ink intelligence

Bio-Based Raw Materials For Printing Inks

Cheat Sheet

This document has been created to summarize the key takeaways that you should keep in mind, when developing a bio-based ink formulation for printing inks.

Defining bio-based products

Biobased Manufacturer's Association defines Bio-based materials as:

- Relies on plant or animal materials as the main ingredient.
- The plants or animals utilized are a renewable resource.
- With some exceptions, generally do not contain synthetics, toxins or environmentally damaging substances.

The United States' EPA's website states that, "LCA is a technique to assess the environmental aspects and potential impacts associated with a product, process, or service, by:

- Compiling an inventory of relevant energy and material inputs and environmental releases
- Evaluating the potential environmental impacts associated with identified inputs and releases
- Interpreting the results to help you make a more informed decision."

Table 1 - Bio-based materials

Product	Origin	Usage
Binders		
Cellulosic resins, including CAP, CAB and Nitrocellulose	Wood pulp/cotton	Binder
Hemicellulose	Plant	Binder
Gum Arabic	Trees	Thickening agent, Binder
Gum Dammar	Trees	Thickening agent, Binder
Gum Rosin	Trees/Plants	Binder
Tall Oil Rosin	Trees	Binder,
Wood Rosin	Trees	Binder
Alkyds	Plants/vegetable oils	Binder
Polysaccharides	Plants	Binder
Polyurethanes	Castor Oil	Binder
Casein	Animal Milk	Binder
Natural Rubber	Trees	Binder
Soy Protein	Plants/Soy bean	Binder
Starch	Plants	Binder
Shellac	Trees (insect)	Binder
Polyester Acrylates	Linseed oil	Binder/Oligomer
Epoxy Acrylates	SoyBean	Binder/Oligomer
Solvents & Additives		
Alcohols	Plant	Solvent
Butyl and ethyl lactate	Plant	Solvent
Water	Earth	Solvent
Castor Oil	Plant	Preservative
Linseed oil		Drying oil/plasticizer
Bees Wax		Wax
Carnauba		Wax
Castor Oil Polyol		Plasticizer

Table 2 - Bio-based alternatives to traditional products

Traditional Material	Bio-based Material	Function
Alcohols	Soybased solvents e.g. Soyanol™ 5000X; 5000X-HS, 5000X-TB	Viscosity modifier Improves pigment dispersion characteristics
Acrylic emulsions Urethane emulsions	Soy based emulsions e.g. Soyanol™ 1000E, 5000E SGE40 Resin Systems (Soy Technologies LLC)	Coalescent/Plasticizer Improves freeze/thaw stability. Improves “open” time
Acrylics and styrene acrylic emulsions	Polysaccharide resins e.g. INKRESTM 33 (Lorama)	Increases ink transfer Increases gloss pH neutral inks Improve ink clean up Improves re-wet-ability. Excellent clarity No VOC Non toxic
Acrylics and styrene acrylic emulsions	Hemicelluloses	Binder for inks Non toxic
Petroleum based resins	Bio-based polyester resins, e.g. Envirez (Ashland)	Binder for inks and coatings.

Other Resources

Below are some helpful online resources for more information on bio-based raw materials and ink formulations.

http://www.greenenvironmentnews.com/Environment/Energy/Biobased+Manufacturers+Association+(BMA)
http://www.napim.org/biorenewable
https://soygrowers.com/news-media/soy-ink-seal/
http://www.pneac.org/sheets/litho/inks.cfm
http://www.smitherspira.com/
http://www.vertecbiosolvents.com/
http://www.lorama.com/

Questions?

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