Because of the successful use of CBEs in British chocolate their incorporation at a 5% level extended into other EU countries, first into Denmark and Ireland and then to Sweden, Austria, Finland and Portugal. Their use was permitted under national regulations but it took until 2003 for there to be an EU-defined set of chocolate regulations.

Purely from a functional point of view a cocoa butter equivalent must meet certain requirements in order to perform satisfactorily in chocolate:

1 It must have a melting range which reflects that of cocoa butter.
2 The fat should have a fatty acid and triglyceride composition close to that of cocoa butter.
3 The fat must be compatible with cocoa butter.
4 The fat should allow processing of chocolate products in an identical manner to that of cocoa butter based products.
5 The fat should crystallise in the same polymorphic form as cocoa butter; that is in the β_V modification.
6 The appearance and bloom free shelf-life of chocolate products containing CBEs should be at least identical to products based on cocoa butter alone.
7 The fat should have good flavour stability.

From a legislative and regulatory point of view further restrictions have been imposed on the use of CBEs in chocolate. In the 2003 EU regulations (European Union, 2000) restrictions were imposed on the basic fats and modification processes that could be used. These fats are described in more detail in the next section. Limits were also imposed on their level of use. No more than 5% CBE (non-cocoa vegetable fat) is allowed to be used in EU chocolate. Even then, there are further limitations. EU chocolate must contain a minimum of 25% total fat and all of that 25% must be from cocoa butter and milk fat. This means that only when the total fat content is higher than 30% can the full 5% of CBE be used. If, for example, the total fat content is 28% then 25% must be cocoa butter and milk fat and only 3% CBE can be used to bring the total to 28%.

It should be stressed that these requirements only apply to chocolate sold within the European Union. Countries outside the EU have their own national regulations. Some countries, such as the United States (US FDA, 2015) do not permit the use of added vegetable fat in chocolate but do allow its use in "chocolate and vegetable fat coatings". Some other countries allow the use of vegetable fats in chocolate without many of the restrictions which the EU place on both its composition and level of use. Insofar as there is any internationally accepted standard for the use of vegetable fats in chocolate, the Codex Alimentarius (2001) standard STAN 87-1981 was revised (Codex Alimentarius, 2003) to permit the use of vegetable fats in chocolate up to a level of 5% of the finished product (after deduction of the total weight of any other added edible foodstuffs, e.g. nuts and raisins). However, as legislation can change, it is advisable to check the legislation within any specific country before including vegetable fats in a chocolate composition (see Chapter 28).

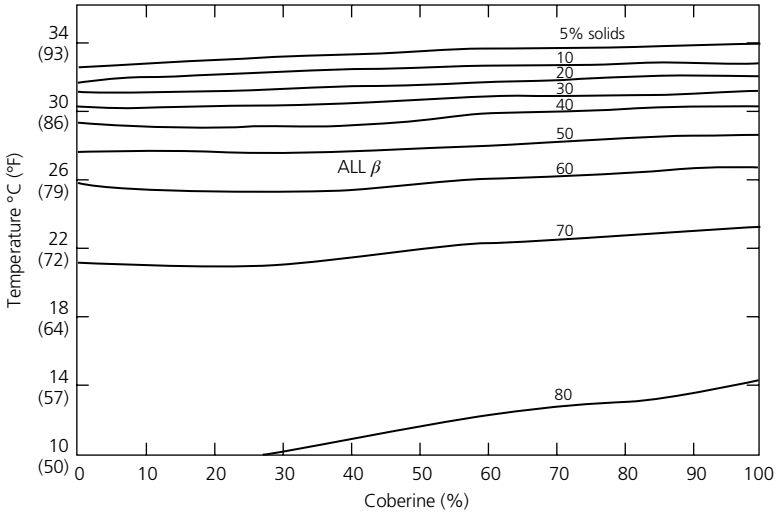

Figure 7.5 Iso-solids phase diagram for cocoa butter and Coberine™ (CBE). Source: Gordon *et al.* (1979). Reproduced with the permission of John Wiley & Sons.

Because the triglycerides used in CBEs are of the same type as those present in cocoa butter, blending them together produces no adverse interactions either in terms of melting properties or in terms of polymorphism. This excellent compatibility between cocoa butter and CBEs can be shown in the form of an iso-solids diagram (Figure 7.5). This shows that cocoa butter and Coberine™ (a well-known CBE) are fully compatible over the complete range of compositions. No lowering of solid fat content at any temperature is detected as one fat is added to the other. In addition, there is no indication of separate phases unique to one or other component.

This complete compatibility allows, in theory, any amount of cocoa butter to be replaced by a CBE. Whilst this is true, in practice, two types of product exist using CBEs. In some countries, as we have seen, up to 5% vegetable fat can be included in chocolate under the standards of identity of chocolate, that is where it is still permissible to call the product "chocolate". In addition, most countries will also permit much higher levels of inclusion of CBEs in place of cocoa butter, but in this case the product cannot be labelled "chocolate". These products have been given the name (within the oils and fats and confectionery industries) of supercoatings (see Chapter 19). Both uses will be considered in Section 7.3.4.

7.3.1 Main CBE component fats

The EU regulations relating to chocolate composition (European Union, 2000) permit CBEs to be produced from only six base oils (although they do allow a seventh oil, coconut oil to be used in chocolate on frozen confectionery). The six