

## **BIOCHEM show case**

# **Develop a more cost-effective route to PDO**

## **Problem**

Poly(trimethylene terephthalate) (PPT) is a polymer with very useful properties. As a textile fibre it has excellent softness, stretch and recovery. As a resin it has excellent barrier properties. Developed over 60 years ago, PPT has not been very widely used compared to poly(ethylene terephthalate) (PET) as one of the key monomers 1,3-propanediol (PDO) was expensive.

## **Technical solution**

DuPont has developed a new bio-based source of PDO for its Sorona™ range of PTT. Working with Genencor, they have engineered metabolic pathways from wild organisms into a commercial host to produce PDO from glucose. Genes from a yeast that can convert glucose to glycerol, and genes from a bacterium that converts glycerol to PDO were used. The pathways of the host were also altered to maximize production of PDO and minimise production of biomass.

## **Benefits**

- Production of a commercial monomer from cornstarch
- Replacement of renewable feedstocks for petrochemical feedstocks
- Lower environmental impact of the process
- Lower cost
- Reduced energy consumption: DuPont's 45 ktpa plant uses 40% less energy than petrochemical production of PDO.

## **Further information**

DuPont website

<http://www2.dupont.com/biosciences/en-us/sorona/dupont-sorona.html>

EPA Presidential Green Chemistry - 2003 Greener reaction conditions

<http://www.epa.gov/greenchemistry/pubs/pgcc/winners/grca03.html>