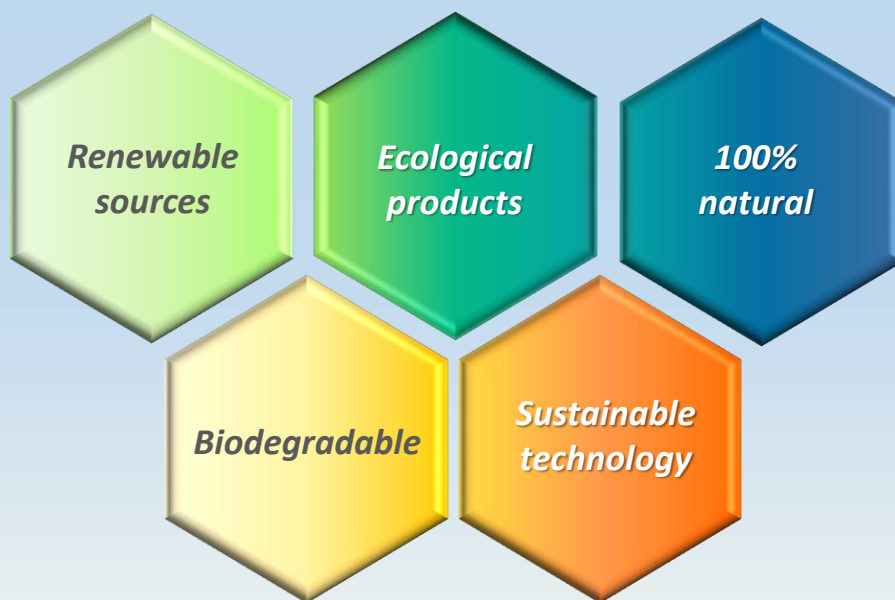


# MEGH present : New product line based on ester wax technology

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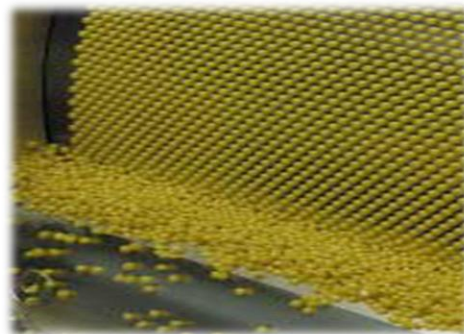
## New ester waxes MEGHWAX SEW

Trough proprietary technology, using natural, vegetable and semi synthetic raw materials from renewable sources, we developed a waxes line which can be used to formulate together or even replace natural waxes currently in use.

Natural waxes are composed by different types of carbon chains among the groups :

- hydrocarbons
- fatty alcohols
- fatty aldehydes
- fatty ketones
- fatty acids
- fatty esters

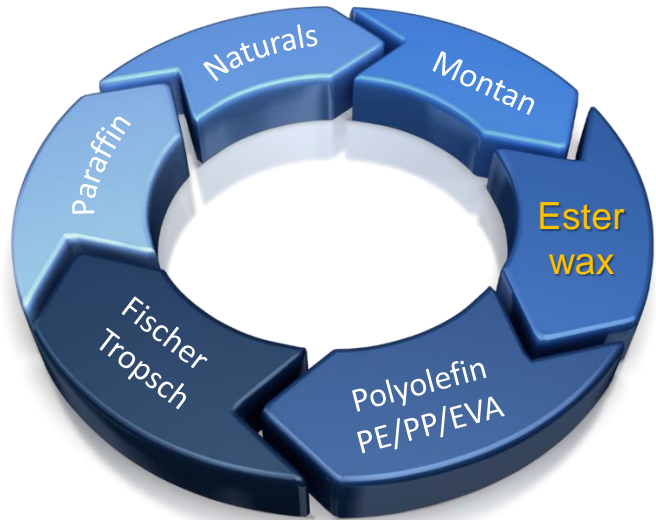
But the fatty esters group comprise the vast majority of fatty chains, about 60% an average, of natural waxes as follows :



Carnauba wax		Candelilla wax		Beeswax	
<b>Fatty esters</b>	<b>50%</b>	Hydrocarbons	40%	<b>Fatty esters</b>	<b>60%</b>
<b>Hidróxi acid esters</b>	<b>31%</b>	<b>Fatty esters</b>	<b>22%</b>	Free fatty acids	15%
Free fatty alcohols	10%	Free fatty acids	10%	Free fatty alcohols	12%
Free fatty acids	3%	Free fatty alcohols	10%	Hydrocarbons	13%
Resins	3%	Resins	18%	<b>China wax</b>	
<b>Lactones (cyclic esters)</b>	<b>2%</b>	<b>Rice wax</b>		<b>Fatty esters</b>	<b>95%</b>
Hydrocarbons	1%	<b>Fatty esters</b>	<b>94%</b>	Free fatty acids	1%
<b>Sunflower wax</b>		Free fatty acids	4%	Free fatty alcohols	1%
<b>Fatty esters</b>	<b>96%</b>	Free fatty alcohols	1%	Hydrocarbons	3%
Free fatty acids	3%	<b>Japan wax</b>		<b>Jojoba wax</b>	
Free fatty alcohols	1%	<b>Fatty esters</b>	<b>92%</b>	<b>Fatty esters</b>	<b>98%</b>
<b>Sugar Cane wax</b>		Free fatty acids	2%	Free fatty acids	1%
Free fatty alcohols	60%	Free fatty alcohols	6%	Free fatty alcohols	1%
<b>Fatty esters</b>	<b>25%</b>				
Free fatty acids	15%				



## A new wax family ?

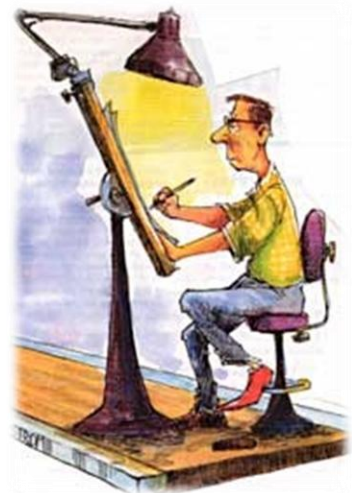


### What are the benefits of ester wax technology ?

Wax chemical molecule manipulation to the desired structure

Possible properties achieve with the ester wax manipulation :

- Excellent gloss
- Excellent hardness
- Excellent abrasion/risk resistance
- Excellent black heel marks
- Excellent emulsion formation
- Excellent water resistance
- Good oil and solvent retention
- Flexibility
- Good adhesion to substrates
- Reactive sites
- High branch degree



## New ester waxes MEGHWAX SEW

### Important information about MEGH ester waxes

- ❑ The MEGH ester waxes technology allows the development of a product range with a very close carnauba wax HLB and thus may be emulsified with similar emulsifiers to those provided by the market, turning easier the formulations developments.
- ❑ The MEGH ester waxes have excellent hardness regardless of the melting point thereof.
- ❑ The MEGH ester waxes technology apply natural, vegetable and semi synthetic raw materials that have no supply problems, unlike the normal natural waxes that may suffer from seasonal periods.
- ❑ The MEGH production capacity to ester waxes is according to the market needs for larger volumes of natural waxes, that can not be supplied by the current sources of these materials.
- ❑ The MEGH ester waxes technology allows a development of a product's matrix with a very close carnauba wax color range and may achieve colors from the T4 type to a T1 type color.



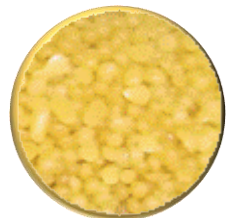
ester wax T4



ester wax T3



ester wax T2



ester wax T1



## WE DEVELOPED SUSTAINABILITY



## Problems with natural waxes supply ?



### Natural waxes Market perspectives

- ❑ The natural waxes production has been shown restrictions of different types, according to the production location and conditions available for its production.
- ❑ Natural waxes originated at very well defined areas and always correlated with some kind of extraction, whether of mineral or vegetable origin.

The table below shows a ranking of key natural waxes known and the origin extractive activity :

wax	occurrence	harvest	origin
carnauba wax	Brazil (northeastern)	palm ( <i>Copernicia prunifera</i> )	vegetable
candelilla wax	Mexico (Coahuila desert)	plant ( <i>Euphorbia cerifera</i> )	vegetable
beeswax	many countries	honey	animal
montan wax	Germany (Eastern Europe)	brown coal ( <i>lignita</i> )	mineral
Japan wax ( <i>sumac wax</i> )	Japan and China	plant ( <i>berries, sumac fruits</i> )	vegetable

It happens that all listed above waxes at one time or another have problems maintaining and increase in their productive capacities, each for their specific purpose.

## Problems into natural waxes production

Below we described peculiar characteristics of the main sources of natural waxes, explaining the reasons why these waxes are dammed production with their amounts and no major growth prospects in the coming years.

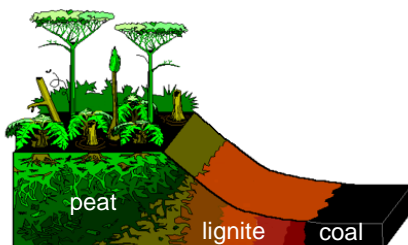
### Carnauba wax

- ❑ An ornamental plant threatens carnauba forests of northeastern Brazil.
- ❑ This plant came from Africa and is causing losses to farmers in Ceará.
- ❑ A few years back here, farmers have noticed that the crops have been attacked by this invasive plant, popularly known as “Devil's fingernail”.
- ❑ The plant is native to Madagascar, Africa, and arrived in Brazil as an ornamental plant.
- ❑ It grows around the carnaubas, up the trunk to reach the branches and cover all leaves.
- ❑ The two trees have almost the same characteristics. They need moist soil and sunlight to develop.
- ❑ The difference is that the African plant grows faster and in the struggle for survival, the carnauba palm tree loses.
- ❑ Carnauba is part of the conservation program of Brazil natural genetic heritage and its use is subject to certain restrictions.
- ❑ Slave labor on small farms.



### Montan wax

- ❑ The montan wax is a by product of lignite brown coal production in Eastern Europe, with most occurring in Germany.
- ❑ The lignite brown coal production has a tendency to stabilize or even decrease, but not growth.
- ❑ In order to have a economically feasible montan wax extraction, a source with a high wax content and a low resin content is required.
- ❑ The wax percentage extracted from lignite has remained constant in recent years, preventing an expansion of productive capacity.



*lignite*



*crude wax*



*refined wax*

## Candelilla wax

- ❑ The irregular and uncontrolled harvest of Candelilla plant in Mexico, causes soil imbalance in the region which Candelilla wax can be produced.
- ❑ The Mexican government now imposes productivity quotas, based on rational land use.
- ❑ Thus the production of Candelilla is restricted to certain government approvals, which are often bureaucratic and not aligned with the market.



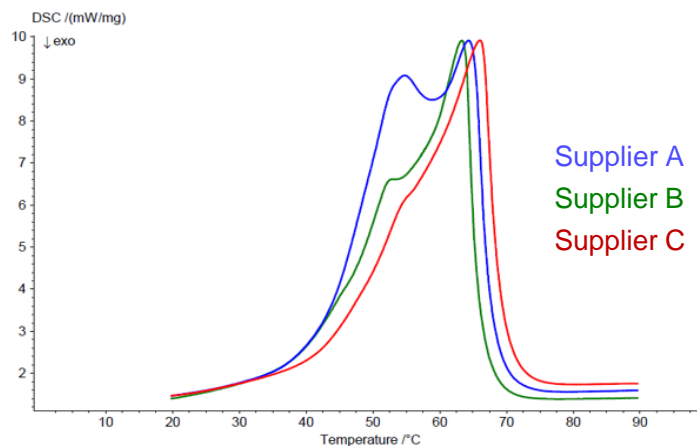
The candelilla wax extraction depends on a number of factors :

- time of the year
- climate conditions
- rainfall
- soil characterization
- extraction frequency
- region altitude



## Beeswax

- ❑ The production is irregular and depends much more on honey seasonality and the value that honey brings to the producer.
- ❑ The production is decentralized and small crops, preventing large-scale market policy, with rationality.
- ❑ Periodic phenomena such as "El Niño" or "La Niña" affect honey production and thus the production of beeswax.
- ❑ The irregular and decentralized production makes the product presents possible composition variations depending on the source of wax production, as can be observed in a DSC analysis :





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