



**Figure 7.8** Iso-solids phase diagram for cocoa butter/lauric CBS. Source: Gordon *et al* (1979). Reproduced with the permission of John Wiley & Sons.

**Table 7.17** Typical recipes using lauric CBSs.

Ingredients	Dark	Milk	White
Cocoa powder 10/12	14	5	
Full cream milk powder		4	
Skimmed milk powder	7	15.5	20
Lauric CBS	31	30.5	32
Sugar	48	45	48
Total fat content	32.5	32	32
% lauric CBS (as % of fat phase)	95.4	95.3	100

rapidly and applying a high wind speed, but taking care to avoid water condensation at the exit of the tunnel (see Chapter 19).

An important feature with coatings based on lauric CBSs is to control the water content and to avoid microbiological contamination of the product. Occasionally chocolate confections, which contain lauric fats, develop a soapy taste and as a result the product becomes unpalatable. In most cases the fat has been split by a lipase enzyme, following microbiological contamination. This soapy taste in compound chocolate based on a lauric CBS can only develop in the presence of lipase and sufficient water. Hence control of the water content and lipase content of the product is of major importance.

## 7.4.1 Quality control

### 7.4.1.1 Control of the water content

Normal good quality raw materials, processed according to good manufacturing practice, yield compound chocolate with a water content that is too low to allow microbiological deterioration. Special attention should be paid to the cooling

conditions during processing of the coating to avoid condensation of water on the product. Because chocolate is hygroscopic, finished products should be packed in airtight wrapping and stored below 60% relative humidity.

#### **7.4.1.2 Control of microbiological contamination**

Generally speaking, most processed raw materials for the confectionery industry are safe to use and are delivered with good microbiological specifications and an absence of active lipase. Post contamination during production and storage can be avoided by following hygienic working practices (see Chapter 25).

#### **7.4.2 Hydrogenated lauric CBSs**

CBSs can be produced from coconut and palm kernel oil by hydrogenation alone. A range of products can be produced which have increasing melting points and hardness. Melting profiles similar to cocoa butter can be achieved, but the harder grades of these types of product have a pronounced tail in the melting profile and the mouthfeel is correspondingly waxy. Over the past decade or so, many manufacturers have removed hydrogenated fats from their products because, by and large, they contain trans fatty acids.

Trans fatty acids are produced during partial hydrogenation of vegetable fats and have been implicated in increasing risk of cardiovascular disease because of the adverse effect they have on blood cholesterol levels. Blood cholesterol is composed mainly of two types - HDL-cholesterol which is considered to be “good” cholesterol and LDL-cholesterol which is considered to be “bad” cholesterol. Trans fatty acids lower the “good” HDL-cholesterol and raise the “bad” LDL cholesterol. This is the reason why consumption of trans fatty acids is seen as a risk factor in cardiovascular disease and why manufacturers have largely moved towards replacement of partially hydrogenated fats in their products. This does not necessarily mean that chocolate is completely trans-free because there is a small amount (typically, 3–8%) of naturally occurring trans fatty acid in milk fat which will, of course, then be present in milk chocolate (see Chapters 19 and 22).

In the case of hydrogenated lauric CBSs the amount of trans fatty acid present is usually quite low. One reason for this is that the lauric fat is often completely hydrogenated resulting in a fat which is >99% saturated and <1% trans. This mainly applies to lauric stearines. On those occasions where the oil is only partially hydrogenated the amount of unsaturation naturally present in coconut or palm kernel oil is such that the trans content will be less than 10%. The problem of trans fatty acids is more acute with non-lauric CBRs (Section 7.5).

The long melting tail that is often found when palm kernel oil is hydrogenated can be removed by fractionation. Consequently, fractionated lauric CBSs have significantly improved mouthfeel. The use of hardened lauric oils is identical to that of the fractionated lauric CBSs. They cannot be mixed with cocoa butter to any appreciable extent and the maximum 5% cocoa butter rule applies.