

It is also important to minimise the size variations of the centres, as every type and shape of pan will act as a classifier and separate smaller pieces from the larger ones. This means that certain sizes become localised within the pan and this segregation tends to become magnified by the end of the process.

The hardness and brittleness of the centres also has a large impact on batch size distribution and throughput of the final product. Soft centres like raisins can easily deform, which results in the coating flaking off later in the process.

The temperature of the centre pieces also affects production in several different ways. Cool centres will aid the setting of the coating, but centres that are too cold can provoke irregular finishes or cracking of the shell, causing the coating to flake off. With light and porous centres, the temperature should not deviate too much from that of the future storage conditions of the final product. This is to avoid subsequent expansion or shrinkage, which once again would result in cracking of the coating.

The following centres are very commonly used:

- Nuts: these are the most popular natural centres (e.g. almonds, peanuts, hazelnuts and cashews);
- Fruit: either in dried form or as an infused product (e.g. raisins, orange peel, apricot, prunes etc.);
- Soft and hard caramels and hard boiled sugars in honeycombed form (e.g. Maltesers™);
- Liquid-filled shells, which are initially solid, but are converted into liquids after coating;
- Fondants, creams, jellies, and so on.

It is important that the coating manufacturer communicates with the centre supplier in order to obtain the correct centres within a relative narrow specification.

16.3.2 Centre preparation

Preparing the centres is one of the most important tasks in pan-coating. There are many reasons for this, for example irregular centres cause deformed product, oil/fat migration will spoil the surface, oily and smooth surfaces will not allow the chocolate coating to grip, frail centres will break and so on.

The preparation step is known in the industry as sub-coating, gumming, isolating and stabilising.

Each name is probably based on the purpose for which the process was intended. However, carefully selected centres like dry roasted nuts, centres with little or no oil migration, free-flowing raisins with water content of no more than 13% and kernels providing good grip (chocolate adhesion) do not require any of these sub-coating procedures.

16.3.2.1 Gumming

In gumming, in the soft pan method, the wetting masse contains colloids together with some kind of drying powder. Currently, starch- or dextrin-based wetting masses are preferred because of the limited availability of gum arabic (*Acacia*

senegal) and the fact that gelatine is not liked in some markets as it may not be kosher or hallal. Gum arabic and gelatine are, however, ideal for this task.

In the gumming process, irregularities and ridges caused by the processing of the centres are rounded off. Many natural products also have a tendency of being pan unfriendly and need this process. The syrup should be around 40–50% solids with a high content of glucose to ensure proper sticking and prevent crystallisation of the sugar.

The pans are filled with a predetermined amount of the centres. Using a ladle or other form of container, the liquid is poured over the centres as they roll over one another, so that they quickly become wetted. It is very important to determine the right amount of liquid to use. If not enough is added, the centres will emerge with uncoated spots and have a generally uneven appearance. If too much liquid is added, the centres will start lumping and very wet areas will attract excessive amounts of dusting powder. In addition to this, with the sticky high glucose masse, the formation of double- and multiple-centred panned goods will occur.

As soon the centres are evenly wet, dusting with a powder can begin. The powder must be added as quickly as possible in order to make sure that the product pieces separate easily. With a slow powder application, the water in the wetting solution can dissolve part of the sugar, creating a paste in the pans. This increases the viscosity of the tumbling masse, resulting in the formation of large balls. In addition, as more sugar is dissolved by the wetting masse, the sucrose/glucose ratio will change and it will start to crystallise. This results in a more brittle and harder masse (hard coating effect). Fine crystalline sugars are preferred to powdered sugar because this coats the surface of the centre much more evenly and the ridges and cracks are filled in much better. Once again lumping must be expected when powdered sugars are used, especially when the amount of liquid used is incorrect. The exact amount is difficult to determine due to variations in the surface to weight ratio of the natural products.

Once the pan load is wetted and dried again with dusting material, the process is repeated again up to five times. If free powder is detected in the back of the pan, the product should be removed and the pan cleaned before the next layer is applied, otherwise free powder will adhere on the centres in an uneven manner during the subsequent wetting process, creating lumpy and irregular product. It is not possible to suggest exact quantities to use in this process and only trial and error will give the right formula for the product being coated.

Once the required number of coating layers has been applied, the centres should be removed from the pan and layered onto shallow trays for drying (e.g. overnight). It is important for air to circulate between the trays, when they are stacked.

16.3.2.2 Isolating

Isolating is a term used where there is an actual physical separation required between the centre and the chocolate coating. Many of the centres used in chocolate panning contain oils or fats. Most of this oil/fat is not compatible with the