

Bio-Oil: Transforming Plant Waste into High-Performance Epoxy Modifiers

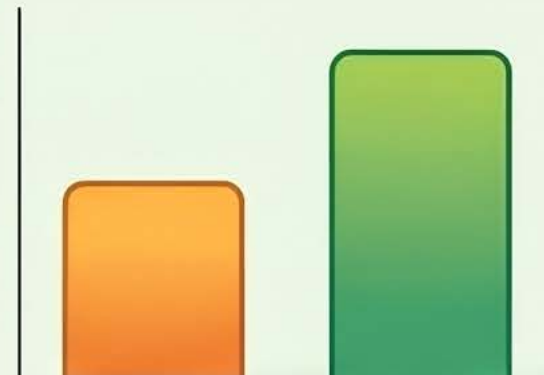
Valorising Agricultural Waste



Converts underutilised by-products from birch, sunflower, and forestry waste into high-value polymer modifiers.

PYROLYSIS BIO-OIL CONVERSION

SUPERIOR COMPRESSIVE PERFORMANCE



DBT-Modified Bio-Oil Modifiers

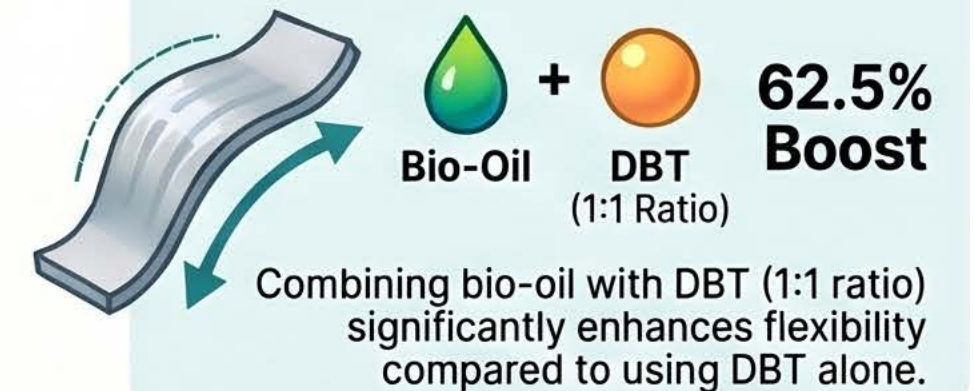
At 12.5 phr Loading Relative to DBT:
Compression: 11% – 39% Higher Strength
Tension: 84% – 97% Strength Retention
Bending: 73% – 97% Strength Retention

PERFORMANCE OPTIMISATION & SYNERGY



THE 12.5 phr "SWEET SPOT"
 Optimal mechanical strength across all loading types is achieved at 12.5 parts per hundred resin.

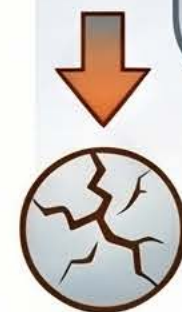
SYNERGY: 62.5% BOOST IN BENDING STRAIN



BIO-OIL PERFORMANCE vs. INDUSTRIAL PLASTICISERS

TRADITIONAL DBT (Dibutyl Phthalate)

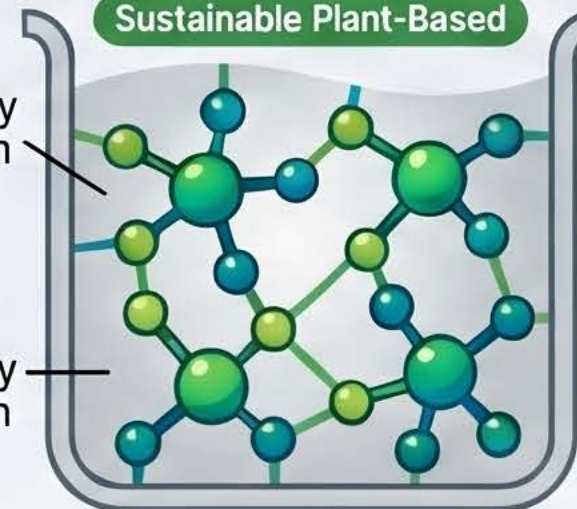
Fossil-Fuel-Based



Acts only as a diluent, no chemical bonding.

BIO-OIL MODIFIER (Pyrolysis Bio-Oil)

Sustainable Plant-Based



Bio-oil chemically bonds to the epoxy matrix.

MIXED WOOD (BO_M) ADVANTAGE



Bio-oil from mixed wood feedstocks provides the most balanced overall mechanical characteristics.