

AAK

Cocoa
Butter
Improvers



Heat stability in chocolate products
– Create new possibilities with **ILLEXAO™ HS**

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Create new possibilities with ILLEXAO™ HS

Cocoa butter has a unique composition and physical properties. Together with cocoa liquor, cocoa butter provides chocolate with its very characteristic flavour and eating qualities such as melt-down and flavour release. ILLEXAO™ has the same physical properties and chemical composition as cocoa butter but iron out many of the difficulties inherent in chocolate production. Based on raw materials such as shea, illipe and palm oil, ILLEXAO™ products are as natural as cocoa butter.

The main advantage with ILLEXAO™ is that AAK can tailor-make the product in order to obtain the desired functionality, when it comes to for example heat stability, bloom stability and sensory properties.

Designed for warm climates the ILLEXAO™ HS products raise the melting point of the chocolate, enabling it to withstand elevated temperatures. In warm climates the problem of softening and bloom on chocolate is well-known; however, with the ILLEXAO™ HS range it is possible to raise the hardness of chocolate at higher storage temperatures without tampering with the melting properties of the chocolate.

At the same time the bloom stability will increase at an elevated temperature and/or a cycling temperature.

The hardening effect is most significant in milk chocolate but when higher amounts of ILLEXAO™ HS are added we get the heat stability effect in dark chocolate too. Countering softness and giving the final chocolate a bloom stability which is acceptable in warm climates – those are the benefits of using the ILLEXAO™ HS range.

The ILLEXAO™ HS range

ILLEXAO™ HS 85 is recommended for chocolate products where the target is a proportion of heat and bloom stability at a higher storage temperature while the impact on the melt-down is minimal.

ILLEXAO™ HS 85 can be used in all ratios with cocoa butter but it is recommended to use minimum 5-10 % of the total chocolate recipe to get a significant heat stabilising effect.

The higher the content of ILLEXAO™ HS 85 in the recipe – the more heat stability in the product.

In a milk chocolate a positive effect is detected at a lower addition of ILLEXAO™ HS 85 than in a dark chocolate recipe.

Figure 1: Typical solid fat curves of ILLEXAO™ HS 90 and HS 85

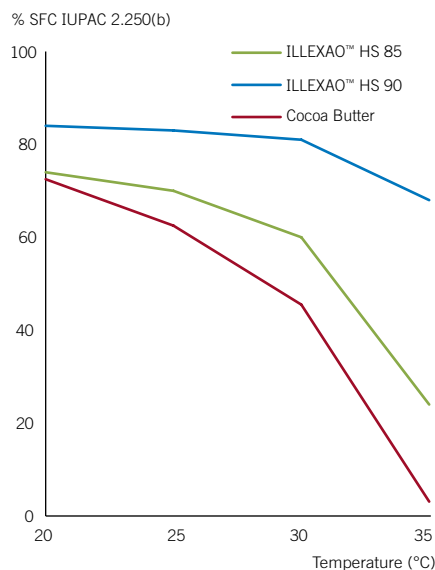
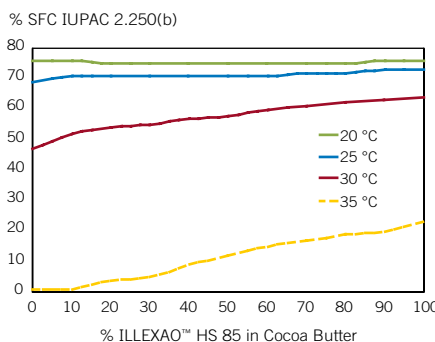


Figure 2: ILLEXAO™ HS 85 – compatibility with cocoa butter



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since 1991

Figure 1 shows the solid fat content (SFC) values for the two products ILLEXAO™ HS 85 and ILLEXAO™ HS 90 compared with a standard West African cocoa butter.

At the four temperatures measured in the graph, the amount of solid fat is higher than cocoa butter. However, the significant difference appears at higher temperatures and that is the reason for the quite significant hardening effect at higher storage temperatures.

Figure 2 shows the solid fat content (SFC) in different blends with ILLEXAO™ HS 85 and cocoa butter – the most significant effect is measured at 30 and 35 degrees Celsius.



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Hardness and texture

The solid fat content (SFC) would not in all cases be an optimum parameter for measuring hardness.

Figure 3 shows a dark chocolate with 0 %, 5 % and 10 % ILLEXAO™ HS 90.

In all three cases, the chocolate mass is comparable regarding fat content, particle size, viscosity etc. The only difference is the amount of ILLEXAO™ HS 90.

The significant effect appears at 30 degrees Celsius in the chocolate with 10 % ILLEXAO™ HS 90 – where the hardness is raised by approx. 30 % relatively (100 g/force measured at a “Texture Analyzer TX2”). Figure 4 shows the visible effect.

There is no significant effect at 20 or 25 degrees Celsius.

Figure 5 shows a milk chocolate with 15 % milk fat in the fat phase and with the

same test parameters as in Figure 3.

According to this figure there is a significant positive effect on texture at both 25 and 30 degrees Celsius in milk chocolate. The largest impact appears when 10 % ILLEXAO™ HS 90 is added, see figure 6 – here the hardness is raised by approx. 150 % relatively (~150 g/force measured at a “Texture Analyzer TX2”).

Figure 3: Percent ILLEXAO™ HS 90 in total recipe – dark chocolate

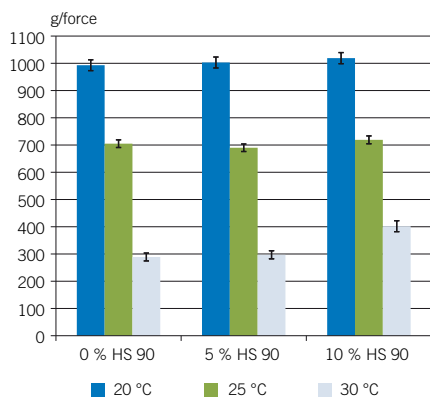
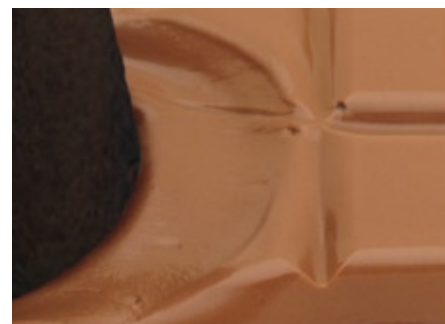


Figure 4: Heat stability ILLEXAO™ HS 90 – in a dark chocolate tablet



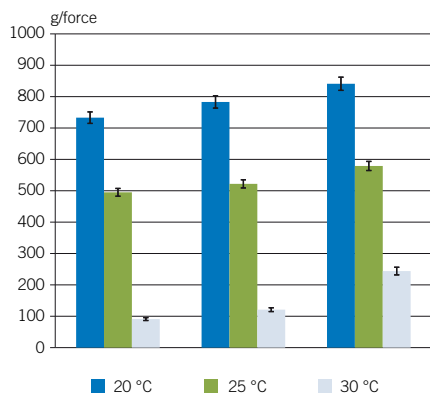
Based on cocoa butter
500 grammes weight
34 °C

Figure 6: Heat stability ILLEXAO™ HS 90 – in a milk chocolate tablet



Based on cocoa butter and milk fat
500 grammes weight
34 °C

Figure 5: Percent ILLEXAO™ HS 90 in total recipe – milk chocolate



Added 10 % ILLEXAO™ HS 90
500 grammes weight
34 °C



Added 10 % ILLEXAO™ HS 90
500 grammes weight
34 °C



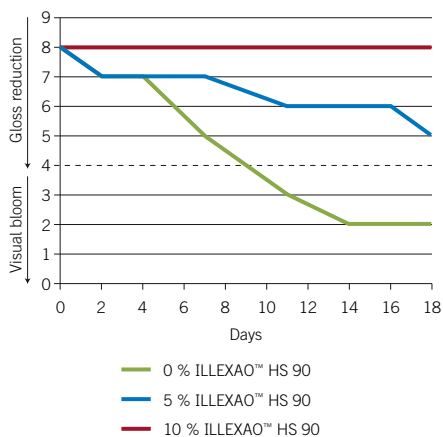


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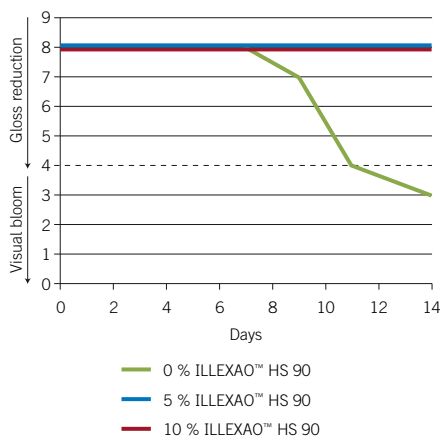
Bloom inhibiting effect

In warm climates it is not enough to have a chocolate which is form stabile and hard with a good snap. It is also very important that the chocolate is bloom stabile – not only in an isothermal storage temperature but also in a more realistic cycling temperature where the change is on a daily basis with fluctuating temperatures.

**Figure 7: Dark chocolate
Cycle test 20 °C – 25 °C – 31 °C**



**Figure 8: Milk Chocolate
Cycle test 20 °C – 25 °C – 31 °C**



Figures 7 and 8 show a shelf life test for a dark chocolate and milk chocolate respectively with and without ILLEXAO™ HS 90. All tablets are cycled between 25 and 31 degrees Celsius two times per day and evaluated after 6 hours at 20 degrees Celsius two times per week.

“Character 4” (the dotted line) is given for the first visible bloom development on

the surface of the tablets. The bloom inhibiting effect of ILLEXAO™ HS 90 in a chocolate stored at warm conditions is extensively more positive!

There is a positive correlation between higher content of ILLEXAO™ HS 90 in the chocolate and higher bloom stability.

Other aspects

Addition of ILLEXAO™ HS 85 or ILLEXAO™ HS 90 to a chocolate will influence other aspect in the production as well.

Typically it will be necessary to adjust both tempering machines and cooling tunnels as the ILLEXAO™ HS will accelerate the crystallization speed of the chocolate – and the chocolate will initiate its solidification at a higher temperature.

Consequently, we will see faster tempering which results in higher capacity on the production line – as well as an earlier final crystallization in the cooling tunnel.



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