

CHOCOLATE PANNING

INTRODUCTION

There are a number of papers on chocolate panning in the literature. The following two are recommended reading for a chocolate panning operation and the problems associated with a panning operation. Thomas Copping's article on the "Basics of Chocolate Panning" is recommended reading for chocolate panning. John Kitt's article on Panning Problems is worthwhile reading for any type of panning operation. These two articles will certainly get you started on a Chocolate Panning operation.

Chocolate Panning is a generic term for the continuous application of a fat based coating to a prepared center. The centers are continuously tumbled in with the addition of a liquid coating that is cooled with cold dry air. The coating is added by ladling, drip feeding or spraying onto the centers. Polishing and glazing in a ribbed pan completes the process. There may be slight differences between the two articles but the principals of panning are important to understand. Panning is somewhat of an art but hard shell sugar and chocolate panning is more science than art. The large continuous automated PCL controlled panning operations with a minimum of human intervention is a reality in manufacturing today.

Chocolate panning involves the following considerations:

- Center Pre-gumming
- Environment
- Coating Selection and Preparation
- Equipment
- Coating Application
- Polishing & Glazing

CENTER PRE-GUMMING

Pre-Gumming or Pre-coating of centers is important for nut products where oil migration can and does occur within a short period of time. Gumming prevents the oil from coming to the surface and causing a loss of gloss and/or softening of the jacket. This is accomplished by sealing the center with a gum arabic solution of approximately 40-50% solids. This solution may also contain sucrose, maltodextrins and/or corn syrup depending on the product and panman idiosyncrasies.

Sufficient gum solution is added to uniformly wet all the centers. The gum solution is dried with low humidity air. Powdered sugar is used to help dry the centers and prevent the centers from sticking together. A good film should evenly coat the centers before any drying agents are added. Irregular centers may require more than one application of the gum solution and powdered sugar to smooth the surface. This helps to smooth and prepare the surface for the coating. The centers are typically dried overnight. However, the coating operation can be started immediately if cold dry air is used to thoroughly dry the centers' first.

Sometimes raisins are soft and sticky or have excessive oil on the surface that may require a pretreatment. The addition of powdered sugar/cocoa powder (90/10) to the cold raisins in a revolving pan will usually dry and separate the individual raisins. However, excessive powdered sugar can cause a gritty texture. If the raisins are very soft, the coating can actually peel off during the build up of the coating. The weight in

the pan may need to be reduced or even grossing syrup used as part of precoating operation.

The centers used for chocolate or compound coatings are quite varied and limited only by ones imagination. Typical centers are almonds, raisins, peanuts, malted milk balls, caramels, cremes, cookies, pectin, filberts, pecans, brazils and cashews. Specialty centers could include coffee beans, pistachios, jellies, gelatin, corn flakes, puff wheat, rice crisp, fruit loops, etc. Almost anything that is approximately ½ inch size or less and does not break up on rolling in a pan can be coated.

ROOM ENVIRONMENT

The environment in the chocolate panning room is critical to a successful operation. Cold air temperature at 55-60 F. is important to set the chocolate with control over airflow to the individual pans to prevent over cooling of the centers. Humidity is important to the grossing and polishing operation. It should not exceed 50% RH. High humidity can cause rough surfaces and require more time for smoothing of the surface. Ideally, the humidity should be below 45% RH but difficult to obtain in most plants on hot humid summer days.

The airflow into the pans should be around 250 cfm with lots of air volume but needs to be controlled depending on the coating used. The air should be directed to the back of the pan to uniformly cool and set the coating. A controlled environment for chocolate panning and polishing are important but remember to allow for make up air in the room.

The alcohol solvents in most of the polishes and glazes evaporate into the room during drying. The alcohol level needs to be maintained below 1000 ppm for health and safety of the personnel. Another consideration is VOC from an EPA standpoint in many areas of the country from a quantity and solvent type. This can become a concern as a panning operation grows.

A well-designed panning room environment will pay for itself in terms of faster gross-up times, quicker setting of the gums and glazes and a firmer surface for a better shine. A continuous temperature and humidity recorder is an essential process control for a chocolate panning room. Overall, the production rate can usually be related directly to the room conditions.

COATING PREPARATION

A wide variety of coatings can be used in a chocolate panning operation but each has their own special requirements. Milk and dark chocolate usually are used at temperatures of 100 to 110 F. while compound and special coatings at 110 to 115 F. The coating should be melted and held at the desired controlled temperature for panning with a heat controlled recirculation to the pans. Untempered chocolate is used for panning. A flavor and texture difference is observed between panned and enrobed chocolate products. The lower the chocolate temperature, the faster the centers will build up in the pans but may be uneven and non-uniform from piece to piece. Additional time is required to smooth the surface for polishing and glazing. Higher temperature chocolate will spread more evenly but requires additional time to set. The blending of milk and dark chocolate can easily be done in a chocolate panning operation to give the desired flavor and color variation.

Compound chocolate flavored coatings are used on many different centers as the final coating and for the first under coat for further processing. White coatings, pastel

coatings and yogurt flavored present special problems in handling unless a dedicated system is used. For limited quantities, a small portable unit can be constructed to pump the coating into the pan or a ladling system can be used. The coating temperatures are usually in the range of 110-115 F. since the fat in these coatings usually have a higher melting point.

The viscosity of the coatings should be 30-50 (Brookfield) or 120 to 175 M. If the coating is not covering the center uniformly due to high viscosity, cocoa butter can be added to the chocolate to lower the viscosity but cocoa butter is expensive. The lower the viscosity, the faster and more uniform the coating will spread over the centers. A spray system will require a lower viscosity coating than a drip system. The same is true for a compound coating.

A chocolate panning grossing operation involves centers properly prepared so the coating can be applied as rapidly and uniformly as possible to all the centers in a controlled environment. This is the art of chocolate panning where through most likely trial and error the optimum conditions are established.

EQUIPMENT

A typical 32, 42 or 48 inch diameter stainless or copper traditional oval or pear shape smooth pan with a flexible controlled air duct is used for chocolate panning. The speed of pans should be in the range of 15 to 25 RPM. The speed should be sufficient to provide good figure eight motion to the centers but not excessive to cause breakage of the centers or coating. This type of system is easy to set up but the air supply system and room environment is critical. A pan turning to slow will result in the product sliding down the inside of the pan resulting in poor distribution of the coating. A pan turning to fast will carry the product to the top of pan before falling down onto the remaining product causing breakage and peeling of the coating. The pan should be turning at speed that will lift the centers to approximately the ten o'clock position before tumbling down over the remaining centers.

The belt coater in a self contained system that has double the capacity of a traditional 42 inch pan. The advantage of this coater is the loading and unloading of the product and air being pulled through the product as compared to the air being blown on surface of the product. The addition of powders to this coater is not easy and tends to go through and onto the plastic belt. The product then has to be transferred to the polishing and glazing operation.

For large volume chocolate panning, jumbo automatic pans are used. These pans range in size from 1000 to 4400 pounds each with automatic loading and unloading systems. These pans are designed to handle dry powders as well as liquid chocolates. They come equipped with a CIP cleaning. The airflow can be either way through the bed of product depending on which gives the fastest uniform setting of the chocolate. These systems are fully automatic with programmable PLC controllers to run the process.

COATING APPLICATION

The coating delivery systems for the pans should be completely heat jacketed to maintain a constant temperature. A water jacketed system is recommended over electrical heat trace system. The pump should also be heat traced or jacketed to maintain the same temperature as the remainder of the system. A circulating ring system should be used to distribute the coating to the pans with draw off points for each pan and the excess returned to the holding tank. The pipe and pump size should be sized

that the flow does not change at the pans when several valves are opened simultaneously. An in-line screen is important to protect the product but also to prevent the plugging of the drip holes or spray system. The chocolate temperature should be uniform from the holding tank to delivery into the pans.

The traditional chocolate or compound coating panning technique is to pour the coating uniformly across the revolving centers with a ladle until a uniform layer has been built up on the centers. Cold air is applied to set the coating. This is repeated until the desired amount of coating on the center has been obtained. After the last application, the product is allowed to run for several minutes without air to develop a smooth even surface before applying cold air to firm the coating before removing the product from the pan in preparation for polishing glazing.

Powdered sugar can be blended with cocoa powder at a ratio of 90/10 to reduce sticking of the centers on the initial coating application. This sugar/ cocoa mix can be made in a pan by adding 11 pounds of cocoa powder to a 100 pounds of powdered sugar in a pan and mixing for 15 minutes. At times, this sugar-cocoa powder mix is added during coating addition to speed up the operation and dry up the coating. This is not recommended since a gritty texture can be detected as well as a change in the overall flavor profile.

The amount of coating being added to center can be determined by doing a initial count per pound on the center and then during the process to determine the quantity of coating added. This is an important calculation to follow from a cost and quality standpoint.

For drip feeding, the coating is released into a pipe with holes in fine streams onto the centers. A valve at the top of the delivery pipe controls the rate. This is a common method used for pan coating. The coating can be added on a continuous basis to the centers. If the rate is properly controlled, a uniform smooth center coated piece will be produced with only cold air needed to set the chocolate at the end before removing from the pan for holding prior to polishing and glazing.

For the spray system, the coating is forced through a nozzle by compressed air. This air should be oil and water free at 45 to 70 psi. The fine spray of coating droplets is evenly distributed over the centers. Cold air is blown into the pan during coating. The size of the droplets can be adjusted to improve the rate of chocolate addition. Spray coating works well where light coatings are desired or the surfaces are quite irregular. However, a lot of chocolate can become air borne in the room causing a sanitation problem. A self contained enclosed jumbo pan uses spray heads very effectively for the rapid coating of centers.

FINISHING AND POLISHING

SUMMARY

In summary, a wide variety of products can be made using different centers and coatings and combinations of coatings. Considering the centers and coatings available, the array of products possible is almost endless and is only limited by the imagination of the candy technologist.

An important consideration in chocolate and hard sugar shell panning is the environmental conditions of the panning area. The best equipment will not produce

satisfactory products if the production area is not satisfactory. Spending money on creating the proper environment for panning and maybe not buying the latest and greatest equipment would be a wise choice.

The same equipment can be used to make a wide variety of products with minimum change over problems and operator training. Chocolate or compound coating panning in a generic sense is a rather forgiving process as compared to other panning and confectionery processes. The cost of a chocolate panning system is not high as compared to other confectionery processes. A small inexpensive system can be used at the start and expanded as the marketing opportunities present themselves.

TROUBLESHOOTING

<u>Condition</u>	<u>Possible Cause</u>	<u>Suggested Remedy</u>
Bumpy Coating	Thick Chocolate Too cold air Center to cold	Use lower viscosity chocolate Reduce airflow Cut off air and let product warm
Fat Bloom	Non compatible fats High temp. exposure	Check fat and pre-coating formula Check storage conditions
Choc. not covering	Choc. too thin Choc. temp too high Air temp too high Centers too warm Oil on centers	Check viscosity, Harder cocoa butter Reduce temp of chocolate Reduce temp of air Cool centers to 50 F. Pre-coat centers
Poor coverage	Inconsistent size	Size centers and pan separately Check pan speed Start with high viscosity chocolate
Choc. peeling off	Soft centers Too cold choc Over loading pans Pan speed too fast	Cool centers, Pre gross with sugar syrup Add warm choc faster Reduce center weight in pan Reduce speed to 25 RPM
Doubles	Choc added too fast Pan speed too slow Incorrect pan angle Center sliding	Reduce rate of addition Increase pan speed Set angle to 18-20 degrees Dress pan with chocolate
Chocolate too thick	High viscosity choc High humidity air Moist contamination Wet air is spraying Low temp chocolate	Reduce chocolate viscosity Adjust RH to 45-55% ideal Pipe leaks, scrap chocolate Check air filters Increase chocolate temperature
Crushed centers	Overloaded pans	Reduce pan load for delicate centers

REFERENCES:

Copping, Thomas, *Basics of Chocolate Panning*, Manufacturing Confectioner, September, 1996

Groves, Reg, *Chocolate Panning*, 46th PMCA Conference, 1992

Kitt, John, *Panning Problems--- Causes and Remedies*, Manufacturing Confectioner, October, 1988

Lynch, Michael, *Panning: an Overview*, 46th PMCA Conference, 1992

Thomas, Allan, *Chocolate Panning*, Manufacturing Confectioner, November, 1987

Urbanski, John, *Panning--- The Selection of Chocolate and Compounds*, Manufacturing Confectioner, September, 1998