

JOINT EVENT ON

# 5<sup>th</sup> International Conference on Bioplastics and 6<sup>th</sup> World Congress on Biopolymers

September 07-09, 2017 | Paris, France

## Cosmetics, a new field of applications for the interpenetrating biopolymer network technology (IBPN technology®)

Michel Dana, Sandrine Peyrat, Laurie Verzeaux, David Boudier and Brigitte Closs  
SILAB, France

Interpenetrating Polymer Networks (IPN) have gained great attention in the last decades, mainly due to their biomedical applications. IPN present properties that can be very different according to the macromolecular constituents and that can be tailored by the process. Currently, IPN are composed of chemical polymers or cross-linked by using chemicals. Our study aimed to develop an IPN based on natural polymers which are chemical free to obtain a biopolymer-based film with “second skin” properties, biosourced, biodegradable and in accordance with the requirements of the cosmetic industry. For this purpose, we studied the influence of different natural polysaccharides molecular mass and their ratio but also the natures and concentration of the cross linker on the IPN properties, in the manufacturing process. This approach led to the development of the eco-designed and patented IBPN technology® (Interpenetrating BioPolymer Network). The resulting material is composed of a galactomannans network from *Caesalpinia spinosa* and of a sulfated galactans network from *Kappaphycus alvarezii* ionically crosslinked. Thermodynamic analyses by DSC (Differential Scanning Calorimetry) and DMA (Dynamic Mechanical Analyses) associated with visualization by AFM (Atomic Force Microscopy) and SEM (Scanning Electronic Microscopy) revealed the physical-IPN organization of the obtained material. Applied to the skin, this natural physical-IPN forms a “second-skin” film since it protects against mechanical aggressions (-14%,  $P < 0.05$ ), pollutants (-47%,  $P < 0.001$ ) and irritants (-22%). In conclusion, the resulting biopolymer-based film has outstanding “second skin” properties. It is biodegradable and perfectly suitable to the cosmetic industry requirements. The sourcing of the two plants used for its production is sustainable. This study demonstrates the interest of the interpenetrating biopolymer network technology for new promising applications.

### Biography

Michel Dana defended his PhD in Organic Chemistry at the University of Bordeaux I in 1996. He works at SILAB since 1997 and is now Manager of the new technology platform.

[l.verzeaux@silab.fr](mailto:l.verzeaux@silab.fr)

### Notes: