

Chocolate from a fat supplier perspective

MARIA WENNERMARK

AarhusKarlshamn Sweden
Business area Chocolate
Confectionery Fats

WHAT IS CHOCOLATE?

Mmmmmm... Chocolate....

Well, we all have our relationships to chocolate, as being more or less "addictive", preferring white or dark chocolate etc.

However what is the history behind such a wonderful product? how is it produced? and what can I expect in the future? are some of the questions that will be discussed in this paper.

HISTORY

Europeans first encountered cocoa during the expeditions to the New World mounted by Columbus, and later during Cortez' conquest of the Aztecs in Mexico. At that time cocoa was a luxury beverage with a very sour taste, completely different from cocoa as we know it today. Since then cocoa has undergone constant development. It was in the Netherlands that the extraction of cocoa butter and cocoa powder was pioneered, by pressing the cocoa liquor, while the chocolate bar was born in Britain when additional cocoa butter and sugar was added to the cocoa liquor. Switzerland played its part by refining the taste through the addition of milk and the use of the conching process.

CHOCOLATE STANDARD

Roughly the recipe of chocolate is about 1/2 sugar, 1/3 fat, 1/6 cocoa solids, and other ingredients. However chocolate is covered by vertical food standards in many countries. In general these define chocolate as "products obtained from cocoa products and sugar" with a certain minimum amount of cocoa.

Similarly milk chocolate standards often involve a minimum quantity of cocoa and milk solids.

As long as these minimum cocoa and milk requirements are fulfilled, other food ingredients may be added. The use of vegetable fat, CBE (Cocoa butter equivalent) is normally limited to 5 percent by weight of chocolate, and in some cases (e.g. the European Union) the legislation contains a more narrow specification of vegetable fats for chocolate.

Codex Alimentarius provides for the use of up to 5 percent vegetable fat without restricting the use of raw materials or manufacturing methods.

Products not marketed under the chocolate designation are not standardised and hence the manufacturer is free to use any type and quantity of food ingredient including fat, and any content of cocoa and milk solids. Such products are often referred to as chocolate flavoured coatings or compound coatings.

THE IMPORTANCE OF FAT

Fat (coming from cocoa butter, milk fat and vegetable fat) accounts for about one-third of the content of chocolate. Thus fat is of considerable importance for the quality of the chocolate, as it influences processing conditions such as tempering and cooling. The type of fat used also makes a great deal of difference for the consumer. It has a major impact on the eating qualities of the end product, including melting behaviour, flavour release and consistency. Finally, the choice of fats in confectionery products is crucial for their shelf life. Factors such as fat bloom and fat migration in composite products are greatly influenced by the fat or combination of fats used in the product.

VEGETABLE FATS

The basic fat is cocoa butter of course, but a range of vegetable fats are also

well suited for this application.

Vegetable fats offer important savings on raw material costs for the chocolate manufacturer. This can be achieved without affecting the properties of the end product. Vegetable fats may also be used to modify the sensory properties of chocolate, however.

As mentioned earlier, legislation in most countries allows the use of up to 5 percent vegetable fats in chocolate. From a technological standpoint, however, vegetable fat may be used at much higher levels. Such products may not be sold under the chocolate designation, but can be used for example as coatings on wafer products.

TRADITIONAL PROCESSING

The manufacturing process of chocolate mass can be divided in three steps mixing, refining and conching.

Mixing

In the first step all dry ingredients, are mixed together with part of the fat in a kneader or blender.

Refining

The refining normally takes place in a five-roll refiner. In this step the mixed dough is passed through a set of rolls that are pressed together. When the dough's coarse particles pass through the very narrow space between the rolls they are ground to a smaller particle size. The small particle size is needed for a smooth consistency and good melt-off in the chocolate or compound.

Conching

During conching the refined ingredients will be constantly agitated under controlled heating. This will give the final product a softer and more pleasant taste as well as better flow properties.

CRYSTALLISATION

In order to get the liquid chocolate mass to solidify into a pleasant consumer product different ways of crystallisation is needed.

Tempering

Fat is a polymorph system, which means that the fat crystals can exist in different forms. Over time, unstable crystals will transform into more stable forms. These transformations change the properties of the solid fat. The melting point will increase, larger crystals may result and fat bloom may occur on the surface.

To prevent such problems the fat needs to be crystallised directly into the desired crystal form, this is done in the tempering, where the chocolate mass is undergoing a certain temperature cycle.

Moulding

There are different types of moulding applications: tablet moulding, hollow figure moulding and shell moulding of pralines to mention but a few. Some things are common for all types of moulding, such as the moulding and cooling parameters.

Tablet moulding

The mass is deposited in a mould and then cooled for crystallisation and solidification.

Shell moulding and pralines

Pralines are made in a three-step process. First the shell is moulded, then it is filled with the filling and as a final step the praline is closed with a bottom chocolate layer.

Coating/enrobing

Coating, or enrobing as it is also called, means covering an item with chocolate or a compound. The item in question may be a wafer or biscuit, a piece of fondant or jelly confectionery. In this application the item to be coated needs an even and complete covering, but for good economy the coating should be as thin as possible.

In addition the coating should have a nice and shiny appearance without being too sensitive to touch or scraping.

Cooling

Cooling completes the production cycle of confectionery products.

When the fat starts to crystallise heat will be released from the fat system - so

called crystallisation heat. The faster the crystallisation of the fat, the more intense the heat release and also the more cooling is needed to remove the heat and proceed with the crystallisation. Thereafter a change of structure will take place, with the chocolate or compound mass going from a liquid state to a solid. In this transition the fat molecules will be packed closer together and the volume will decrease. The volume decrease and tight packing are referred to as the contraction of the fat system, which is also the phenomenon that makes de-moulding of chocolate or compound items possible.

Now the chocolate or pralines are ready to enjoy.

WHAT CAN WE EXPECT OF THE CHOCOLATE AND PRALINES OF THE FUTURE? WHAT DOES THE TRENDS LOOK LIKE? HOW CAN THE FAT SUPPLIER SUPPORT IN THE TRENDS?

In order to be a strong partner as an ingredient supplier it is important to keep up with developments in the consumer market, with a view to understanding the needs of the end customers.

Main trends

The main trends in the confectionery market are very much following the global mega trends. Life gets increasingly hectic and consumers seek experiences that appeal to all senses. We want something quick, we want an indulgence - we want a snack!!

Snacking

You either have a snack because you would like to have something for pleasure, you want to give yourself a treat. The other reason is that you need energy/nutrition.

As a consequence, full-fat snacks and "healthy" snacks have been growing at approximately the same pace. An important characteristic of the modern snack, however, is that it can be eaten on the run, preferably one-handed.

Pleasure

When you would like to give yourself a special treat, you look for luxury products. In the chocolate and confectionery market this includes premium chocolates, pralines etc; all with rich flavours of nuts, cocoa, coffee or fruit. The product should also give you a particular eating sensation, so very often one part of the product is crispy, the other one chewy. The more different sensations you get from the product, the better. Akocent/Shokao with cool melting properties and Akomic/Confao BR for increased shelf-life in soft fillings are products of choice in these applications.

Health

As the main reason for eating chocolate or other confectionery products is pleasure, health is not a big issue. You nevertheless want it to be as "good for you" as possible, however, to alleviate your guilty conscience. This means that all ingredients should be in line with the most recent discoveries within nutrition. For example, the fats in the product should contain the lowest possible proportion of saturated and hydrogenated fatty acids, without compromising quality. The Akotres range is designed to meet these requirements.

Packaging and promotional

Also the packaging and promotional activities follow the mega trends of convenience and imagination. This is of course very important, as these are the tools that will make the customer see the product at the very purchasing moment.