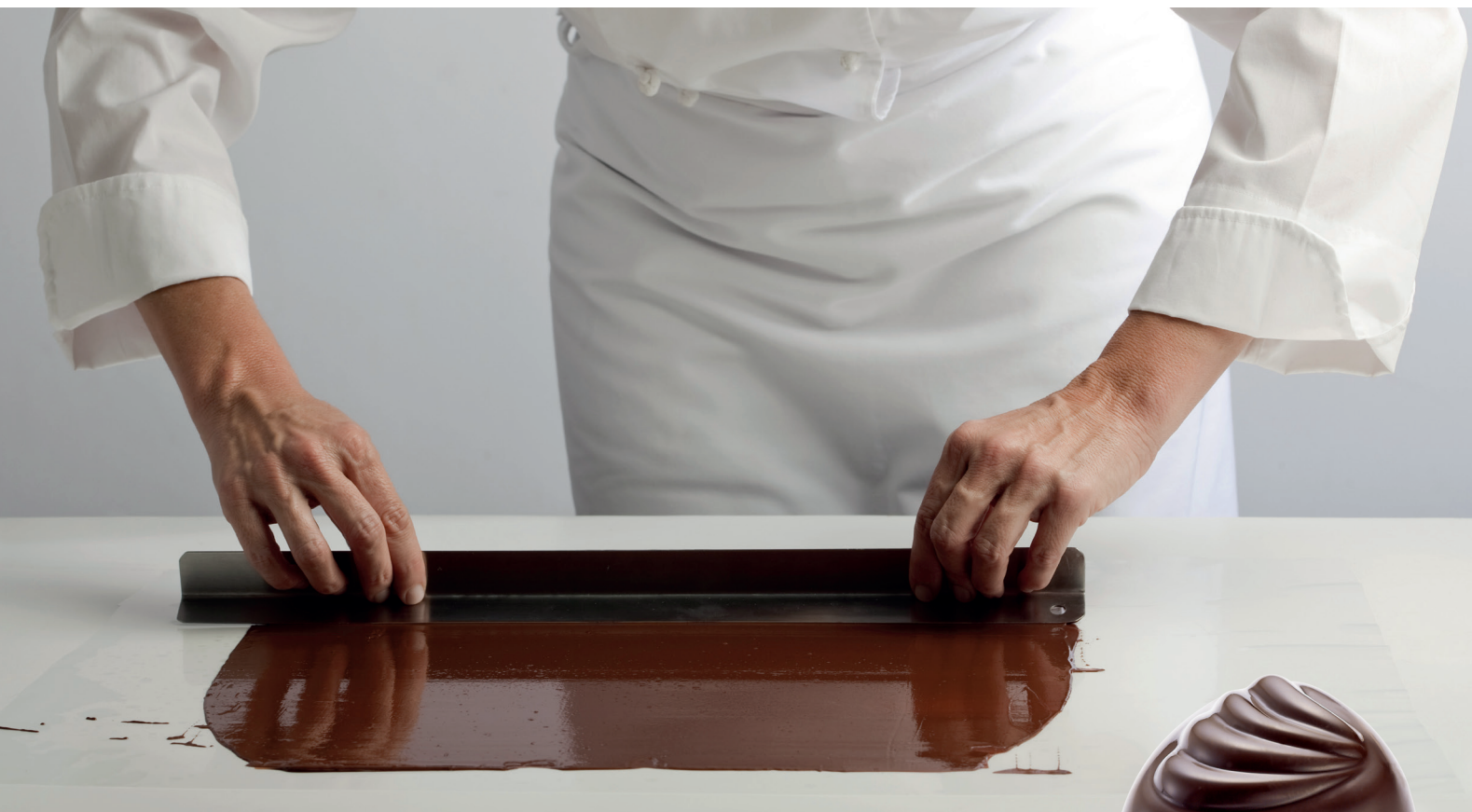


WE DO experts in emulsifiers and stabilizers for bakery, confectionery, dairy, ice cream, margarine and fine foods - and we are happy to share our expertise. our company values can be defined in just three words: **loyalty, responsibility** and **commitment**. we aim to be the preferred partner products, application service and know-how to regional and multi-national food companies. to Palsgaard **loyalty** means that we act as a reliable and honourable business partner for our customers. we treat information confidentially and know how to keep a business secret. to Palsgaard **responsibility** means caring about the environment and being aware of our corporate social responsibility; we have a goal to be CO<sub>2</sub> neutral by 2020 and are members of SEDEX and RSPO. to Palsgaard **commitment** means we are dedicated to getting the best results for our customers' products - to the benefit of their customers. we care about our employees and have a declared aim that Palsgaard must be a pleasant place to work. Palsgaard we know that our most important resource is the know-how and dedication found in our employees. **Heart** we are committed to getting the best results with our products in our pilot plants and in your facilities. **Working** at Palsgaard we don't sell standard solutions - we start with your needs. Palsgaard - Heart Working **People** heart work is the best way to achieve success - let us help YOU get it. our products are produced according to the strictest quality criteria. we are experts in emulsifiers and stabilizers and we are happy to share our expertise with you. let our pilot plants help you shorten the step between idea and your new product. heart work is the best way to succeed - let us help you do so.

## New chocolate emulsifier puts the squeeze on costs



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Thanks to food ingredients producer Palsgaard, there's now a new and highly effective avenue to explore potential savings and expand profit margins. Called Palsgaard® AMP 4455, it's a new chocolate emulsifier that meets or exceeds the effects of lecithin at vastly reduced dosages. And it's enabling Palsgaard's chocolate producing customers to take back control of their costs.

## COST REDUCTIONS HIT THE WALL

After years of hard-won progress on the cost-efficiency side of chocolate production, chocolate manufacturers might be forgiven for thinking they've finally hit the wall – that they are at the whim of the cocoa butter traders and that further cost savings are thus beyond their control.

## UNCERTAIN FUTURE

The chocolate industry is faced by a very uncertain future, with much speculation around the supply

and demand for cocoa. Will there be enough supply in the coming years? Have the prices of cocoa butter reached their peak? Already today, with the prices of cocoa butter and other cocoa ingredients steadily climbing, industry profits margins are squeezed more tightly than ever before. Little wonder then, that the management of many chocolate manufacturers is asking whether all possible potential savings have been identified in their recipes. And they're not always satisfied with the answers.

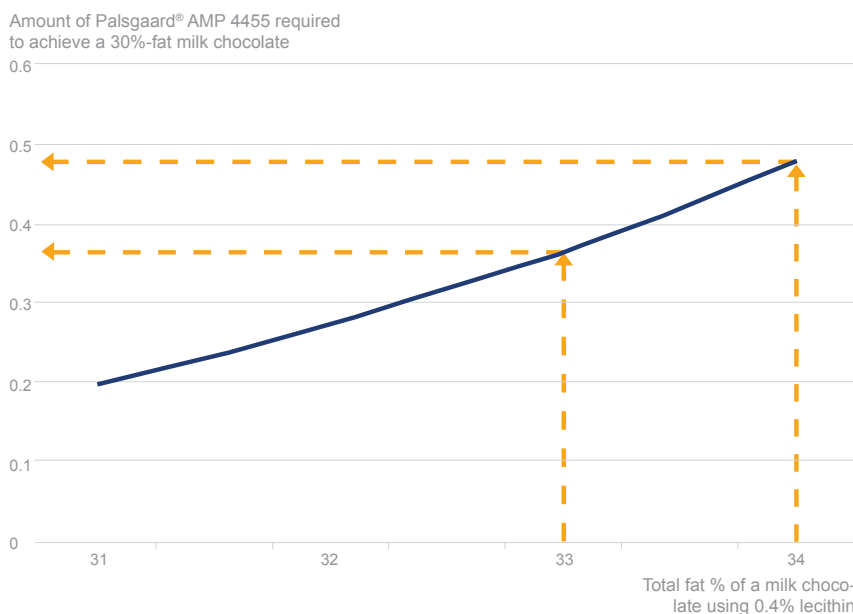
## PALSGAARD TO THE RESCUE

Palsgaard® AMP 4455, which is essentially ammonium phosphatide (also known as AMP, Emulsifier YN or E442), has been developed as a powerful alternative to lecithin. It's just as easy to use, but outperforms lecithin in reducing the chocolate's plastic viscosity and yield value – using as little as 40 percent of the normally applied dosage.

**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 as e.g. 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.

**Figure 1:** Cocoa butter savings achieved by replacing lecithin with Palsgaard® AMP 4455.



*In the above example, a manufacturer producing milk chocolate with 33% total fat using 0.4% soy lecithin switches to using 0.37% Palsgaard® AMP 4455. The result is a product with 30% total fat, saving 3% on expensive cocoa butter yet maintaining the same rheology. A manufacturer producing a 34% fat product could dose 0.48% Palsgaard® AMP 4455 in order to save 4% on cocoa butter.*

## OUT-SAVING LECITHIN

Using lecithin in chocolate at a dosage of around 0.4 percent normally provides cocoa butter or vegetable fat savings of around 4 percent. At the same dosage level, however, Palsgaard® AMP 4455 can extend these savings by an additional 2 to 3 percent to create a total potential saving of 6 to 7 percent.

While actual savings may vary over time due to fluctuating raw material prices and the different qualities of ingredients in use, reducing cocoa butter usage by an additional 2-3 percent could be expected to translate to savings of

EUR 100,000-175,000 per 1,000 tons of produced chocolate. And that's a difference management will certainly notice. See Figure 1 across for an example.

There are additional savings, too, made possible by adjusting recipes to use Palsgaard® AMP 4455. And they're related to the very nature of the emulsifiers in popular use.

### SPEEDING UP PROFITS

Today, most manufacturers use soy lecithin, sunflower lecithin or rapeseed lecithin as their chocolate emulsifiers. All can potentially cause a problem encountered by production managers all around the chocolate industry and known at Palsgaard as the "Thickening Effect". Occurring at dosages of around 0.4 to 0.5 percent, the Thickening Effect describes an increase in yield value that could potentially slow down production and place both the quality and the cost-effectiveness of the final product at risk.

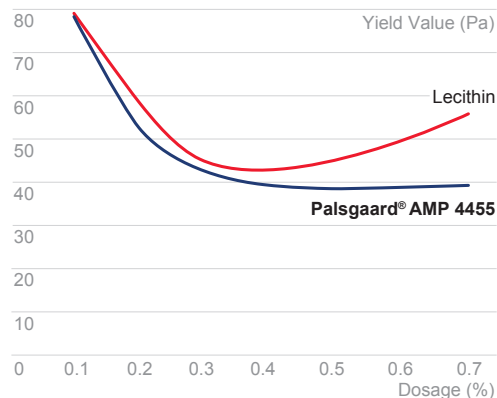
In fact, the Thickening Effect may actually hide cocoa butter savings. Many chocolate recipes may have been formulated with this "challenge" in mind, and lecithin may

therefore have dictated a natural barrier to product development. Palsgaard® AMP 4455, however, continues to perform at normal lecithin dosage levels and beyond, oblivious to the Thickening Effect and giving manufacturers a unique tool to explore the limits of cost reduction while maintaining the quality of the chocolate.

### TAKING SAVINGS EVEN FURTHER

If an additional 2 to 3 percent saving on cocoa butter isn't enough to impress the boss, then perhaps 4 to 5 percent – or total cocoa butter savings of 8 to 9 percent when the traditional lecithin saving is added in – will do the trick. Palsgaard® AMP 4455 has what it takes to deliver at this level, too, at least for special applications.

Where the taste profile isn't a critical parameter – as with the chocolate drops used in cookies, or the chocolate used for enrobing a cake, countines or biscuits – there's more flexibility to use less cocoa butter. For such special applications, Palsgaard® AMP 4455 can take cost savings far beyond the limits of lecithin. In fact, this powerful emulsifier continues to reduce the viscosity of the choco-



**Figure 2:** Using Palsgaard® AMP 4455 means no undesired increase in yield value (thickening effect) at higher dosage levels. This enables efficient production of very low fat chocolates.

late even at dosages of 0.6 or 0.7 percent – still without encountering the Thickening Effect.

At these dosage levels, increased savings of around 4 to 5 percent can be made on cocoa butter, enabling new product development or sharpening of "old" recipes in ways not possible before.

Yet another advantage of Palsgaard® AMP 4455 in the product development process is its taste neutrality, enabling it to be used, unlike lecithin, at high dosages with applications sensitive to off-flavours such as crumb chocolate with its low content of cocoa solids, white chocolate, or white confectionary spreads.

**Figure 3:** Where the taste profile isn't a critical parameter, as with the chocolate used for enrobing cakes or biscuits, Palsgaard® AMP 4455 can take cost savings far beyond the limits of lecithin.





## VISCOSITY REDUCING POWER (VRP)

For confectionary manufacturers, overall production costs are also closely tied to the ability to achieve and maintain consistent product quality, producing batch after batch of their top products and securing customer loyalty. Here, Palsgaard has a unique approach to ensuring functional stability in chocolate: no Palsgaard® AMP 4455 emulsifier batch is supplied to customers without undergoing extensive testing in chocolate. Called the VRP method, this ensures every batch meets the specified viscosity reductions in chocolate to produce the same rheological results every time.

Additionally, Palsgaard® AMP 4455 is a showcase of compliance with widely demanded manufacturer and consumer preferences, offering the following important attributes:

- 100% vegetable-based (sunflower oil and glycerine in stable supply)
- Non-GMO status
- Contains no allergens
- Non-soy
- Kosher & Halal certifications available
- Proven low risk of microbiological contamination
- AMP's proven track record in chocolate since the late 1950s
- Pumpable at room temperature for easy handling

## SHARPEN YOUR RECIPE

A cost-saving yet functional recipe is a treasured competitive advantage for any chocolate manufacturer, and should be re-visited regularly for a "service check". Yet not all chocolate manufacturers have conducted such a check – and many are missing out on savings made possible by new advances such as Palsgaard® AMP 4455. Palsgaard always recommends manufacturers to check their long-

established chocolate recipes, focusing on exactly how much cocoa butter is actually needed for the specific application and revealing any hidden cost-saving opportunities.

Palsgaard has many years of experience with identifying the optimal recipe settings, and its application specialists are always keen to assist customers to find hidden savings that can ensure competitiveness and secure a healthy bottom line. For many chocolate manufacturers, Palsgaard® AMP 4455 could be the tool to achieve exactly that.

Should you be interested in learning how Palsgaard's chocolate emulsifiers can benefit your production and create more cost-effective recipes, please visit [www.palsgaard.com](http://www.palsgaard.com) to locate and contact your local Palsgaard office.

## DELIVERY DETAILS

Palsgaard® AMP 4455 can be supplied in 200 kg steel drums, 900 kg IBC containers or as bulk deliveries. The most cost-effective solution – bulk deliveries of up to 24 tons – only requires a storage tank to be ready when off-loading the product.

