Bio-based Synthesis of Resveratrol Analogues

Resveratrol and its analogues have received considerable attention due to their diverse biological effects that include chemoprotection, anti-oxidant, anti-inflammatory, anti-diabetic, anti-thrombotic, cancer prevention and anti-aging properties. For instance, 4,4′-dihydroxy-trans-stilbene was reported to prevent cancer invasion and metastasis and has a four-fold higher antioxidant capacity than resveratrol.

The bio-based ferulic acid, cumaric acid, sinapinic acid and caffeic acids are abundant in lignocellulosic biomass. This technology offers a collaboration to convert these inexpensive starting materials into analogues of the natural antioxidant resveratrol which are very promising constituents for lubricants, cosmetics, health products and polymer packaging.

Potential Applications

This technology is applicable in the following industries:

Medical
- Anti-Aging
- Anti-Inflammation
- Anti-Diabetic
- Anti-Thrombotic
- Cancer Prevention

Food/Feed
- High capacity anti-oxidants

Cosmetics
- Oxidative protection
- Lubricants

Customer Benefits
- New derivatives of resveratrol can be synthesised
- Bio-based starting materials
- Two-step one-pot reaction with >90% isolated yield
- Co-development opportunities available

Technology Features & Specifications

A new reaction cascade converts this inexpensive starting material into highly valuable bio-based oxidants that are classified as symmetric stilbene derivatives. This technology consists of a series of proprietary steps to prepare and functionalize the polymer with a nanolayer of conductive molecules. The reaction combines an enzymatic decarboxylation with a subsequent metathesis reaction in a two-steps-one-pot process.

The starting material can be obtained from renewable sources such as fermentable sugars. The technology also paves the way for further research opportunities such as glycolysation of the novel antioxidant derivatives to improve its bioavailability and metabolic engineering of microorganisms such as yeast to produce antioxidants from fermentable sugars.

Market Trends and Opportunities

Resveratrol has been linked to a higher lifespan in yeast and subsequent similar findings in worms, insects, fish and mammals the world-market continuously grew. Biotechnological production of highly potent resveratrol derivatives exhibiting higher antioxidative capacity than basic resveratrol is therefore an exciting new opportunity for companies. Feedstock is obtained from renewable sources and enzymatic decarboxylation is easily scalable.

For more information on technologies we have to offer, please visit our website at https://www.ipi-singapore.org or enquire at techscout@www.ipi-singapore.org