Bacterium for conversion of plant biomass waste into valuable chemicals

Spanish National Centre for Biotechnology (CNB) are developing strains of robust stress-resistant and safe (GRAS-certified) bacterium *Pseudomonas putida* KT2440 that are able to utilize plant biomass-derived sugars – glucose, cellobiose, and xylose – and convert them into valuable bioplastics, polyhydroxyalkanoates (PHA), and platform chemical xylonate. Xylonate can be used as a complexing agent, chelator, or a precursor for co-polyamides, polyesters, hydrogels, 1,2,4-butanetriol, ethylene glycol or glycolate, and may also provide a cheap, non-food derived alternative for D-gluconic acid, which is widely used (about 80 kton/year) in industry.

Partners from the food, chemical, and pharmaceutical industries are being sought to collaborate on further stages of the biotechnology development through a patent licence agreement.

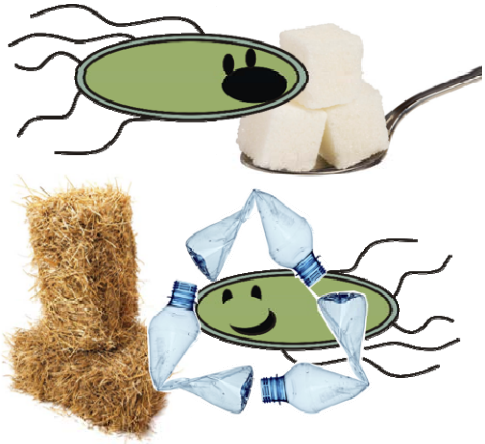
An offer for Patent Licensing

We make environmental bacterium convert trash to treasures

P. putida KT2440 is a safe soil bacterium which is drawing attention of biotech community for its high stress tolerance, low nutritional demand, versatile metabolism, and ability to degrade lignin.

Team of prof. de Lorenzo from CNB-CSIC has prepared new *P. putida* strains with improved physiological properties and expanded substrate scope, capable of co-utilisation and valorization of major sugars from non-food derived plant biomass.

P. putida becomes the first microbial host capable of biotechnological processing of and adding value to all three lignocellulose-derived fractions (cellulose, hemicellulose, lignin).



We teach *Pseudomonas putida* to eat plant biomass-derived sugars and convert them into valuable chemicals.

Main innovations and advantages

- Engineered strains with reduced genome show better physiological vigour, higher ATP and NADPH availability, higher resistance to oxidative stress, and more stable heterologous gene expression when compared with wild-type *P. putida*.
- New *P. putida* strain EM42β grows rapidly on cellobiose, converts this sugar into PHA and, in addition, oxidizes xylose to xylonate. Thus, two desirable bioproducts are obtained in parallel.
- Xylonate is also produced from xylose with high yield (up to 0.97 g g^{-1}) by non-growing *P. putida* whole cells which can be recycled to reduce process cost.
- Engineered *P. putida* strain which can co-utilize xylose with glucose and cellobiose is already available and new strains that can co-utilize multiple plant biomass-derived sugars and convert them into valuable chemicals are under development.

Patent Status

PCT patent application filed

For more information, please contact:

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