# ADVANCEMENTS IN SUSTAINABLE BINDER TECHNOLOGY FOR COMPOSITE WOOD PANEL APPLICATIONS

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## Abstract

Increasingly consumers in Europe and North America are demanding reduction and elimination of formaldehyde from domestic and industrial products. Governments and regulators are responding with increasingly stringent demands on its emissions, as seen in Carb2 and the new EPA regulations on formaldehyde emissions from composite panels. Industry is responding to this as required, or on a voluntary basis, in anticipation of further restrictions. Composite board manufacturers have long been seeking an alternative to formaldehyde. However, most alternatives have failed to meet all their criteria, including availability, price stability, uniformity of properties and batch to batch or year-to-year variability in performance.

A new solution now makes it possible to produce next generation composite boards using bio-based adhesives that deliver the required technical performance and simultaneously deliver cost neutrality vs incumbent Formaldehyde based resin systems. EcoSynthetix, and its technical partner Chimar, have combined over 40 years of dedicated application experience with modern bio-binder expertise. They have developed high performance products that deliver the industry's lowest emitting boards.

In this presentation the concept of engineered bio-polymers is presented in detail and the production procedure, from raw material to product is described. The final products, as well as the raw materials, are characterized and their properties are discussed using examples ranging in scale from lab to full

industrial trial in oriented strand board (OSB), medium density fiberboard (MDF & HDF) and particleboard applications.

In addition, the effectiveness of the emulsification system with Polymeric Methylene Diphenylene Diisocyanate (pMDI) is discussed, along with the economics of the solution. Demonstration of the macro-level benefits enabling the use of pMDI within the emulsified system to produce NAF panels such as improved machinability, reduction of process build-up, reduction in release agent required, increase pot life of resonated fiber and

reuse of MDF refiner water will be reviewed.

Last but not least an estimation regarding the future demand and supply of biopolymers is presented together with a forecast depicting a future less dependent on fossil based toxic chemicals and enjoying the benefits green chemistry can finally deliver at no added cost.