

Manufacturers overlook cocoa butter savings

An important question asked by the management of many chocolate manufacturers is whether all potential savings have been realised in their recipes. It's a question that receives even more attention when the price of cocoa butter skyrockets – as it has in recent times. In fact, many manufacturers are already experiencing an uncomfortable squeeze on profits. So the big issue is: given that cocoa butter prices likely have further to go before they peak, how can manufacturers tighten their belts even further to prepare for new highs?

Sharpen your recipe

Defining a chocolate's viscosity for a specific final application is every bit as important as achieving the correct flavour. And knowing exactly which viscosity is needed also makes it possible to ensure that as little cocoa butter is used as absolutely necessary. In turn, achieving just the right amount of cocoa butter – and no more – enables layer thickness to be controlled, air bubbles to be vibrated out of the chocolate, inclusions to be covered, and more besides.

Of course, with cocoa butter prices currently above EUR 4,200/ton, there are substantial gains to be made from developing more cost effective recipes. In fact, a cocoa butter saving of just 1% will typically deliver worthwhile bottom-line effects.

Yield value (YV) defines the force needed to initiate a flow in a non-Newtonian fluid such as chocolate. The YV is typically important when working at low shear such as when moulding/vibrating.

Plastic Viscosity (PV) defines the force needed to maintain a constant flow in a chocolate. The PV is important when working at medium to high shear such as in the enrobing process.

Yet, despite the savings offered by reducing cocoa butter use, far from all chocolate manufacturers have conducted a service check on each recipe to check whether the most precise formula has been identified for the application. Sharpening the recipe requires the manufacturer to define the correct plastic viscosity and yield value. Once these values are defined, it becomes possible to determine whether each new chocolate batch lives up to the viscosity specifications for the particular type of chocolate. As many manufacturers have already discovered, a service check on long-established chocolate recipes may reveal hidden savings by reducing cocoa butter for specific applications.

Going one step further

If a 1% cocoa butter saving doesn't seem compelling enough, then it's time to look into further wins offered to the industry by chocolate emulsifiers. Emulsifiers not only cut costs, but also offer the manufacturer an extra tool for controlling viscosity during chocolate production.

More efficient emulsifiers

Ammonium phosphatide or Emulsifier YN (E442), sold under the trade name of Palsgaard[®] AMP 4448 (AMP), is an emulsifier typically made from rape seed oil. With its ability to reduce the Plastic Viscosity (PV) and the Yield Value (YV), it's a highly efficient tool that outperforms lecithin in chocolate applications.

Simply by changing from soy lecithin to AMP, manufacturers can achieve cocoa butter savings from 1.7% to as much as 3.5% in a milk chocolate. Results like these are produced by increasing the usage of AMP up to either 0.7% (max. allowed legal usage in the USA) or 1.0% (max. allowed legal usage in the EU) from 0.4%

The potential of AMP as a fat reduction tool is illustrated in the graph above which shows the possible savings at different milk chocolate fat contents. The comparison is between a chocolate with 0.4% lecithin and a chocolate with 0.7% and 1% AMP. All chocolates have the same rheological parameters, but with cocoa butter fat savings when using AMP. The figure shows that a fat saving from 1.7% - 3.5% can be achieved by switching from lecithin to AMP.

soy lecithin, while still maintaining unchanged viscosity properties. It's a move plenty of manufacturers are prepared to make, since 3.5% less cocoa butter translates to savings of more than EUR 100,000 when producing 1,000 tons of chocolate and more than EUR 1 million at a 10,000-ton production level. Of course, the calculation takes into account current sugar prices, as sugar is needed to balance the recipe after removing cocoa butter.

To learn more about this uniquely powerful emulsifier, please consult the literature list at the end of this article*.

Added savings with co-emulsifiers

Another chocolate industry tool widely used to deliver cost savings and increased processing control is Polyglycerol Polyricinoleate (E476), sold under the trade name of Palsgaard[®] PGPR 4150. PGPR mainly reduces YV levels in chocolate and is therefore always used in combination with either lecithin or AMP to achieve a pumpable product with a low YV. It's particularly useful for applications such as moulding, spinning and coatings, where its track record in reducing YV levels is difficult to match with any other additive. To learn more about PGPR and its functionality see the literature list at the end of this article**.

Naturally, if AMP and PGPR are to be an integral part of a manufacturer's chocolate recipe, then they must deliver the same, reliable effect for every production run. To ensure this is the case, Palsgaard tests and adjusts the viscosity-reducing power of each AMP and PGPR batch before releasing the batch for sale, making both emulsifiers perfectly suited as viscosity-controlling ingredients in cost-efficient and quality-conscious chocolate manufacturing processes.

Neither AMP nor PGPR produces negative side effects on the tempering of the chocolate, nor do they have any effect on the taste what so ever. And both can be easily added to make the final viscosity adjustments approximately one hour before the end of the conching process.

Win-win collaboration

For chocolate manufacturers looking to lift their cost performance and ensure consistent product quality, maintaining tight recipe control and using no more cocoa butter than necessary are of paramount importance. This is an area where food ingredient manufacturer Palsgaard's expertise makes it a useful partner for the chocolate industry, and one that can apply detailed knowledge of how to use chocolate emulsifiers such as PGPR and AMP to optimise recipes and reduce costs.

Typically, Palsgaard works with its customers to optimise recipes in two simple steps: First, the customer refines its chocolate and sends a sample of the refiner flakes to Palsgaard for evaluation. Second, Palsgaard uses this sample to explore what can be done to sharpen the recipe for specific applications. Special attention is given to the potential benefits of using chocolate emulsifiers. Experience shows that, by combining emulsifiers, savings can often be significantly higher than the 3.5% mentioned above.

If you would like to learn more about the benefits you can achieve from using AMP and PGPR in your recipes, visit www.palsgaard.com/downloads to download the two articles listed below.

Literature references:

* '[Emulsifier YN – the unique ingredient](#)' by Arne Pedersen

** '[The importance of rheology information and emulsifier functionality in chocolate production](#)' by Jørgen Holdgaard