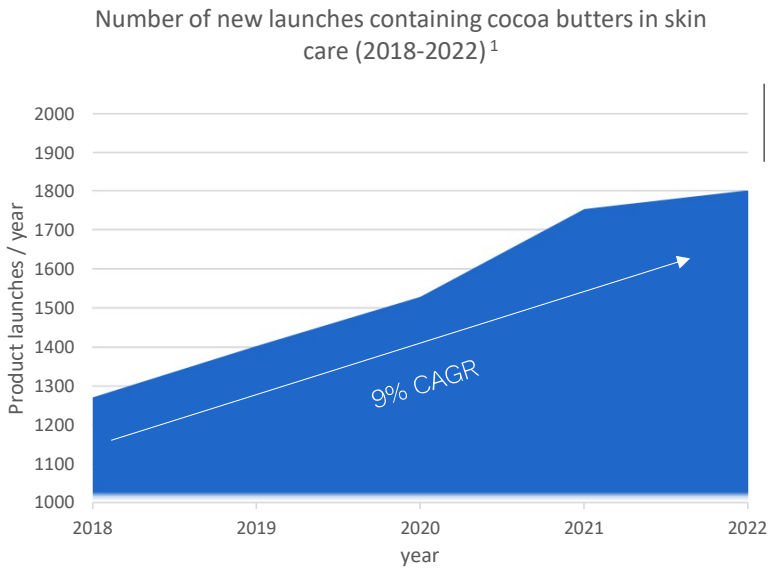
LIPEX® CocoaSoft RA MB™

14-03-2023

AAK

The Co-Development Company

The number of products containing cocoa butter is growing, driven by sustainability trends and sensorial and functional properties



The number of launches in skin care in the period 2018-2022 has grown 3% CAGR [2]

- Cocoa butters is used to deliver highly nourishing, richer, formulations
  - 30% of the body butters launched claim “richness” and premium moisturization (last 3 years)
  - Almost ½ of the body butters launched contain cocoa butter (last 3 years)
- It plays a key role in solid/anhydrous formulations to bring structure and hardness, which are very much on-trend.

9%[2] CAGR — Number of formulations in stick launched 2018-2022

- It enables formulating more natural products and, when selecting the right cocoa butter, it allows to appeal to the desire of consumers for transparency and to have a positive impact.

>35%[2] CAGR — Number of formulations with enviromentally friendly & sustainable claims launched 2018-2022

(1) Mintel, number) of launches in skin care containing cocoa butter (INCI= Theobroma Cocoa Seed butter)
(2) Mintel

Examples of product launches during the last 6 months containing cocoa butter

Rich, natural, ”concious” body care products

Anhydrous formulations

From a functional and sensorial perspective plant based butters offer very interesting possibilities

Sensorial benefits

- Butters are usually used to thicken creams.
- In anhydrous formulations, such as lipsticks, they build structure helping them to hold shape.
- They bring viscosity and hardness to formulations
- They can provide a more luxurious after feel

Functional benefits

- They provide moisturization, high emollience, and nourishment to the skin
- Give high versatility to formulators, where different crops would have unique benefits

Cocoa butter is a solid butter, which feels harder than other broadly used butters such as shea butter. It is specially convenient when formulating anhydrous formulations (to provide structure and hardness and to deliver rich, nourishing formulations)

A key challenge formulators face with plant-based butters is to get stable formulations with the desired sensorial and functional properties

- During their transportation, storage and usage by the end consumer, cosmetic products are subject to temperature fluctuations that can alter both their physical appearance as well as their sensorial and functional aspects

- **Bloom and temperature-induced phase separation** are two of the most common **undesirable outcomes.**

    - Bloom, also commonly known as the formulation being ”grainy” is a common phenomena experienced by formulators and consumers with > 11millions entries in google linked to solving (*)

- When formulating with plant-based butters and oils there are some parameters that can be used to predict the stability and sensorial and functional properties of a formulation.

(*) Result of google search: Obtaining non grainy butter containing cosmetics

Bloom, gritty, grainy… several words are used to describe the same phenomenon, which can appear differently in different formats

Formulations with bloom

Consumer complaints / enquiries on lipsticks

(1) Is Wax Bloom On Your Lipstick Really "Normal" Or Should Pat McGrath Fix Her Formula? | Lipstick Alleyx
(2) Can anyone help figure out what these grainy spots are from? They're all over this new lipstick. I've never seen this before. : MakeupLounge (reddit.com)
(3) Brand new Maybelline 325 Dusk Rose lipstick, mold or wax bloom? : MakeupAddiction (reddit.com)

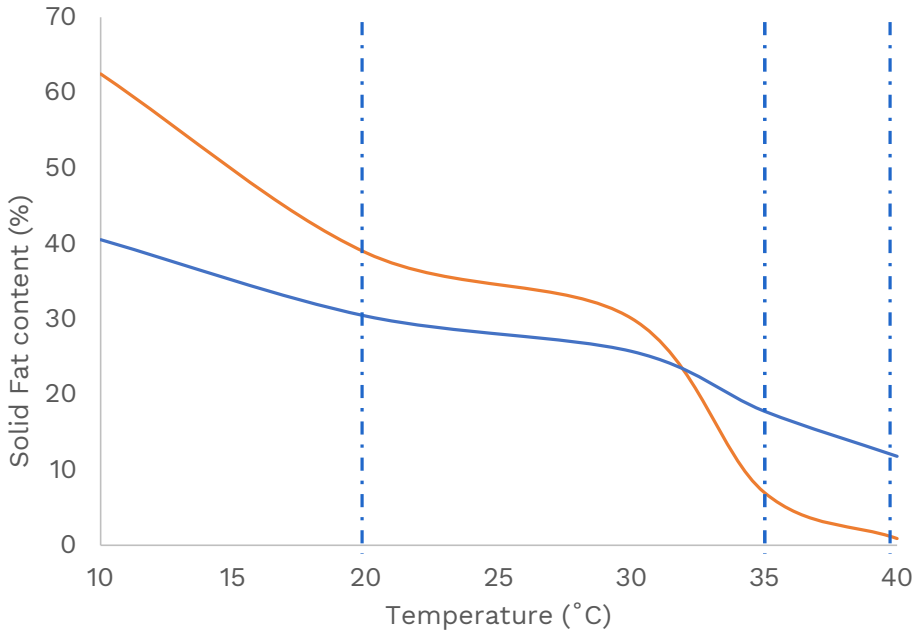
The right crystallization is key in obtaining thermally stable formulations with the desired properties but, how is that achieved?

- A regular network of very small crystals is desired to achieve a thermally stable formulation with the right texture.
- How can crystal behavior be controlled and bloom avoided?
  - Crystals will grow due to their transition to different crystal forms during processing; the important aspect is to have a temperature-controlled manufacturing process
  - A fast transition to the stable crystal form is key to minimize undesired crystallization (e.g., bloom). Bloom is the visual manifestation of these bigger crystals recrystallizing

- In order to control the crystallization in the personal care industry:
  - A controlled crystallization process needs to be applied, which requires heavily controlled cooling and stirring, bringing complexity to product development and production process.
  - Alternatively, functionality can be optimized to achieve the fast transition to the stable crystal form.

The melting profile of a plant based butter is a great tool to predict its thermal stability and sensorial and functional attributes

- The melting profile reflects the amount of solid fat content at different temperatures, which gives information on how the ingredient will be perceived and will perform in the jar and in the skin.



- A flatter melting curve translates into a less temperature sensitive ingredient
- SFC @ 20 ° C/RT gives a view on how the ingredient will be perceived in the jar.
  - 60% will feel waxy, <50% pasty
- SFC @ 35 ° C / skin temperature gives information on how the ingredient will be perceived and perform when applied to the skin
  - <5% will feel liquid, oily , >10% drier, longer play time
- SFC @ 40 ° C indicates the ability of the raw material to stabilize emulsions at high temperature, avoiding temperature-induced phase separation.
  - >5% helps stabilize emulsions at high temperature

From GREEN to CLEAN to CONSCIOUS

The responsible citizen behaviour is accelerating the green transformation and sustainability commitments show to be crisis resistent

CONSUMER DRIVEN

- Millenials and Gen Z are driving the demand for sustainable beauty
- (Eco)money talks: shopper behaviour is impacted by on pack sustainability claims
- Environmental, health and safety concerns drive need for transparency (block chain enabled)

CORPORATE CSR + BRAND PROMISE DRIVEN

Risk mitigation: products/ formulations have to go green (focus areas and targets publicly communicated by multinationals)

- EUROPE: European Green Deal driving focus on carbon footprint across the supply chain. Certifications and verifications needed.
- US: Being a good citizen focus. Ethical sourcing and social impact. CO2 reduction has been focused on packaging improvements.
- ASIA: Regional multinationals motivated to meet the market demand in Europe and the US

Sources: April 2022 Euromonitor, Mintel, Kline and 2021 China strategy research

The challenges facing the cocoa industry have been broadly investigated, identified and communicated

Cocoa is at the heart of many economies in West Africa, with Ivory Coast and Ghana producing nearly two-thirds of the world's cocoa. It is a high-profile supply chain with identified risks communicated through many channels and stakeholders.

Child and forced labor

- Almost 1.6 million children are estimated to work in medium and high-growing cocoa regions in West Africa.
- Around 0.2% of those are forced into labor by someone outside the family.
- 87% carry out hazardous work (lifting heavy loads, using sharp tools)
- Around 0.4% of adults working in medium and high-growing cocoa regions in West Africa are victims of forced labor practices.

Farmer poverty

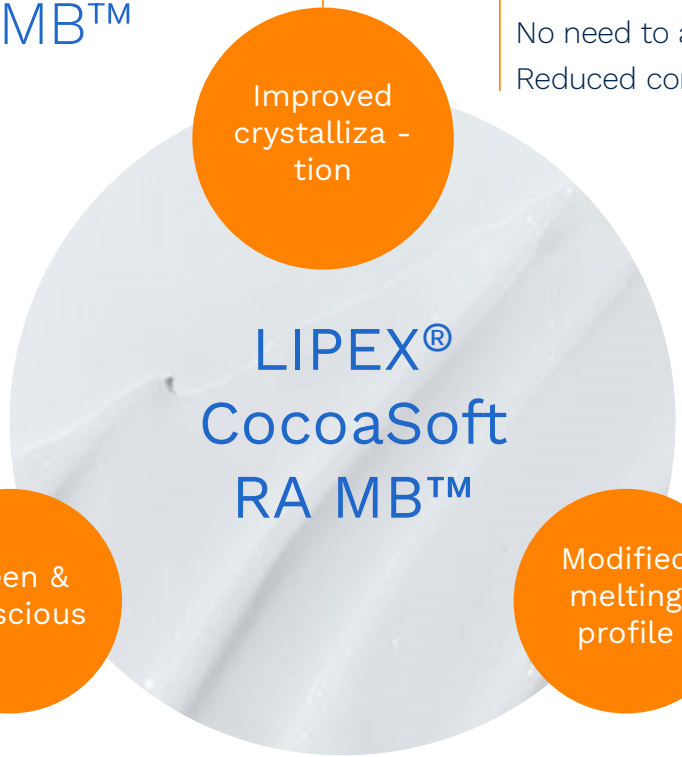
- The average cocoa farmer earns below the extreme poverty line of US$1.25 per day, which drives demand for cheap labor, and allows an environment where labor exploitation and modern slavery can exist.
- Weak bargaining power, low levels of literacy, lack of governance structures, and poor prosecution rates for exploitation exacerbate the poverty cycle.

Deforestation and climate change

- Deforestation is a major issue in Ivory Coast and Ghana, which respectively lost 25% and 8% of their primary forest between 2002-2019, with a significant portion of deforestation due to cocoa farming.
- Drought, pests, and diseases can decimate a cocoa harvest and be devastating for cocoa farmers already struggling to make ends meet.

Sources: www.worldcocoafoundation.org
www.rainforest-alliance.org

Introducing
LIPEX® CocoaSoft RA MB™



Improved thermal stability & structure to formulations
Avoid bloom formation
No need to add texturizing agents
Reduced complexity in product development and upscaling

100% Naturally derived
Rainforest Alliance Mass Balance

Softer, more pliable product
Helps protect and restore the lipid barrier
Stabilizes emulsions at high temperature

In AAK Soft technologies specialized lipid technology has been applied to optimize the melting and crystallization properties

- In AAK soft technologies, a specialized process has been applied to **improve the crystallization** form, so that the transition to the stable crystal form happens faster, and without the need of controlled cooling by specific equipment/processing.

  ↳ This leads to the formation of a regular network of small crystals that brings thermal stability and structure to the formulations and helps avoid bloom formation, without the need of texturizing agent.

- As a consequence of this specialized process, **the melting profile of the soft technologies is flatter,** where the soft indicates less amount of solids at room temperature.

  ↳ The flatter melting profile gives a uniqueness in how the ingredient will be perceived and will perform in the jar and on the skin

One of the key benefits of the improved thermal stability of the crystal structure is the resistance that it provides to bloom formation

The video shows the superior crystallization properties of Lipex CocoaSoft RA MB compared to standard refined cocoa butter Samples were stained with red dye and filmed over three cycles of cooling and heating at 20-30˚C for three days.

https://youtu.be/NKQisFXPtNE

- The soft technologies crystalize faster and are not sensitive to temperature changes
- In the refined butters, some of the material recrystalizes in the surface creating bloom. This can be perceived as the material being “grainy”
- The surface of the soft technologies remains homogeneous and smooth through the process
- When used in an emulsion, the resistance to bloom formation can lead to visual differences

In anhydrous formulations the regular network of very small crystals results into less brittle, shiny, bloom-free formulations over time

- The fast crystallization of LIPEX CocoaSoft RA MB generates a homogeneous network of small crystals that provides structure and shine to the formulation and helps avoid bloom.
- The fast crystallization enables even dispersion of particles such as peeling particles, in this case coffee grounds.
- A standard cocoa butter will crystallize slowly and form large crystals that will continue to grow. The result is less dense, brittle matt structure with clear bloom.

https://youtu.be/M40Qt6C-LHM

The improved crystallization results in easier formulating and upscaling

- No need for specialized equipment and highly temperature controlled manufacturing process – reducing complexity in product development and production process
- No need to add texturizing agents – allowing for a “cleaner label”
- Viscosity stays constant over time - easing manipulation during formulation and upscaling

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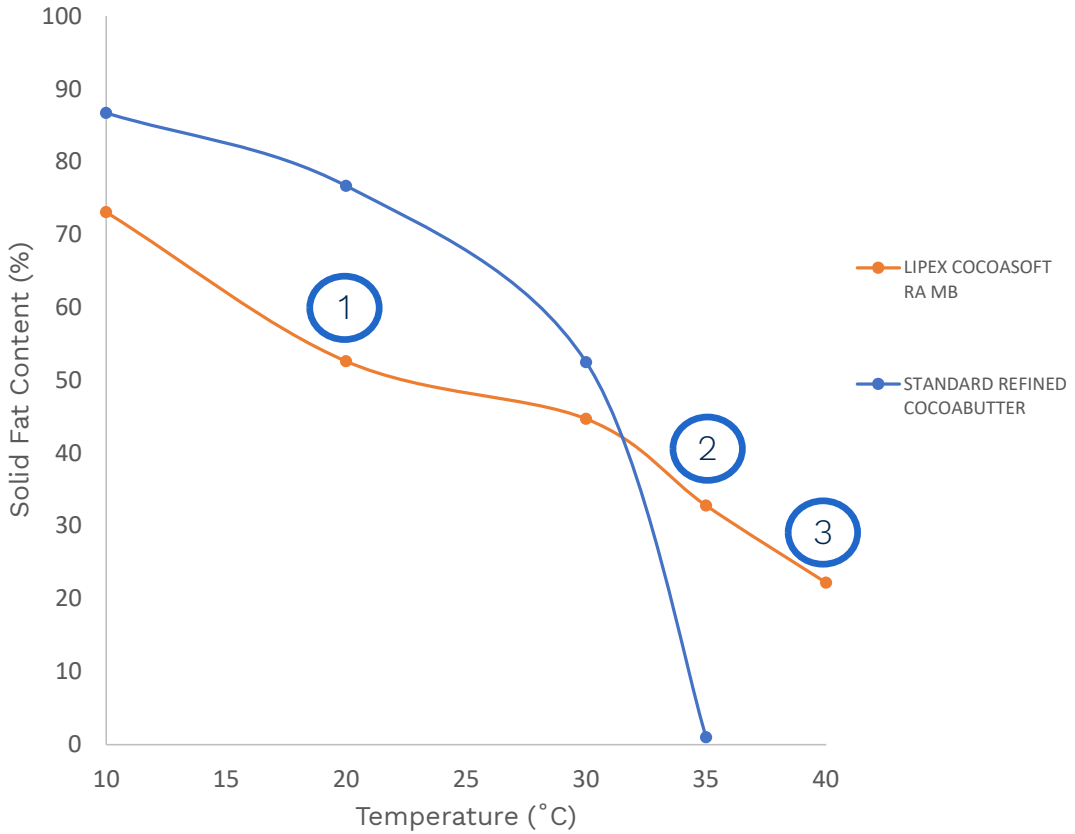
The flatter melting profile indicates a less temperature sensitive ingredient and it provides improved sensorial and functional properties



- Flat melting profile indicates that the ingredient is less sensitive to temperature fluctuations

1. Lower SFC @ RT than refined cocoa butter (50%) indicates a softer, more pliable product

2. Higher SFC @ 35°C/skin temperature (30%) indicates the ”soft” technology will have a longer play time and a more luxurious afterfeel. It will help protect and restore the lipid barrier.

3. Higher SFC @ 40°C (22%) indicates that the soft technologies will help stabilize emulsions at high temperature, helping avoid temperature-induced phase separation.

Rainforest Alliance makes a difference by targeting some of the biggest risks identified in the cocoa supply chain

Rainforest Alliance certification benefits people, planet and profit

Sources: https://www.rainforest-alliance.org
Brako et al. 2020; Iddrisu et al. 2020; Ingram et al. 2018

Gives assurance a cocoa-based ingredient is produced and sourced responsibly

- Rainforest Alliance works with almost one million cocoa farmers—mainly in West Africa, to address risks in the supply chain and build thriving livelihoods and climate resilience in the farming regions. The certification program tackles challenges with holistic, data-powered approaches informed by many years of experience in the sector.
  - Studies confirm that incomes on certified cocoa farms in Ghana and Ivory Coast are 40 percent higher on average than incomes on non-certified farms.
  - Rainforest Alliance trains farmers in climate-smart agricultural methods, including planting drought-resistant trees, crop diversification, and good soil management. These and other techniques improve farm productivity and livelihoods by increasing yields and minimizing costs.
  - Child and forced labor on certified farms is not permitted. Rainforest Alliance certification requires farmers to establish audited systems to assess, mitigate and monitor risk, which includes identifying and taking immediate action on cases if found.
  - All certified farms are GPS mapped to prevent the expansion of cocoa plots into forests. And as part of an integrated approach to fight deforestation, farmers must also increase native tree cover on and around their land.

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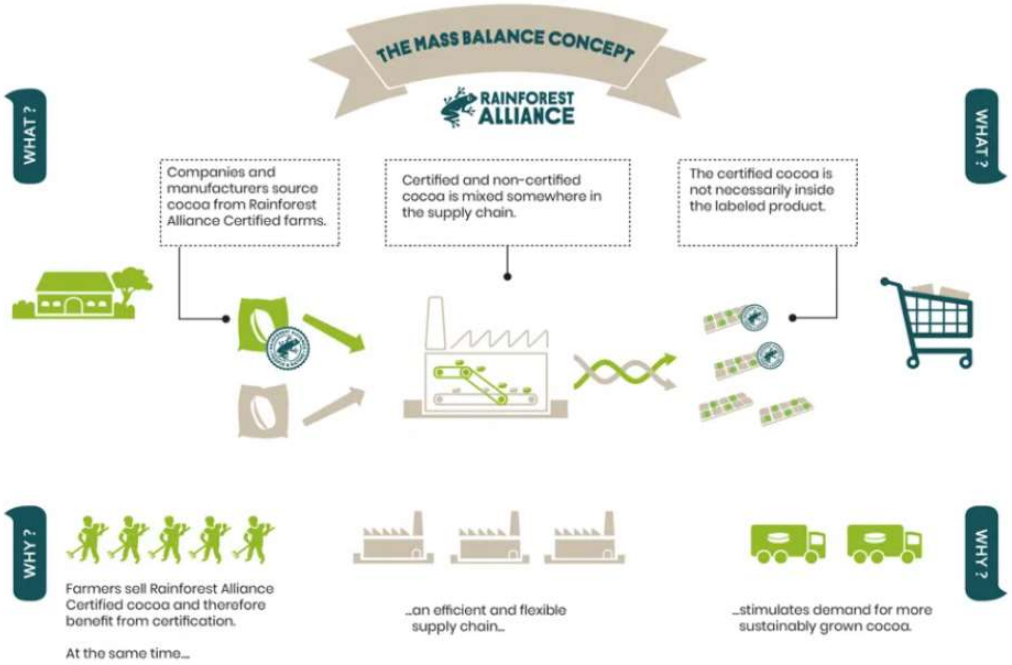
A reminder of the mass balance model

The mass balance model means more cocoa farmers benefit

- The cocoa supply chain is complex, and segregation is expensive. Therefore, the mass balance model that allows for mixing certified and non-certified ingredients is by far the most used model in the cocoa industry.
- As mass balance makes it more affordable for companies to source certified crops, this, in turn, increases the demand. And it means that more farmers can benefit from the social and economic advantages of certification. What's essential for farmers is that there is a market demand for their certified cocoa. The end product certification does not make any material difference to them.
- Mass balance simply means the total quantity of cocoa purchased from Rainforest Alliance Certified farms is equivalent to the total amount used in manufacturing a product. So an equal amount has been purchased from a certified farm for every gram of cocoa used in Lipex CocoaSoft RA MB.



https://youtu.be/XPCPGNJ8xpI

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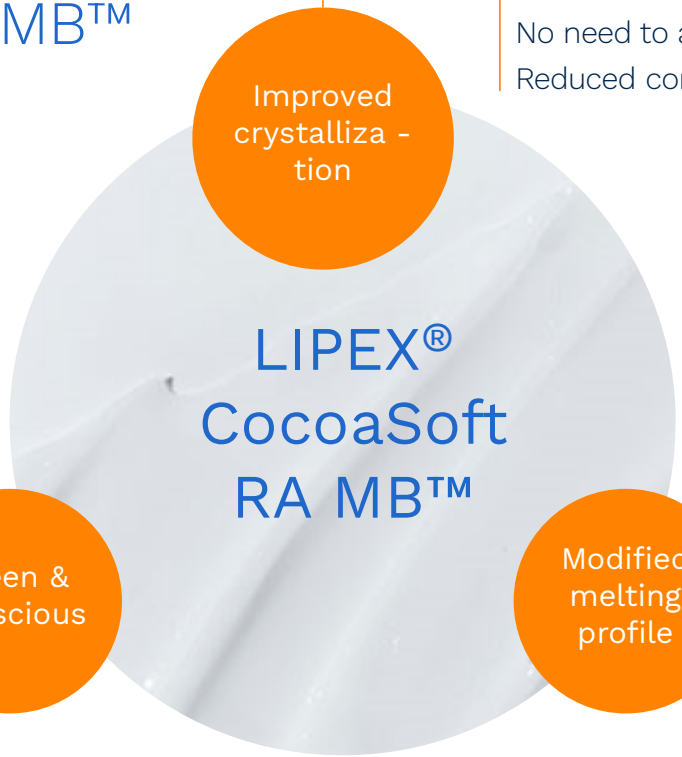

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Inspirational formulations using soft technologies

AAK-22-006 Choco Mocha Body Scrub

Product	Manufacturer	INCI Name	w/w
Phase A			
LIPEX® CocoaSoft RA MB™	AAK Sweden	Theobroma Cacao Seed Butter, Theobroma Cacao (Cocoa) Seed Butter	20.00
LIPEX® SheaLiquid TR™	AAK Sweden	Butyrospermum Parkii Butter, Butyrospermum parkii (Shea) butter	40.00
Sunflower Wax	Koster Keunen Holland BV	Helianthus Annuus (Sunflower) Seed Wax	5.00
Phase B			
Kaffibre	Kaffe Bueno	Coffea Arabica Seed Powder	15.00
Phase C			
Hostapon SCI 85P	Clariant	Sodium Cocoyl Isethionates	15.00
Hostapon TPHC	Clariant	Sodium Methyl Oleoyl Taurate	5.00

This vegan-friendly, pampering scrub, infused with rich cocoa butter and ground coffee beans, gently sloughs and smooths away dry skin to leave your body beautifully hydrated, silky soft, and smooth to the touch.

It's a simply delicious way to wake up the body and delight the senses in the morning. And chocoholics and coffee lovers alike will naturally adore it!

LIPEX® CocoaSoft RA MB™ has a superior fast crystallization which helps to create a smooth, glossy, firm structure and keeps the coffee grounds evenly dispersed

See for yourself how to formulate the Choco mocha body scrub!

https://youtu.be/nyJwSCJQuS0

AAK-22-020 Coco Delight Face Cleansing Bar

Product	Manufacturer	INCI Name	w/w
Phase A			
Akocare Coconut RA SG™	AAK Sweden	Cocos Nucifera Oil	1.00
LIPEX® CocoaSoft RA MB™	AAK Sweden	Theobroma Cacao Seed Butter, Theobroma Cacao (Cocoa) Seed Butter	15.00
LIPEX® IllipeSoft™	AAK Sweden	Shorea Stenoptera Seed Butter	15.00
LIPEX® PreAct™	AAK Sweden	Canola Oil	5.00
LIPEX® SheaSolve™	AAK Sweden	Shea Butter Ethyl Esters	10.00
Phase B			
Sunflower Wax	Koster Keunen	Helianthus Annuus (Sunflower) Seed Wax	5.00
Phase C			
Glucotain Gem	Clariant	Sunfloweroyl Methylglucamide	15.00
Hostapon SCI 85P	Clariant	Sodium Cocoyl Isethionates	20.00
Phase D			
Coconut EXFOLIATOR 200	Lessonia	Cocos Nucifera (Coconut) Shell Powder	2.00
Maisita 9040	Agrana	Zea Mays (Corn) Starch	11.50
Phase E			
Geogard 221	Lonza	Dehydroacetic Acid, Benzyl Alcohol	0.50

This simply delicious deep cleansing face bar uses tiny coconut particles to gently remove impurities, while a rich blend of cocoa and illipe butter nourishes and strengthens the skin's protective lipid barrier.

LIPEX® CocoaSoft RA MB™ and LIPEX® IllipeSoft™ show a fast crystallization pattern that helps to create a smooth, glossy, firm structure and keeps the coconut particles evenly dispersed.