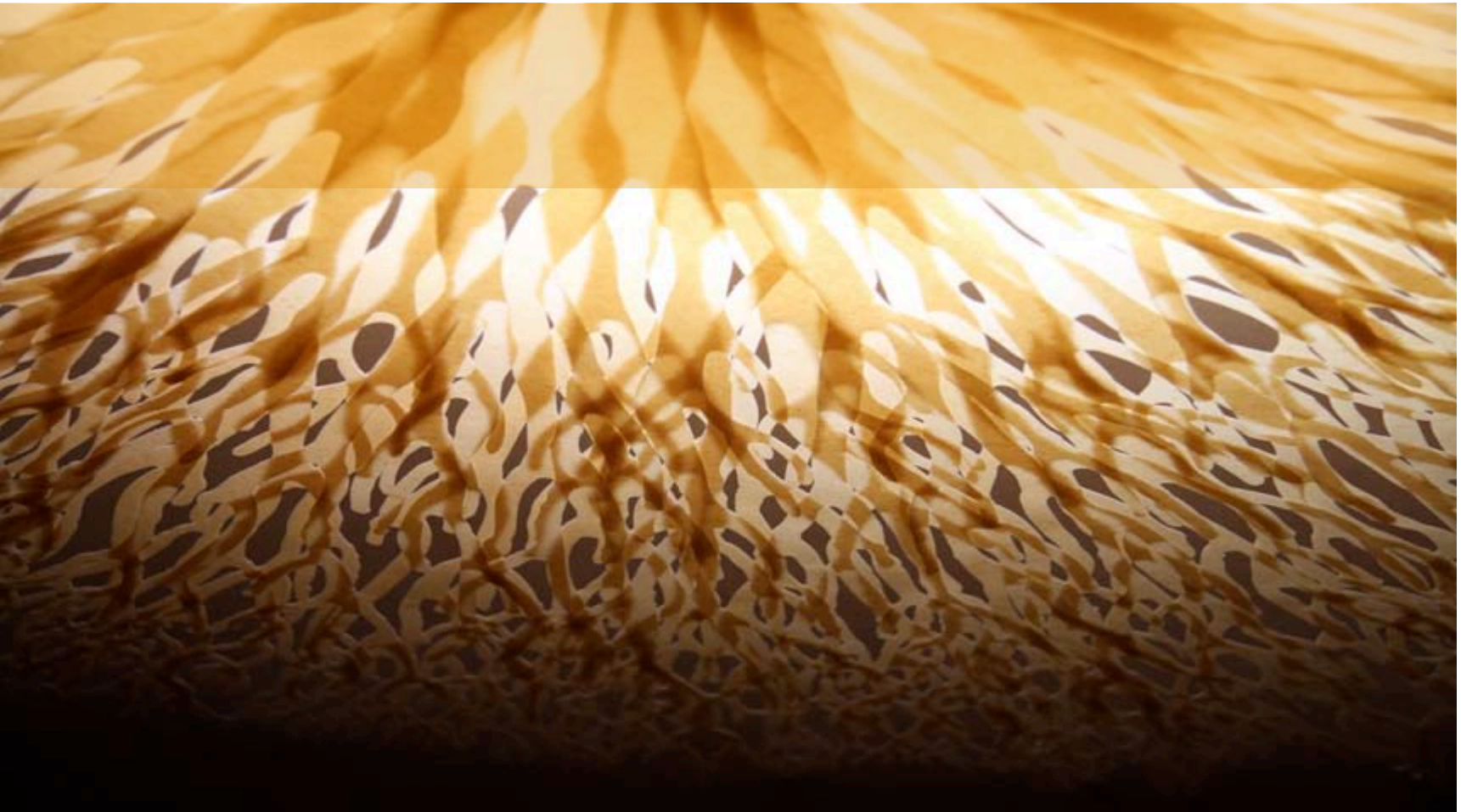


# Overview Of Biopolymer Network & Research :

20<sup>th</sup> October, 2011



# Biopolymer Network Ltd



Plant & Food  
RESEARCH  
RANGAHAU AHUMĀRA KAI

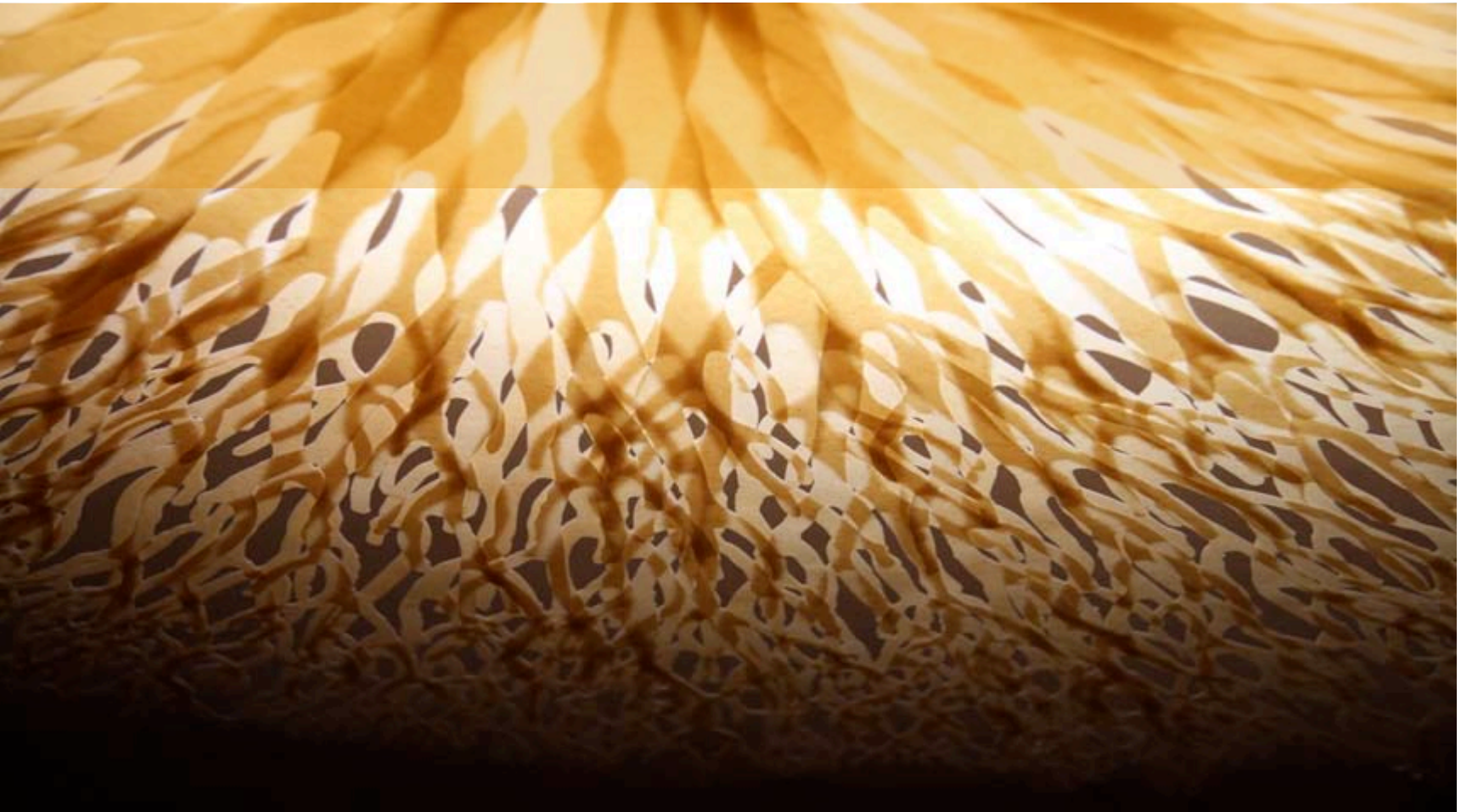


- **Established: 2004**
- **Research & Technology Focus**
  - NZ Natural Extracts & their Biopolymer Products
    - ***plastics-coatings-cosmetics***
    - ultrafine starches ; functional proteins
    - tannin polyphenols
  - Non-wood Natural Fibres & Biocomposites
  - Thermoset Biobased Resins
  - Biofoam Technologies



## Example Developments: Biopolymer Network

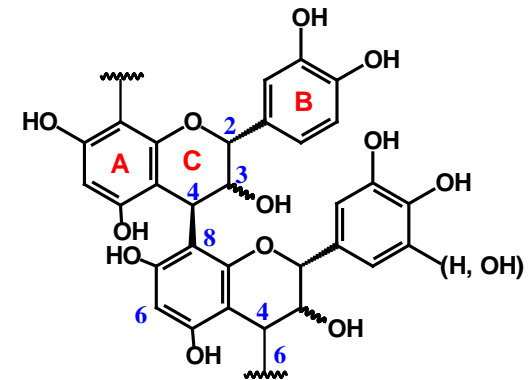
20<sup>th</sup> October, 2011



# Tannins: Functional Additives/Resins



- **Bark Extraction, Fractionation, Derivatisation**
- **Characterisation & Functionality Testing**
  - *antioxidant, UV stabiliser, anti-microbial, ...*
  - *plasticisers, crosslinkers, flame retardants,...*
- **Pilot Plant Extraction & Drying**
- **Processing, Formulation, Dispersion**
- Resins & composites
- Personal care (cosmetics), plastics, coatings,



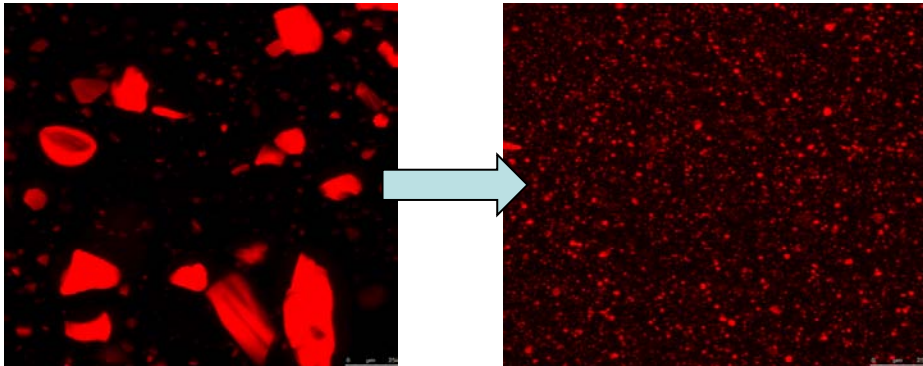
# Natural Bioactives/Extractives in Plastics (BPN + Scion)

Flame Retardant  
Heat Resistant  
Melt Strength  
Chain Extender  
Plasticiser  
Impact Modifier  
Compatibiliser



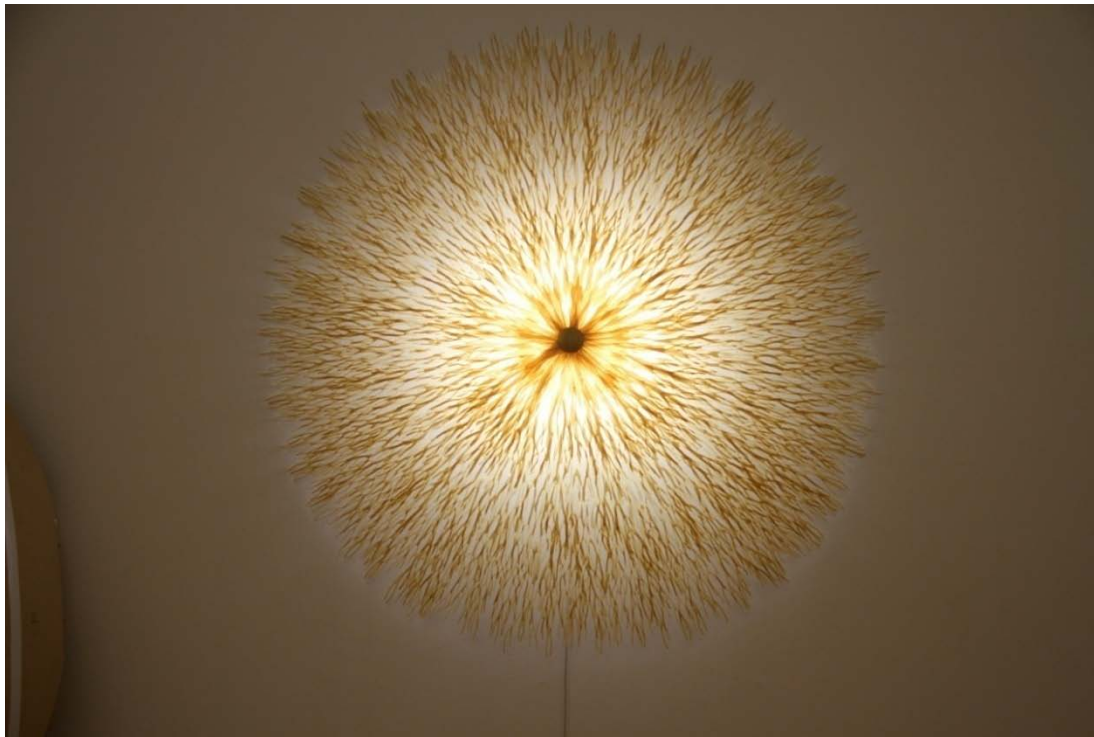
Anti-microbial  
Anti-fouling  
UV Protective  
Antioxidant  
Anti-corrosion

*Achieving good compatibility, dispersion & interactions are critical for good all-round performance in plastics*



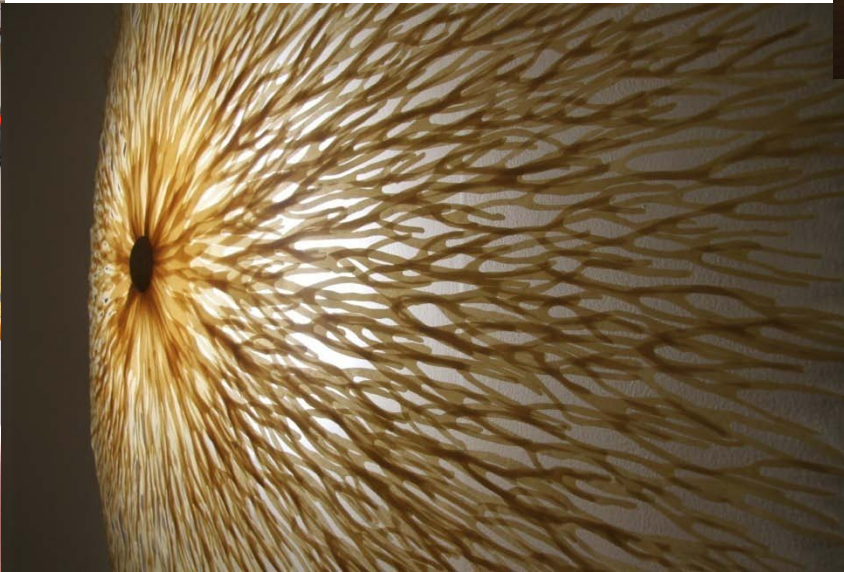
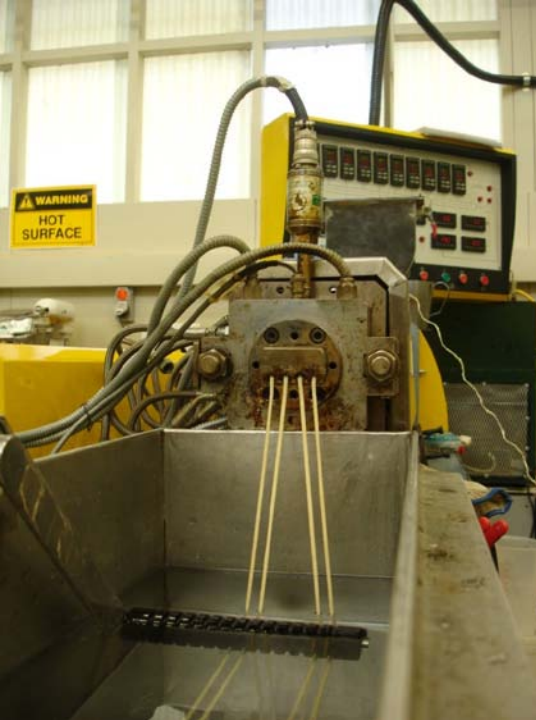
# Novel Hot-Strength PLA Film *plus NZ harakeke fibre*

*joint development with David Trubridge Ltd*



*This lamp design, named Tipu, stands two metres in diameter. It was unveiled at the prestigious Hawke's Bay Invitational Art Exhibition and sold on the first night.*





  
**Biopolymer**  
NETWORK

**SCION**   
forests · products · innovation

# Other Harakeke/Natural Fibre Composite Products



# Expanded PLA (E-PLA) Biopolymer Foam Technology

## The Technology



*Expanded(E) - Polylactic Acid (PLA) Foams using CO<sub>2</sub>  
A sustainable alternative to EPS & other foams*

### Research

- Foaming of biopolymers & fibre-filled foams
- **CO<sub>2</sub> processing – bioplastics**
- **Impregnation & moulding of plastics with CO<sub>2</sub>**
- Properties of biopolymer foams
- Flame retardant PLA & PLA foams

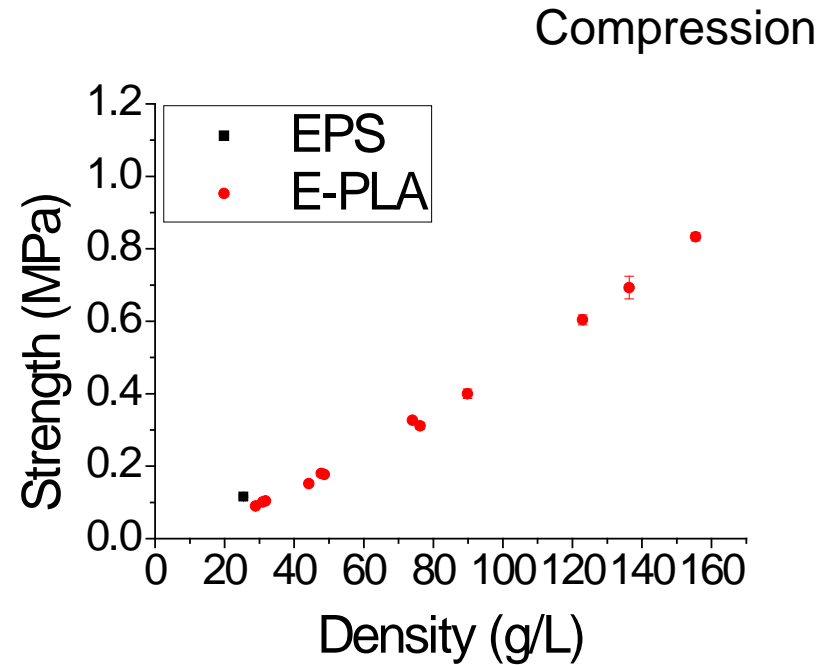
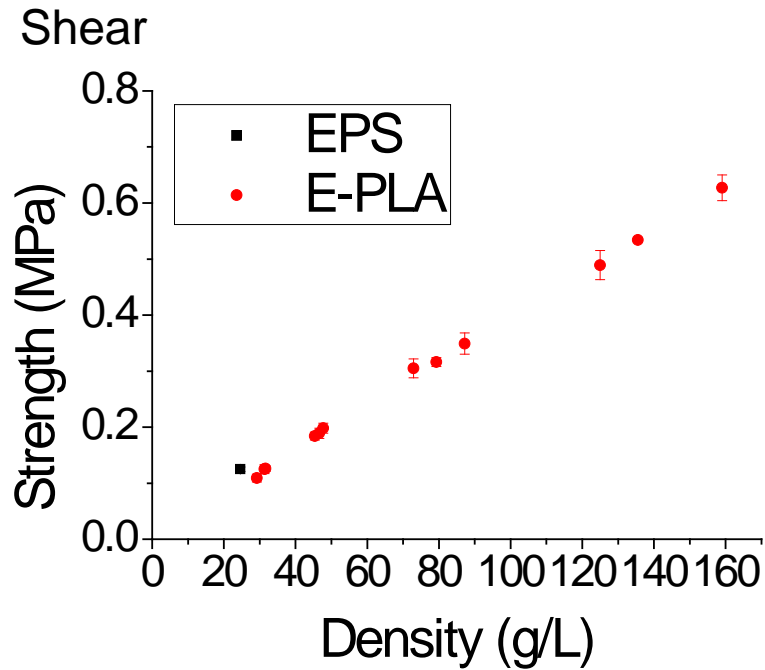


# E-PLA properties

- Excellent insulation properties
  - *can be used as insulation like EPS*

	Density (g/L)	Thermal conductivity (W/m.k)
EPS	~30	0.032
E-PLA	~30	0.032

# E-PLA : Shear, Compression, Cross-breaking



  
**Biopolymer**  
NETWORK

**SCION**   
forests · products · innovation

# Applications for our E-PLA

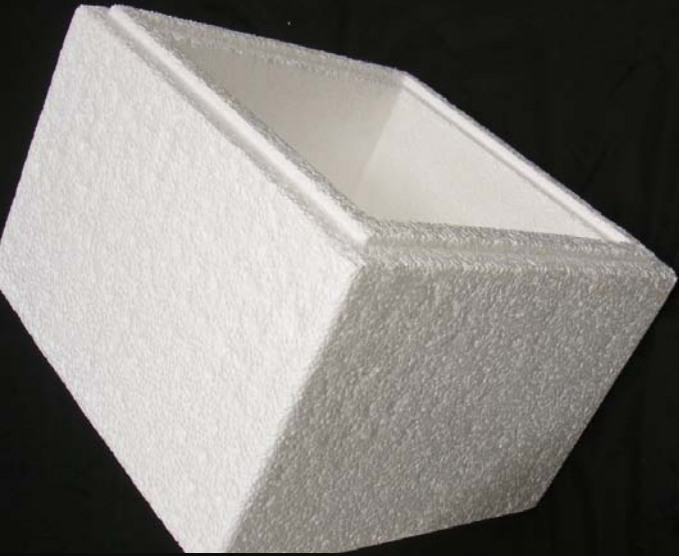
- Packaging
- Furniture
- Thermal and acoustic insulation
- Composites / structural insulation panels
- Biomedical
- Automotive
- Sporting goods
  
- Anywhere EPS **or other foams** are used!

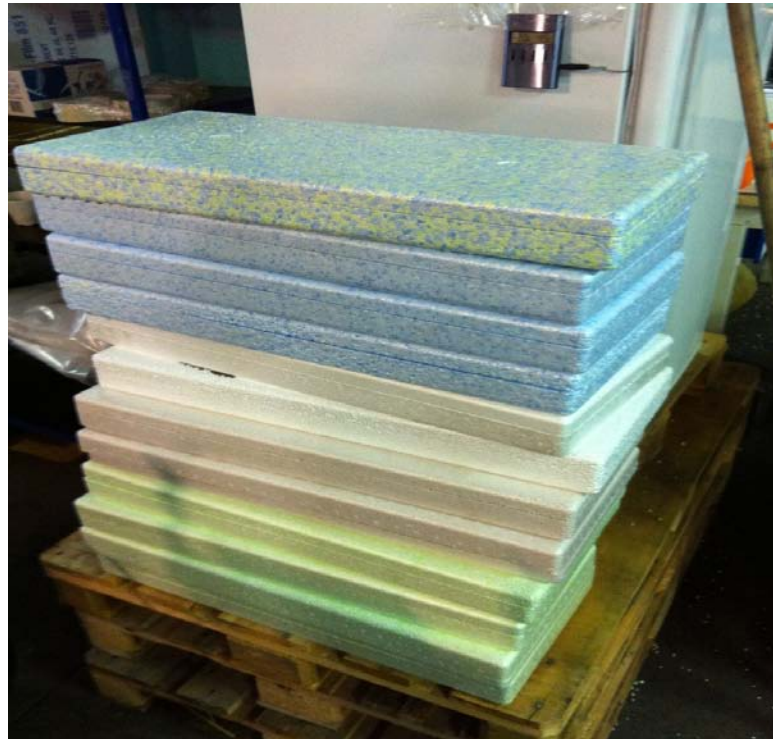
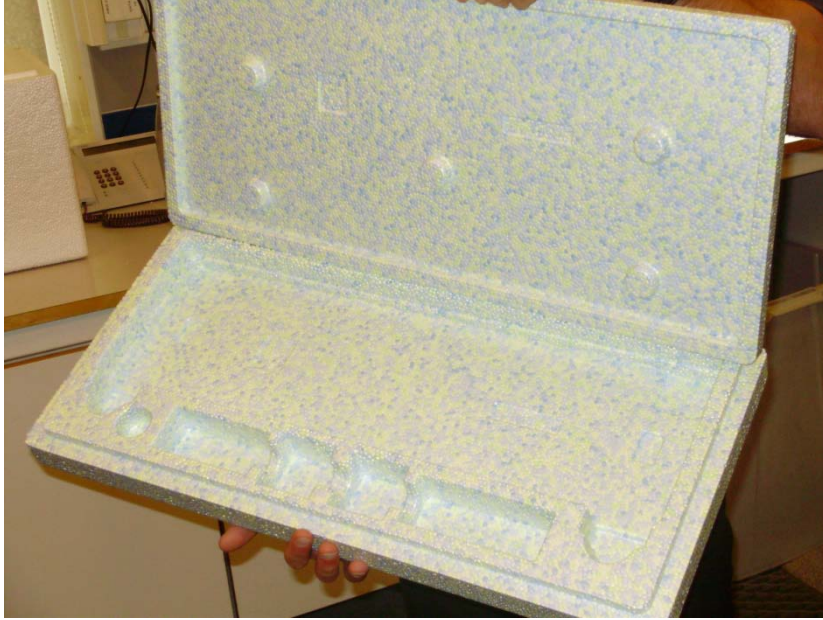


# Manufacturing Trials/Evaluations - NZ

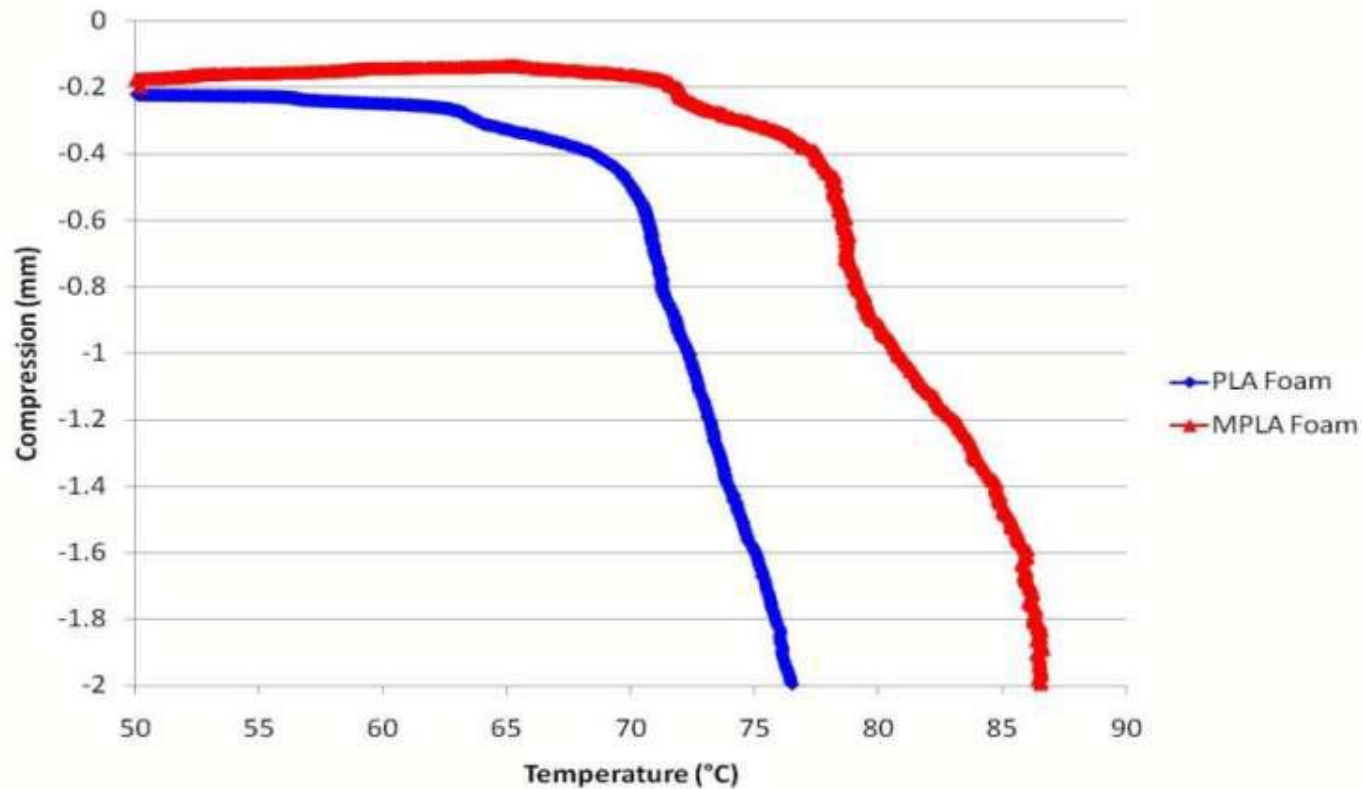


# Manufacturing Trials/Evaluations - Overseas





# E-PLA: Improved Heat Resistance



# Other Biopolymer Network Foam Technologies

- **PLA Foams**
  - Other CO<sub>2</sub> processes
  - Extrusion PLA foams
  - Reinforced PLA foams
  - Flame retardant
  - Heat resistant
- **Starch Foams**  
(with Potatopak/Plant& Food Res./BPN)
  - Water resistant
  - Reinforced
- **Phenolic Foams**
  - Biobased / Reinforced / Hybrids
- **Biopolyurethane Foams**



**Thank You**

