

of the chocolate with the added fat before coating. Oxidative rancidity can occur relatively rapidly when high-fat centres or roasted nuts are used in a formulation.

23.12.3 Manufacturing

Whether confections are manufactured by hand or using factory equipment, conditions must be maintained to maximise shelf life. Moulded pieces must use properly tempered chocolate cast into room temperature moulds, passing through a cooling tunnel to set the product for shrinkage and easy demoulding. Improperly tempered chocolate will continue to stabilise after the product is wrapped and has left the factory, which may lead to soft texture and the appearance of fat crystals or bloom. Lack of contraction (shrinkage) so the product is not easily released from the mould can be due to improper tempering. Dull appearances, poor snap and long set times can be from improper tempering. Improperly designed moulds can lead to poor quality products. Warm moulds can delay onset of crystallisation or break temper causing bloom. Cold moulds can expose chocolate to premature cooling, forming incorrect crystals.

Enrobing is when a centre is passed through a curtain of chocolate or compound coating and then over a bottomer to coat the base. Bases may first be coated with a compound coating to aid in integrity or to prevent fat migration and then enrobed with chocolate. Pieces can also be double enrobed to ensure extra coating if the centre is vulnerable to softening or leakage or difficult to coat. If enrobed centres are cooled too rapidly, the chocolate could crack; if cooled too slowly, it could end up discoloured and soft. This problem may not be apparent right away and could emerge later in the distribution process or when your customer purchases the product. If centres are too warm, they can detemper the chocolate. If a piece has an uneven surface to coat, this could cause the centre to be exposed creating conditions for reduced shelf life. Incorrect viscosity may also alter coverage rate as well as increase feet formed at the base of each piece.

Chocolate and compound require different cooling tunnel conditions. Chocolate needs to be cooled gently at 12–15 °C (55–60 °F) with moderate air flow. Compound coatings are best cooled in colder 4–7 °C (40–45 °F) tunnels because they spontaneously solidify in a stable crystal form. The temperature of all tunnels should increase close to room temperature at exiting to prevent moisture condensation.

23.12.4 Packaging and storage

Packaging types will have a great influence on the stability of the confectionery product over time (see Chapter 26). The goal is to keep flavour and texture in and moisture or off flavours out. Moisture can cause cracking of, for example, pretzels coated with chocolate and could make them soggy. Milk chocolate is more susceptible to flavour degradation if packaging is not controlled. There are

many types of packaging materials such as polypropylene, metalised or multi-layered films. Packaging suppliers are excellent resources for the best type of packaging for a specific product.

Some things to take into consideration:

- Heat sealing – be careful if shrink filming is used, this could cause bloom due to excessive heat.
- High moisture pieces may lose and trap moisture, this could cause moulding if tight packaging is being used. Sometimes wax paper would be the best option due to its semi-permeability.
- Packaging material could cause off odours and flavours from inks used, the type of material in the packaging and from where the packaging has been stored.
- The Robinson Test can be used to evaluate if packaging materials are a source of off flavours. Place a piece of the packaging material (20×22 cm) into a sealed jar with 15 g of grated chocolate so they are not in contact. Place the jar in the dark at room temperature (20°C; 68°F) at 75% relative humidity (if needed, add saturated salts to create a high humidity) for 48 h. The flavour can then be evaluated as compared to a standard. Specific tolerances as to how much flavour pickup is acceptable for the product should be developed. This would be approximately equivalent to nine months of shelf life.

Storage of confections is critical to maintaining the original flavour and texture when the piece is fresh. Confections do not tolerate temperature variation well and prefer constant temperature and constant humidity. It may be difficult to control what happens during storage, distribution and display on the store shelves. Ideal storage conditions would be in a cool, dry environment, away from off odours at 12–18°C (55–70°F) at <60% relative humidity.

Points to consider:

- The fat phase of a confection is partially solidified at this point which will either continue to solidify or remain liquid depending on how a product is stored.
- If products are stored at too low of a temperature, condensation can form and create sugar bloom when coming back to room temperature.
- Be careful if freezing candies to preserve freshness and halt centre oil migration. Care must be taken with delicate shells to not crack during the rewarming process. This must be carefully controlled to prevent condensation from forming on the products.
- Compound coatings would be more heat resistant than chocolates mainly due to higher melting points with some compound coatings and the fact that they do not require tempering.

23.12.5 Distribution

All of the hard work maintaining the product to this point would be for naught if the product is not transported and distributed in similar conditions as the product is stored. The need for refrigerated trucks and controlling the product on the