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Ph.D. thesis (2022-2025)
LGP2 (A. Blayo; A. Boyer)

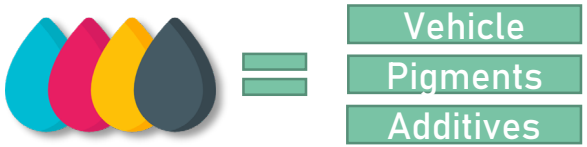
Bio4Inks: Formulation of 100% biobased 4-colored inks for press printing

Formulation d'encres offset quadrichromiques 100% biosourcées pour la presse

FunPrint / Biochip

Context / Objectives

Need for sustainability
Replacing pigments in offset ink



- Several biobased vehicles are already used
- Very few research on biobased pigments in inks

Finding suitable pigments for ink formulation
- Compatibility with oil-based vehicles and fountain solution
- Color strength
- Low ΔE compared with the standard values
- Stability (light, pH)

Obtaining ink with suitable properties
- Rheological properties
- Tack
- Permanence properties

End of life (recyclability, biodegradation)

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In collaboration with Écograf, Sun Chemical & Grakom

Methods

Pigment grinding
Dry grinding using bead mill (~60 balls of Ø2 cm)
Wet grinding using three-roll mill / bead mills

Mixing
Mixing using a SpeedMixer device

Printing
IGT C1-5 on paper
Printing force: 750 N
Ink volume: 0,5 cm^3
10 successive prints

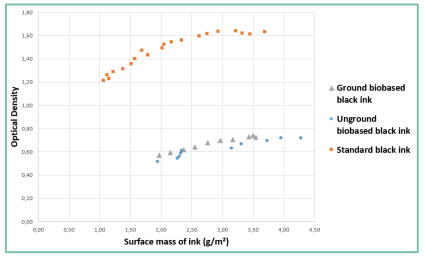
Pigment characterization
- Pigment size (granulometer)
- Surface energy (tensiometer)
- BET Specific Surface Area
- Composition (proximate and elemental analysis)

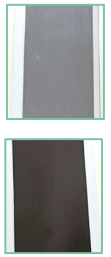
Ink characterization
- Tack
- Rheological properties (thixotropy, viscosity)
- Colorimetric properties (optical density, color)
- Lightfastness (Xenotest)

Results

Selection of biobased pigments
Lookout for pigments through literature and known historical biobased pigment

Black inks
Inks formulated with biobased pigments (1) are lighter than industrial black inks (2)
→ Need to optimize pigments dispersion via grinding, better dispersion or increase of carbon content





Colored inks
Promising results for yellow inks
Some good leads for magenta inks
Only few biobased pigments for cyan inks