

CHOCOLATE MANUFACTURING

Introduction

The worldwide demand for chocolate confectionery is continuing to increase, with the EU being the world's largest producer and consumer.

Europe also accounts for the largest chocolate exports – more than 70% globally. In Ireland, revenue in chocolate confectionery amounts to over €200m annually, and our per capita consumption stands at 3.6kg. The market for premium and organic chocolate confectionery is growing steadily. Health-conscious consumers are looking for products with high levels of cacao solids and lower levels of sugar, driving a growing demand for dark chocolate. In Ireland, chocolate has become an increasingly successful area of artisan production throughout the country.

Small producers

For most small producers of chocolate, it is far too expensive and time consuming to actually manufacture the chocolate themselves. In Ireland, almost all chocolate is purchased in block form and it merely has



Worldwide demand for chocolate is growing.

to be tempered prior to moulding. This involves using a melting kettle, which can be digitally controlled to give the desired melting characteristics and temperature range.

Manufacturing

Plain chocolate requires only cocoa mass, cocoa butter and sugar. To these ingredients, milk powder is added to produce milk chocolate. White chocolate is made with just cocoa butter, sugar and milk powder. These ingredients are mixed to a smooth dough. To make the chocolate as smooth and granule-free as possible, it is finely rolled. The next step is conching, where the chocolate mass is kneaded in combination with heat to give the final aroma. The chocolate is then tempered and poured into moulds to attain its final shape.

Working with chocolate

Working with chocolate is best done at ambient temperatures of 20-22°C:

- chocolate should not be processed in high-humidity conditions – under 50% is best;
- never let water come in contact with chocolate; and,
- store in a cool, dry and odourless environment.

Chocolate should not be stored in a refrigerator or freezer, because condensation will form when removed.

04: Chocolate manufacturing

Costs

Start-up equipment is not expensive relative to other food production enterprises. Basic requirements include a melting kettle, digital thermometer, stainless steel work table, and assorted steel bowls and moulds (polycarbonate). The scale of production will determine the capacity and size of equipment required and therefore the cost.

The product packaging is the most expensive element of chocolate manufacturing and there are a wide range of packaging options to choose from with varying costs.

A paperboard box to hold 250g of chocolates

will cost in the region of €1.25 to €5.00, depending on the specification.

A further difficulty with packaging is the minimum order quantities that suppliers frequently apply. This can result in money being tied up in a stock of packaging materials that aren't required immediately, as well as an additional requirement for storage space in your premises.

Cost of bulk chocolate	€5-€8/kg
Cost of equipment	€1,000-€10,000
Cost of packaging	Variable

Packaging

Packaging presents the product in an attractive and appealing manner, as well as keeping the chocolate in top condition. The ideal package is not merely cosmetic, but should prevent both the absorption and loss of moisture, protect the product from contaminants, and stop the absorption of undesirable odours.

The packaging you choose should also

exclude light, to limit the acceleration of oxidative changes within the fat that lead to rancidity. Finally, the package should have sufficient mechanical strength to withstand the hazards of filling and transport.

Fine cardboard boxes, embossing, holograms and foil print are features, which can turn each individual package into an exclusive luxury product.

Chocolate tempering

Tempering is an essential step for making smooth, glossy, evenly coloured, crisp chocolate. It prevents the dull greyish colour and waxy texture that occurs when the cocoa fat separates out. Traditionally, chocolate was tempered by pouring some of it on to a tempering stone and working it into a 'mush' as it cools. More commonly now, tempering involves stirring solid chocolate into melted chocolate to 'inoculate' the liquid chocolate with crystals.



Tempering helps make chocolate smooth and is commonly performed by stirring melting chocolate.

Premises

Like all food manufacturing facilities, a suitable premises which conforms to health and safety guidelines is essential.

The processing and packaging areas should be kept separate, if possible, with a dehumidifier in constant use.

Equipment

The following equipment will form part of the chocolate-making process, and is an investment for any company wanting to produce on a small scale:

1. Melting kettle/tempering machine – this equipment will be used to melt, cool, temper and hold the chocolate for encoding, moulding, spinning or dipping.
2. Enrobing machine – this is required for coating certain products with chocolate, e.g., caramels, fudge, nuts. The tempering machine usually comes with an enrobing line, but can be bought separately and connected to the enrober.
3. Polycarbonate moulds – the tempered chocolate is poured into these shaped moulds, before cooling and solidifying.
4. Vibrating table – when your mould has been filled you will need to vibrate it to ensure that there are no air bubbles present in the chocolate, and to guarantee the perfect professional finish. A vibrating table is the most effective way of doing this.

You will also require a fridge or cooling area before final packing of the chocolate products.

Further information

For further information please contact Ciara McDonagh, Food Industry Development Department at:
+353 (0)18059546
ciara.mcdonagh@teagasc.ie

The following resources are also helpful:

- www.vantagehouse.com
- www.chocolateworld.be
- www.chocolate-academy.com

Fact sheet produced by the Food Industry Development Department.