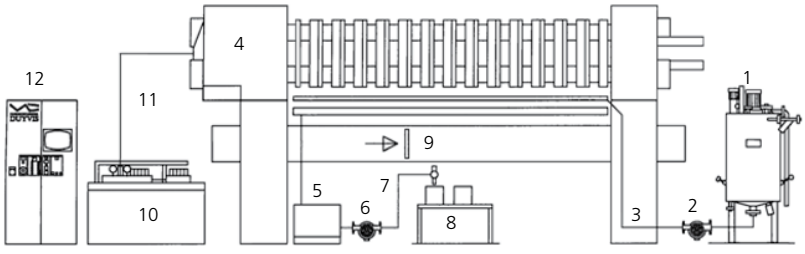

Figure 3.11 Schematic representation of the operating principles of a horisontal cocoa butter press. (1) Cocoa mass conditioning tank; (2) cocoa mass pump; (3) pipe for cocoa mass; (4) hydraulic cocoa press; (5) cocoa butter scales; (6) cocoa butter pump; (7) cocoa butter pipe; (8) cocoa butter blocking off; (9) cocoa cake pushing conveyor; (10) hydraulic pumping unit; (11) hydraulic pipe; (12) electric control with panel; (Royal Duyvis Wiener). Reproduced with permission of Royal Duyvis Wiener.

Cocoa butter is clearly defined under EU law (see Table 3.2 and Section 28.3). Although the process used to separate the cocoa butter is no longer regulated, the Federation of Cocoa Commerce Market rules divide cocoa butter into press cocoa butter (fat obtained by pressing, Figure 3.12), expeller cocoa butter [fat obtained by physical removal using an expeller from cocoa beans, nibs or mass (reduced fat), press cake or any combination of these] and refined cocoa butter (FCC Market Rules, Section 2). The latter includes press, expeller or solvent extracted cocoa butter that has been refined by neutralisation with an alkaline solution and decoloured with bentonite, active carbon and so on. Subsequent deodorisation can also be applied. In addition to these processes cocoa butter can also be obtained by extraction using solvent extraction.

The type of process used may affect the quality of the cocoa butter. For example, a too high deodorisation temperature or a too severe alkalisation can

Table 3.2 Definitions and characteristics of cocoa products according to EU Directive 2000/36/EC and Codex standards.

Standard/material	Percentage
EU Directive 2000/36/EC	
Cocoa butter	
Free fatty acids (expressed as oleic acid)	maximum 1.75
Unsaponifiable matter (determined using petroleum ether)	maximum 0.5
– in the case of press butter	maximum 0.35
Cocoa powder	
Cocoa butter content (on dry matter basis)	minimum 20
Moisture content	maximum 9
Fat reduced cocoa powder	
Cocoa butter content (on dry matter basis)	maximum 20
Codex standards	
Cocoa mass (Codex standard 141–1983, rev 1–2001)	
Cocoa butter content (AOAC 963.15 or IOCCC 14–1972)	47–60
Cocoa shell and germ (AOAC 968.10 and 970.23)	maximum 5 (on fat free dry matter)
Cocoa shell (AOAC 968.10 and 970.23)	maximum 4.5 (on fat free dry matter)
Cocoa butter (Codex standard 86–1981, rev 1–2001)	
Free fatty acids (method IUPAC (1987) 2.201)	maximum 1.75
Unsaponifiable matter (method IUPAC (1987) 2.401)	maximum 0.7
– in the case of press butter	maximum 0.35
Cocoa powder (Codex standard 105–1981, rev.1–2001)	
Moisture content	maximum 7
Cocoa powder	minimum 20 cocoa butter (on dry matter basis)
Fat reduced cocoa powder	minimum 10 and <20 cocoa butter (on dry matter basis)
Highly fat reduced cocoa powder	<10 cocoa butter (on dry matter basis)

completely alter its setting (solidification) characteristics. High quality raw materials are needed to make the best quality cocoa butter. Other important factors for high quality are the origin of the beans and the processing conditions used. Press cocoa butter, which is most commonly used in the chocolate industry, is only filtered and partly deodorised to obtain the desired flavour. Table 3.3 lists the quality parameters for cocoa butter. Most cocoa butter is made from alkalised cocoa mass and retains some of the flavours from the cocoa beans, alkalising and roasting stages. The term "natural" cocoa butter usually refers to a butter that has not been deodorised, so it has a full flavour. Fully deodorised cocoa butter has virtually no cocoa flavours. Generally the more highly flavoured cocoa butters are used in dark chocolates and the less flavoured in white chocolate.