

product. This will vary because of the product composition and storage temperature; generally the colder the storage temperature the longer the shelf life. Another general rule is that for every 10 °C (18 °F) reduction in storage temperature will result in double the shelf life. If the material is held too long and deterioration has occurred, this will have a negative impact on the flavour and shelf life of the recipient product. This is especially true when the rework's fat has degraded (a problem particularly with many compound coatings which may go soapy/rancid).

As chocolate products are very sensitive to microbiological contamination (De Luka, 1996), extra care is vital. In addition, during storage, rework (as with any ingredient) can be subjected to insect and rodent infestation. It must therefore be stored in proper sealed containers. Rework must be treated with the extra care afforded an ingredient and not like a scrap/waste material.

## 17.4 Economics

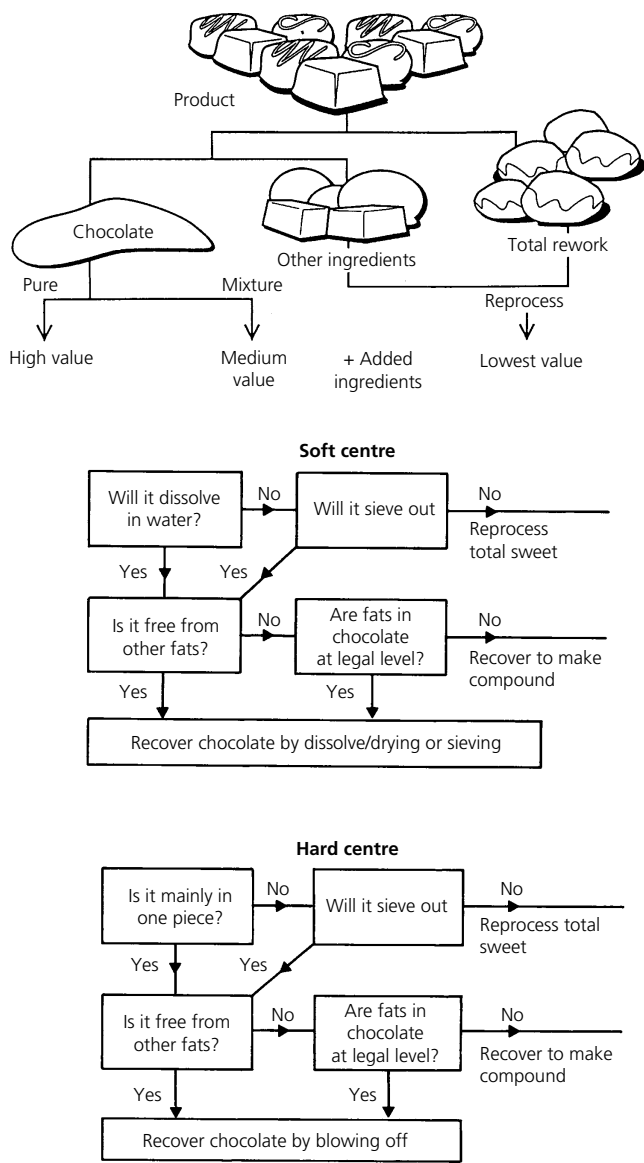
Chocolate and related ingredients are often among the most expensive of the ingredients in a confectionery or bakery item. Accordingly, rework containing chocolate must be used wisely. Economically, the best solution is one where chocolate or coating rework goes back into itself.

Whenever possible, it is desirable to separate the chocolate components from any other ingredients that have already been combined with them. This may be as simple as remelting the product and physically sieving out the other components, for example nuts. Caution needs to be exercised, when using chocolate rework, that any fat-containing inclusions have not already released excess quantities of the "foreign" fat into the chocolate. The consequence could be bloom, tempering problems, poor mould release and fat bloom (Rittenberg, 1996).

In addition, the effective separation of chocolate from other components is often difficult. For these processes to be economically viable, a large pool of rework is necessary (Beckett, 1990). This author described several machines which could be useful in recovering chocolate from finished confections and baked goods. Many food manufactures have invented their own devices to carry out this separation into one of the three channels illustrated in Figure 17.1.

For a hard centred good (such as a cookie or cracker), it is important to first eliminate any loose debris. This is followed by a mild heating process and then a blower to force the now liquefied coating from the surface of the reworked product. Temperatures must be moderated to inhibit heat damage to the coating (recommended temperatures are under 50 °C (122 °F).

Beckett (1990) further noted a process for recovery of chocolate from soft centred confections. This involves dissolving of the centre with water, followed by drying of the chocolate. In this process, cool temperatures are maintained to



**Figure 17.1** Schematic diagram showing the different approaches to processing rework (Beckett, 1990).

keep the fat of the chocolate in a solid form. Water is then used to dissolve any non-coating constituents. It should be noted that the process of moisture elimination from chocolate can be quite difficult.

Alternatively, the chocolate and other ingredient combinations may be reworked together into an appropriate portion of the processed product. Careful selection of the best use for this type of rework requires extensive knowledge of the