If cocoa powder is to be used in the manufacture of the chocolate compound then a further method of manufacture that can be utilised is the pre-milling of the dry materials, sugar, cocoa powder, milk/whey powder and vanillin before adding them to a mixer or conche to be combined with the fats and emulsifiers. Air classifier mills will give the tightest particle size distribution if this methodology is to be used, preventing the production of large quantities of super fine particles which have the greatest surface area to volume ratio. This is advantageous because the lower the surface area to volume ratio, the lower the quantity of fat that is required to achieve the desired viscosity. If cocoa mass is to be used in the recipe formulation, milling can still be used to reduce the particle size of the sugar and milk powder products, but the cocoa mass must also have its particle size reduced to final fineness prior to the conching/mixing step. It can either be purchased this way or be passed through a bead/ball mill or disc mill to reduce its fineness. This increases the capital investment and floor space required.

19.4 How compounds are used

Chocolate compounds and coatings have many uses throughout the food industry. It is possible to use them for depositing (either into a formed mould or as an individual formed piece), for enrobing (or bottoming), for dipping of ice cream products, for spraying or for the formed centres of sugar panned products. The main uses are in the manufacture of biscuits, cakes, confectionery and ice cream products. They can be found being used as choc chips, in ganache, as a moisture barrier (e.g. to protect an ice cream wafer) or even as pet treats (e.g. where the cocoa has been replaced by carob flour as the theobromine in cocoa is harmful to dogs).

19.5 Benefits of using chocolate compounds

In addition to the lower manufacturing cost of compounds, there are several important benefits.

19.5.1 Non-tempering

For the manufacture of confectionery using chocolate compounds, one of the main advantages is that there is no need for tempering unless the fat used in the recipe is a CBE. A CBE fat needs to be tempered in the same way that cocoa butter needs tempering. Not having to temper a compound chocolate removes the major capital expense of having to purchase tempering machines and simplifies the process enormously.

Not having to temper also allows the chocolate compound masse to be used at a temperature where all the fat is still in its liquid state. Normal usage temperatures

are between 37 and 40 °C. Being able to use the compound chocolate at the same or a similar temperature to that which the viscosity measurement is made ensures the user can much more accurately assess how the compound coating will perform on plant. Being able to use the compound coating at a temperature of 40 °C gives much better flow properties than an equivalent viscosity chocolate that would need to be tempered and would therefore typically be used on plant between 29 and 33 °C. Much thinner enrobed coatings can be achieved with a lower fat content than is possible with chocolate. When moulding, flow into intricate designs of a mould is much more readily achieved being able to use a compound chocolate at 40 °C as opposed to a chocolate tempered and being used at 29 °C. The chocolate would require a fat content 4–6% higher than the chocolate compound to achieve the same result.

19.5.2 Cooling

Cooling is also simpler for CBS- and CBR-containing chocolate compounds. The cooling does not need to be designed to allow the fat crystals to be seeded, as is the case for chocolate. Instead, more intense cooling to promote a more rapid transformation of the fat from liquid state to solid state is possible and desirable. This makes for shorter cooling tunnels and hence shorter production startup times and throughput times. It is necessary to not allow the cooling temperature to drop below the dew point temperature in the cooling tunnel otherwise condensation will occur and sugar bloom can become an issue.

19.5.3 Heat resistance and fat bloom

Fat bloom is not as big an issue for compound coatings as it is with chocolate but the user should be aware that it is still a possibility. Exposure to heat that causes a chocolate to bloom (due to de-tempering the cocoa butter) does not have the same impact with a compound coating. The product may still deform under heat stress but when cooled again should still have a glossy appearance. However contamination with incompatible fats, particularly cocoa butter with a CBS-based compound, will cause bloom to occur. This is due to cocoa butter and CBS having completely different crystalline structures (Lonchampt and Hartel, 2004). If contamination with cocoa butter cannot be kept below 5% due to using lines that also manufacture chocolate products, it is better to use CBR than CBS to manufacture the compound. The CBR is much more compatible with cocoa butter. Compound chocolates manufactured using CBS can also display signs of fat bloom if cooling is not sufficiently rapid. The presence of anhydrous milk fat also has the opposite effect in CBS-based compounds than it does in cocoa butter-containing chocolates. It actually promotes bloom formation rather than inhibiting it. So if using whole milk powder in the formulation, it is important that as much of the milk fat as possible is “bound” and is not free to cause disruption to the crystallisation of the CBS. It is better that any milk solids present are in the form of either skim milk powder or demineralised whey powder, thus avoiding the