Sustainable coatings from biobased waterborne alkyds and polyesters

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CONTENT OF THE PRESENTATION

- Introduction
- Polyester for coil coating applications
- Waterborne alkyd for wall paints
- Conclusion

BENESTER BIO

Taylor made polyester for coil coating applications

Target of the development:

To synthetize a binder with good durability (RUV_3) and mechanical properties, matched with higher reactivity than the standard polyester using as much as possible sustainable biosourced raw materials and a safe and efficient production process.

BENESTER BIO

Dry content: 65% ± 1

Viscosity (cPs @25℃): < 2500

Acid number (mgKOH/g) : <5

OH number (mgKOH/g): 75

Biosourced monomers: 54%

Biosourced solvent: 50%

FORMULATION RESULTS

Test	Specifications	Results
Substrate	HDG	HDG
Gloss	>80 gloss	92
Color	White	White
T-bend	2T	1T 
Pencil Hardness	H Min	H
Coin Scratch hardness	OK	OK 
Mek Rubs	> 100	200 
QVA 340 nm (2000hrs)	Ruv 2 Min	84% GR 0,4 ΔE 
Peak Metal temperature	232℃	200℃

Binder/cymel 303 ratio= 8:2 solid on solid

CONCLUSION

As targeted at the beginning of the project, we achieved good results with the development of a biosourced coil polyester. Nevertheless we can consider two possible improvements where to work on:

- Increase the final solid content keeping similar or even inferior viscosity values.

- Increase the percentage of the biosourced materials used in the synthesis of the binder.

IDROBEN NAT 84
Waterborne alkyd resin

Target of the development:

To develop an alkyd resin with more than 95% of bio-sourced monomers and solvent to be addressed in the wall paint market with the following characteristics.

- Odorless
- Easy to clean
- Scrub resistant

Though alkyds are already synthesized using a high percentage of biosourced monomers, vegetable oils, there is a big issue in the solvent used to dilute the final resin, i.e. white spirit, containing an aromatic portion.
That's the reason why we focused our work on a w/b product.

USING…

- Solventless process

- Biosourced catalyst

- Partially biosourced surfactants

- Water as solvent

IDROBEN NAT 84

Dry content: 50% ± 1

Oil Length: 89

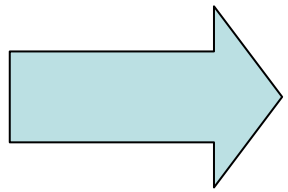
Viscosity (cPs @25℃): < 11000

Aspect: milky

Shelf life: 6 months

TEST RESULTS ON A WALL PAINT FORMULATION

A wall paint formulation, supplied by one of our customers, with a Solid content of 57,0% and a PVC of 37,5% was used to perform the tests.



Vapour Permeability
UNI EN ISO 7783/2-2001
Classification UNI 10795-1999
V=4322 g/m2d **(very high)**

Water Permeability
UNI EN 1063/1-2001
Classification UNI 1062/1
W=1,57 kg/m2 h 0,5 **(very high)**

Dirt Pick Up
UNI 10792-1999
Classification UNI 10795-1999
ΔL*= 11,79 **(very high)**

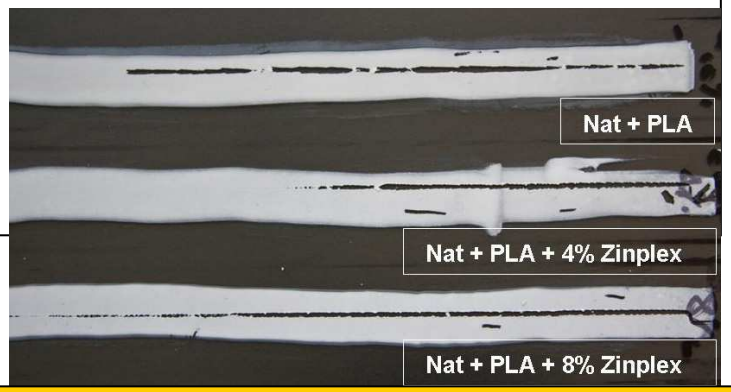
Scrub Resistance
UNI 10560-1999
Classification 10795-1999
Number of cycles 6 **(very low)**

Some lab trials were also made to better understand the performances of the binder.

Results:

-Not all the titatium dioxide are dispersible in the binder, but only a few (the others causing flocculation issues).

- Driers: the best results were achieved using Borchi Oxy coat, Iron based driers, in combination with PLA and a Zn complex as shown by the below picture and the following table.



Driers g/50g of resin	*Persoz 1week/surface*	*Persoz 1month/surface*	*Yellowing YE 313-98*
Octa soligen Co 7 (0,18)	*57 (--)*	*40 (-)*	*10,5*
Borchi oxy coat (0,15)	*94 (++)*	*96(++)*	*2,9*
Borchi oxy coat + PLA (0,15+0,17)	*81 (+)*	*106(+)*	*3,3*

CONCLUSION

As stated at the beginning we succeed in developing a new w/b biosourced product to be addressed to wall paint market. Up to now the product can only be used for high permeability paints, due to its low achievable hardness.

Future development will be addressed to produce a better performing resin to be also addressed to wood or industrial paint applications.

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