because they are diabetic. There are many chocolates and fillings made for diabetics, which are made using manufacturing processes very similar to that for normal chocolate or fillings.

Three of the main of sugar replacers (Chapter 4) are sorbitol, fructose and maltitol. Sorbitol is very heat sensitive, therefore difficult to use on mass production equipment. It is also very hygroscopic. Its sweetening power is also less than sugar and it has a laxative effect if more that 100 g/day is consumed.

Fructose or fruit sugar, is less heat sensitive in production, but is about 20% sweeter than sugar.

Maltitol is now widely used in no added sugar products, as its sweetness power is only slightly less than sugar, it is not very heat sensitive in production and also it has a taste profile similar to normal chocolate made with sugar. It has a lower calorific value than sugar (–40%) and is therefore used, often together with polydextrose, to make low calorie chocolate. As fat contains more calories per gram than the other major ingredients, this type of chocolate should be made with the minimum amount of fat possible, whilst maintaining adequate liquid flow and eating properties.

For no added sugar chocolate and fillings, it is possible to use normal chocolate recipes, but replace sucrose with maltitol. When using sorbitol and/or fructose, all processing, pumping and storage temperatures must be kept below 50 °C (122 °F).

### 20.4.7 Compounds and coatings

This section covers two of the three types of non-cocoa butter chocolate-flavoured coatings, which are often called confectionery coatings or compounds (see also Chapter 19). These types of coatings are normally made of a variety of fat types (Chapter 7) and are designed to replace real chocolate, but still give a relatively good flavour, a good melting profile in the mouth and long shelf life.

#### 20.4.7.1 CBE fats

These are available in a range of hardnesses, both to suit the product and to suit the environmental temperatures of the region. Chocolate-flavoured coatings made with this type of fat are mainly used for biscuit and cake enrobing and half coating. Basic recipes are similar to real chocolate, but with the CBE replacing cocoa butter. At point of usage, the coatings need to be handled exactly as real chocolate, which includes tempering and the correct cooling profile after enrobing.

#### 20.4.7.2 Cocoa butter substitute or lauric fats

Cocoa butter substitute (CBS) coatings are made with lauric fats, such as HPKO and coconut oil. As lauric fats are not compatible with cocoa butter a low fat cocoa powder has to be used.

The shelf life of these coatings is normally up to 4–6 months, before fat bloom occurs, but this can be extended by the addition of an anti-bloom ingredient.

**Table 20.14** Typical recipes for lauric fat coatings.

| Ingredient | Milk coating recipe (%) | Dark coating recipe (%) | White coating recipe (%) |
|---|---|---|---|
| Sugar | 45 | 53 | 50 |
| Skimmed milk powder | 15 | | 15 |
| De-fatted cocoa powder | 5 | 11.5 | |
| Lauric fat[a] | 34.6 | 35.1 | 34.6 |
| Lecithin | 0.4 | 0.4 | 0.4 |

[a] If the anti-bloom agent is not already present in the fat, it will replace about 2% of the lauric fat.

This must always be added to hot liquid fat, but it is often preferable to have it added by the fat supplier. Occasionally, CBS coatings can also develop a soapy taste. This is caused by the action of an enzyme (lipase) which breaks down the fat into free fatty acids.

These coatings are normally used for enrobing sugar confectionery, wafers and bakery products. They set rapidly and have good melting properties in the mouth. Three typical recipes for lauric fat based coatings are given in Table 20.14. As with the chocolate recipes, a small amount (such as 0.02%) of vanillin flavour is used in almost all coatings.

All three chocolate-flavoured coatings are ideal for enrobing wafer and sugar confectionery products, where the use of real milk chocolate is too expensive or likely to melt easily in high ambient temperatures. They can be mixed with nuts, dried fruit and cereals, for a children's type of confectionery bar (sold in warm climates).

The milk coating can also be used as a base for ganache and truffle paste by the addition of condensed milk and glucose, but the shelf life may be short.

The white coating is often coloured and flavoured with fat soluble colours and flavours and is widely used in the United States for very colourful cake and candy decorations.

## Conclusions

This chapter has provided a guide to the many different recipes that can be used for the wide variety of confectionery products found on the market. There is however no substitute to trying oneself. A product can be completely transformed by changing the flavour, texture or melting profile of the chocolate. Always however use high quality ingredients coupled with careful processing.