



BIO-BASED INDUSTRIES
Joint Undertaking
www.bbi-europe.eu

Kao Chimigraf



New bio-based food packaging materials with enhanced barrier properties

NEW COMPOSTABLE INKS

Workshop, 29 November 2021

BENJAMIN MORENO

Senior Researcher
Water-based inks

Kao Chimigraf

kaochimigraf.com
kaoprint.com

Kao Chimigraf is a world reference company.
Since 1970 developing new products.
The KAO group is committed to sustainability.

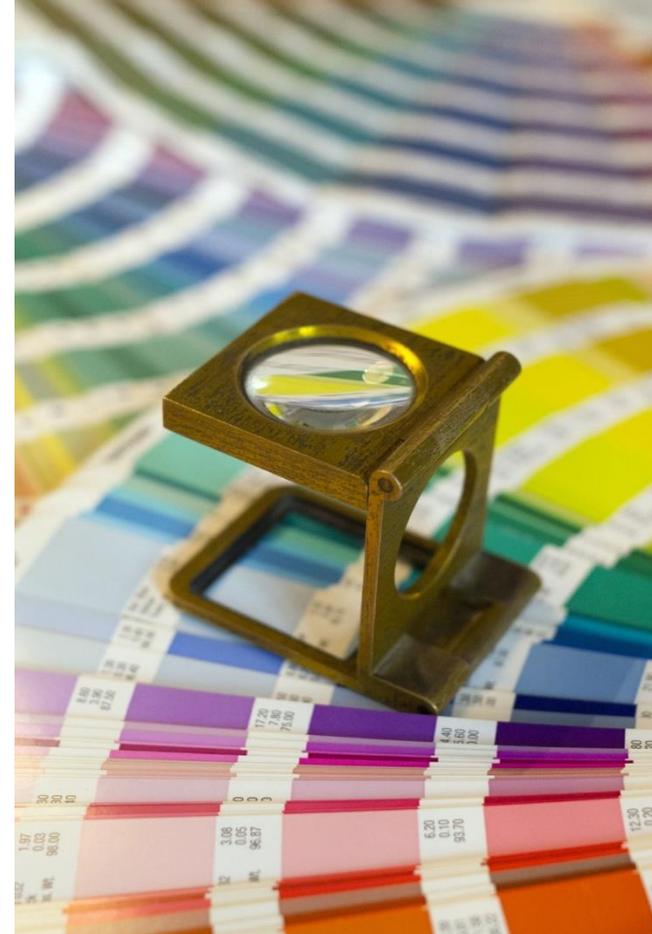




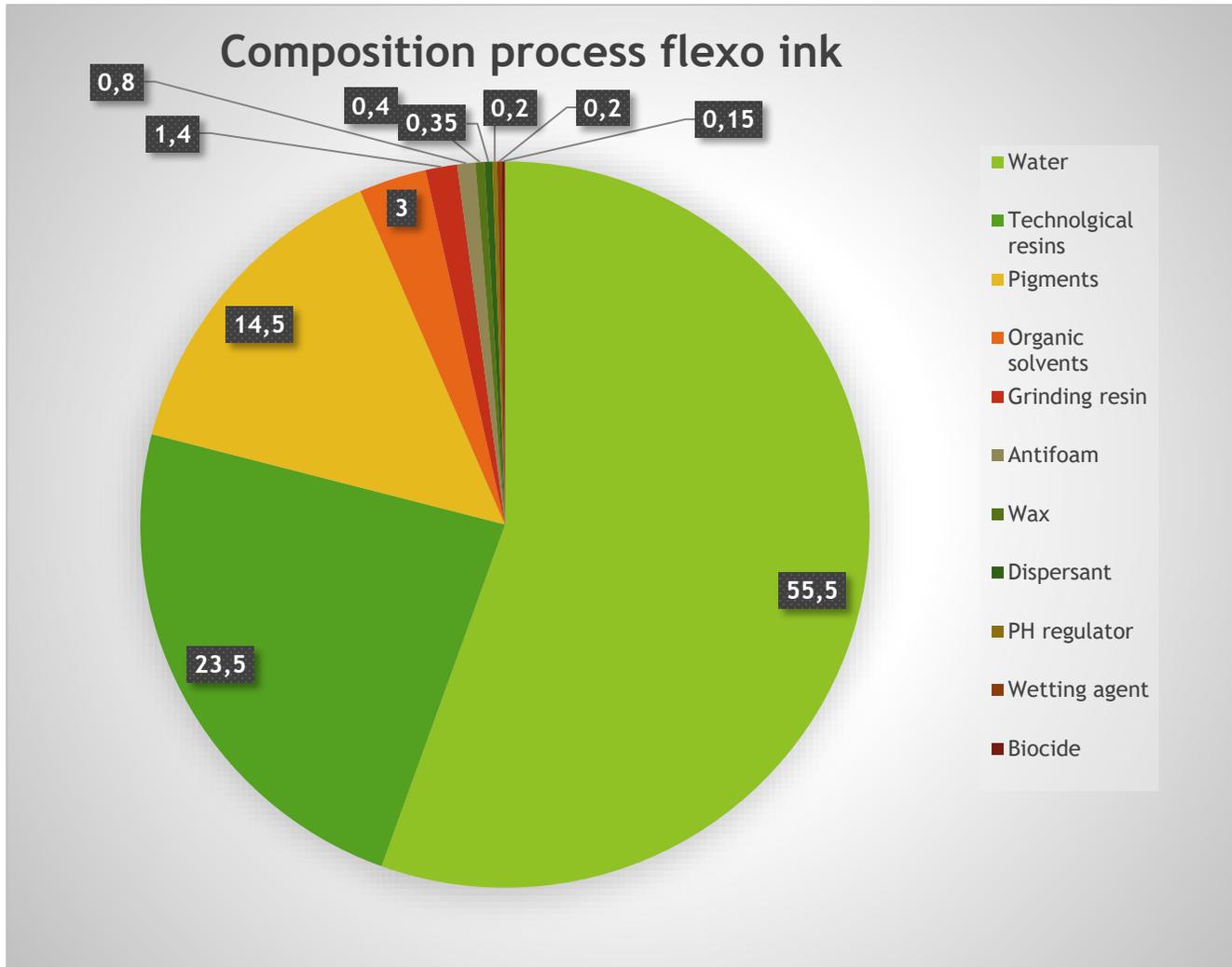
Table of contents

Compost water based ink optimization.

Development of a new bio-based ink.

Printing process validation.

Compost water based ink optimization



Compost water based ink optimization

Replacement of additives for others of renewable origin and suitable with the regulations of food packaging and with the same features of original raw material:

- Antifoam: easily dispersible and with high effectivity in a short, medium and long term, replaced by an additive obtained from vegetable oils.
- Wax: good sliding coefficients, non-foaming and no matting effect. Replaced by an product obtained of the carnauba palm or other vegetables sources.
- Wetting agents and dispersants: easily dispersible, non-foaming, compatible and with good rheology behavior. Replaced by additives synthesized from different plants: coconut, soya...
- Alcohol from the fermentation of starch or sugar.



Compost water based ink optimization

The optimization of Idrostar OK compost series has been done keeping the properties of original inks.

TECHNICAL SPECIFICATIONS

High pigment concentration
Excellent gloss.
Good rub resistance.
Good dry-rub resistance.
Good water resistance.
Good printability.

GENERAL PRINTING SPECIFICATIONS

Print viscosity: With rubber tapping roller (traditional inking system): 19-24" in Ford Cup 4.
In closed chamber with scraper: 23-28" in Ford Cup 4.
These viscosity values should be adjusted with the anilox specifications.

Print speed: Variable depending on the air flow available in the printing machine and drying temperature (minimum 55°C).

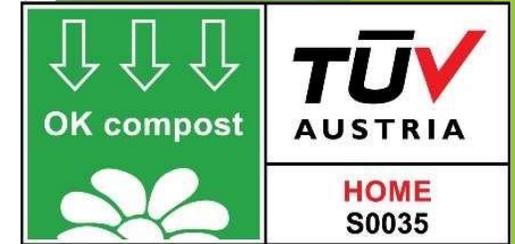


Compost water based ink optimization

IDROSTAR OK COMPOST Series

*“Series of water-based inks made of selected pigments and resins suitable for the FLEXOGRAPHIC printing of plastic films and quality papers. It is compliant with requirements for recyclable containers by composting and biodegradation according to the EN 13432 and NF T 51-800 standards and is **optimized with renewables additives.**”*

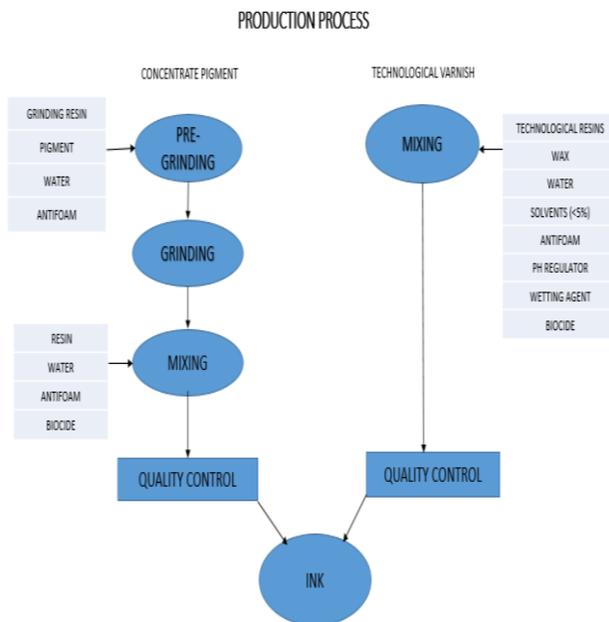
Our society is increasingly sensitive to the environment. The use of compostable packaging is one of the solutions that companies can give their products to satisfy consumers and enhance their corporate social responsibility. Brands as Amazon, Colgate, Alter Eco ... are replacing their traditional packaging and compostable inks are a good solution for the customization of new ones.



Development of a new bio-based ink

Goal: replace synthetic resins and organic pigments in the final ink achieving stability, printability, adhesion on the PHA substrate and good physical and chemical resistances.

The flowchart of the ink manufacturing process has two lines.



One line to produce pigment concentrates and other line to produce technological varnish. The development has been done in both types of products.

Development of a new bio-based ink

Resins from different bio-based resources have been tested to formulate technological varnishes and pigment concentrates.

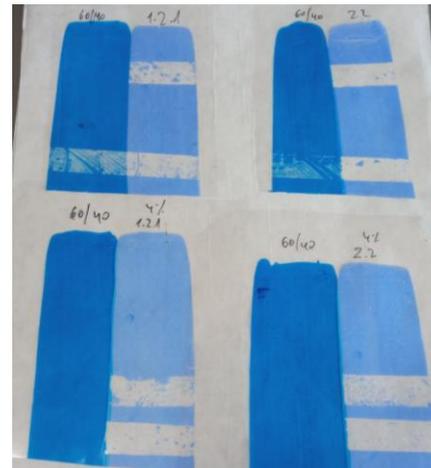
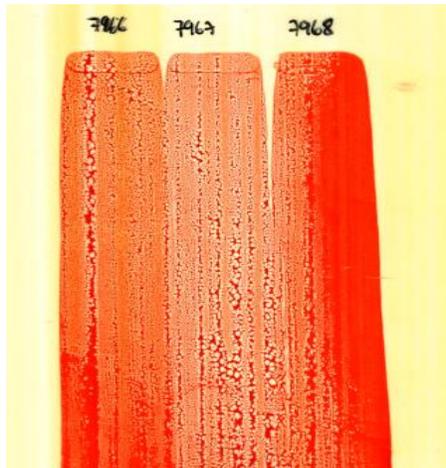
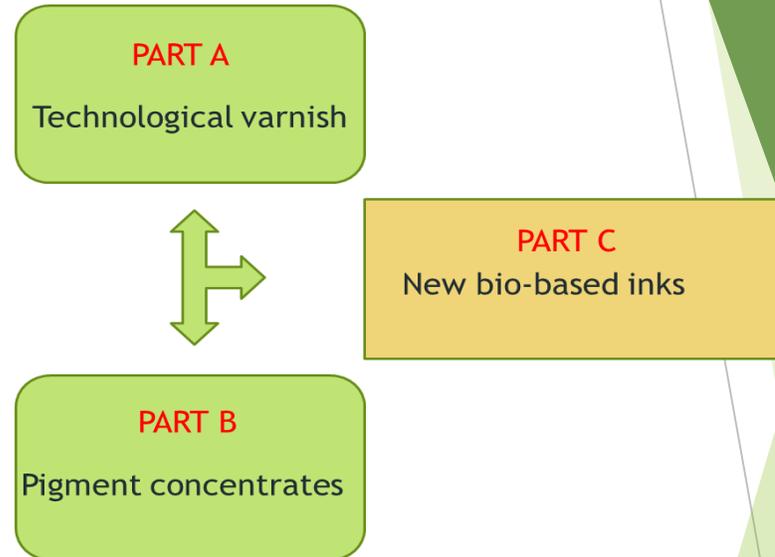
Soy protein
Milk protein
Rice starch
Rosin resins from wood
PU and acrylic from plant polyols
Polylactic acid emulsions
vinyl acetate



Development of a new bio-based ink

Challenges related to the new ink development

- Good stability.
- To have adhesion on PHA film.
- Get a good water resistance.
- The redissolution of ink.
- Achieve a good film formation.
- To avoid tacking or blocking.
- A reasonable cost.
- To incorporate products during all the project.



Development of a new bio-based ink

RNV TECHNOLOGICAL VARNISH

Water-based varnish for the manufacture of inks from FLEXIBAS single-pigment concentrates for flexographic printing on paper and film with corona treatment, formulated with 40% (in solids) renewable raw materials.

PRINTABLE MEDIA

Coated cardboard.
Wrapping paper in general.
Polyethylene.
Polypropylene bio.
PLA or PHA.

TECHNICAL SPECIFICATIONS

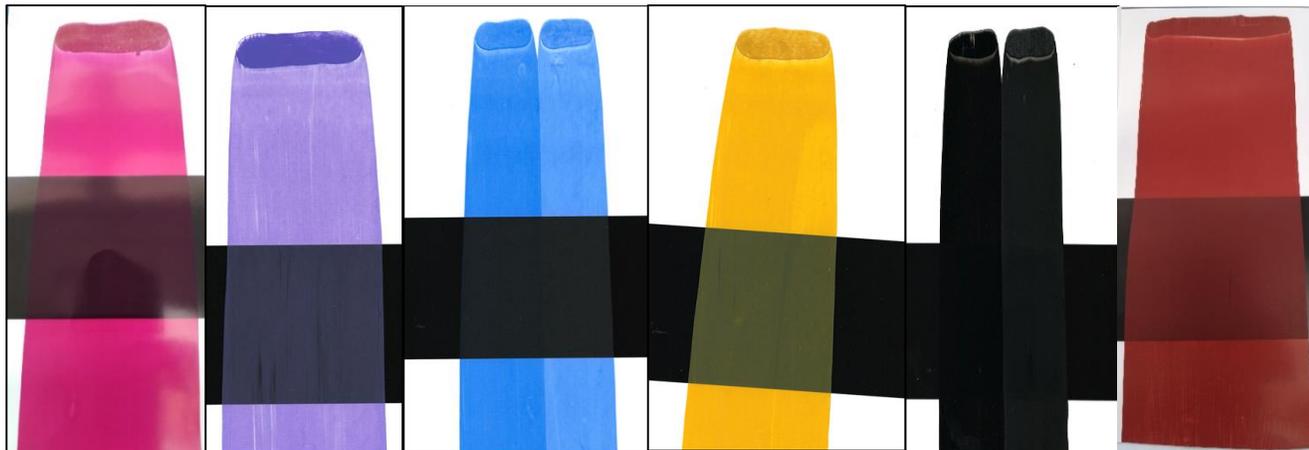
Excellent drying speed.
Good rub resistance.
Good gloss.
Good printability.



Development of a new bio-based ink

Organics pigments: among the standard pigments only the quinacridone pigment PR 122 is being produced with a renewable part by one manufacturer. Other renewable organics pigments (green chlorophylls, red, orange or yellows carotenoids..) are too expensive.

Inorganic pigments: only some of them comply with the European regulations on food packaging (10/2011) and with short range of colours.



Development of a new bio-based ink



By mixing the technological varnish and inorganics pigments concentrates (yellow, red, black, blue and white) we has obtained a new series of ink (IDROSTAR RNV) that supposes an advance in the market.

With these inks the reduction of raw materials obtained from petroleum is comprised between 15% for the white that was already manufactured with inorganic pigments up to 40% for the inks with high color intensity.

Printing process validation

The results in laboratory test are good and seem to be reproducible on the printing press. An industrial test is ongoing for verifying the stability in the printing machine and the quality of printings.



Thanks for your attention