Production of Palm-based Panned ‘Chocolate’

INTRODUCTION

Panned products are among popular treats nowadays due to their size, shape, quantity and value. It is a rapid and powerful method to coat numerous items with chocolate. Among popular items to coat are nuts such as almonds, cashews and peanuts as well as fruits such as raisins and cherries. Since panning may have been used for 1000 years, it is considered as one of the oldest types of processed confection (Copping, 1996). It evolved from pills or dragees in which it is rolled in sugar to conceal the displeasing medicine taste. The word dragee is believed to have initiated from a confectioner named Julius Dragatus who established a coated confection around 177 BC (Kitt, 2004).

Pan-coated candies are produced by applying successive layers of coating to suitably shaped centres as they tumble in a revolving pan. In this article, the term ‘chocolate’ will be used to refer to any fat-based coating material for simplicity. Heat transfer is one of the major principles in the process of chocolate panning. Efficiency of chocolate panning process is largely determined by rapid heat transfer of the product. Other than this, other factors including humidity also play an important role. In addition, the drying of each layer of chocolate coating is crucial as the rapid drying of a layer of chocolate coating allows for the rapid application of the next coating. Chocolate smoothness and distribution are influenced by the friction from the tumbling activity (Pullia, 2004).

PROCESS OF PANNED CHOCOLATE PRODUCTION

i. Centres

Various centres are available for chocolate panning ranging from a few millimeters to few centimeters length. Typical centres are fruits (raisins, cranberries, etc.) and nuts (peanuts, almonds, cashews, etc.). It is always preferred to have centres of approximately similar size to achieve similar size and homogeneous coating of each panned item as well as to avoid clustering. Centres that are small in size such as raisins are a bit difficult to coat at its initial stage due to tumbling challenges. Firmer centres are easier to handle as chocolate shell cracking due to flexing is near to none. Denser centres are easier to manage as tumbling movement is more uniform compared to lighter centres. Rounder centres foster homogeneous chocolate coating. Centres with smooth surface area are perfect for panned chocolate. However, surface area is dictated by nature. Centres with rough surface such as raisins can only be regarded as high-quality items only if there is complete coverage of chocolate between the rough surfaces. Liquid migration (e.g. water, oil and fat etc.) can jeopardise the shelf life of panned chocolate as there will be issue on adherence of chocolate to the surface of centres, which the problem can be reduced by pre-coating. However, most centres would not be able to comply with all of these specifications (Geschwindner and Drouven, 2009).

ii. ‘Chocolates’

Dark, milk and white chocolate and compound coatings are suitable for panned products. Dark chocolate is normally used for sweet centre (e.g. raisin) (Malaysian Cocoa Board, 2017). Compound coatings from palm fractions namely cocoa butter equivalent (CBE), cocoa butter replacer (CBR) and cocoa butter substitutes (CBS) are suitable for panned chocolate. Fat content of between 28%-35% is preferable for panned chocolate and compound coatings (Geschwindner and Drouven, 2009). Compound coatings has broader range of melting points...
as well as rates of solidification and therefore, fat phase can be better controlled. Besides the rate of solidification, cost as well as quality and consumer demand are amongst the principal preference (Hartel et al., 2018). The used of CBE, CBR and CBS has been well-reviewed by Norazura and Noor Lida (2017). General formulation of compound coating using CBS is shown in Table 1.

iii. ‘Chocolate’ Coating Process

Temperature and relative humidity (RH) play important role in successful panning. In general, room temperature and RH should range from 15.5°C-18.4°C and 40%-55% respectively. However, cool air to promote solidification should have temperature and RH of 7.0°C-15.5°C and less than 35%-50% respectively, depending on coating, centres and equipment (Hartel et al., 2018). As a guideline, CBE has to be treated similarly to cocoa butter while the air temperature for processing CBR and CBS should be lowered to 8°C-12°C with a maximum RH of 45% (Geschwindner and Drouven, 2009). The most crucial part is that condensation does not take part in the panning process. The panning does not require tempering as the chocolate coating will set too fast and promoting irregular and rough coating with enormous adherence of chocolate on the inside of the pan (Hartel et al., 2018; MCB, 2017). Viscosity of the chocolate should not be too high or low as high viscosity will result in inconsistent centres coverage and enormous adherence of chocolate coating on the inside of the pan, while low chocolate viscosity will lead to unwell tumbling of centres (Hartel et al., 2018).

Several techniques can be employed in order to apply chocolate to the centres. This includes hand ladling, drip feeding and spray nozzle (Urbanski, 1998). Appropriate amount of chocolate is needed to guarantee a good coating and this can eventually avoid clumping of centres. It was proposed that when working with 45.5 kg of centre, 2.5 kg of chocolate should be employed as a start. As the centre of the coating grows, chocolate should be increased to 4 kg for the same number of centres (Grooves, 1992a). Cool air is blown to the centre when the centre has been fully covered and a certain coating thickness has been achieved. Cool air is used to stimulate solidification. Further tumbling step excluding air flow is needed to ensure a smooth surface and a uniform coating. It will then retain in the pan to let it further solidify for good finishing foundation. It is now ready for polishing. Examples of polishing agent are gums, starches or dextrins and are usually water-based (Geschwindner and Drouven, 2009; Grooves, 1992b). The polished panned chocolate is then glazed using edible shellac, which is dissolved in alcohol to retain glossiness, function as moisture barrier and protection from minor heat (Hartel et al., 2018).

iv. Storage and Handling

Upon completion of panning process, the panned chocolates are normally stored in pans or

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**TABLE 1. GENERAL FORMULATION OF COMPOUND COATING USING CBS**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Plain chocolate</th>
<th>Milk chocolate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocoa powder (10/12)</td>
<td>14.0</td>
<td>5.0</td>
</tr>
<tr>
<td>CBS</td>
<td>32.0</td>
<td>32.0</td>
</tr>
<tr>
<td>Whole milk powder</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Skimmed milk powder</td>
<td>6.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Sugar</td>
<td>47.7</td>
<td>44.7</td>
</tr>
<tr>
<td>Lecithin</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Stewart and Timms (2002).

Figure 1. Example of panned chocolate.
containers at a temperature of 15.5°C-20.0°C and an RH of 40%-50% before packing. Room condition with lower RH leads to seal coat cracking from drying, while higher RH causes the panned chocolates attaching to one another. Once the panned chocolate is packed with good moisture and oxygen barriers packaging, it can be stored at a typical temperature of 18°C±2°C with a RH of 45%±5% and odour free room. Panned chocolate has better heat resistance compare to molded and enrobed chocolate. However, severe heat exposure leads to product distortion and fat bloom (Hartel et al., 2018).

CONCLUSION

Palm-based CBE, CBR and CBS are suitable for the production of panned ‘chocolate’. By following the steps and conditions about similar to panned chocolate from cocoa butter, the panned ‘chocolate’ from palm-based CBE, CBR and CBS would be able to achieve relatively similar finished products.

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REFERENCES


