## Focal Point & the Purpose of Innovation

# Production of biobutanediol

2,3-Butanediol is a versatile bulk chemical with huge market of ~-320 billion USD- (source: Market publishers 2012) owing to its wide application in the manufacture of printing inks, perfumes, fumigants, moistening and softening agents, explosives, plasticizers, foods, pharmaceuticals etc. Currently it is derived from crude oil fractionation but due to increasing crude oil prices, the price hike for 2,3-BDO is indispensible. Thus, there is an emergent need to search for an alternate resource for making 2,3-BDO. Lignocellulosic biomass is an attractive feedstock for 2,3-BDO industry since it is available at low cost, abundant and renewable.

Therefore, we have optimized fermentation conditions for high level production of 2,3-butanediol from *Paenibacillus* sp. ICGEB2008 using lignocellulosic biomass as substrate. The pH optimization experiment indicated the highest production of 2,3-butanediol at pH 6.3. The media optimization was done using response surface methodology. The optimized media was then used to grow *Paenibacillus* sp. using alkali-treated hydrolysate as substrate and it was shown to completely utilize all the sugars present in hydrolysate. Moreover, when compared with complex media, the optimized media didn't affected the productivity and yield to a great extent. To make the overall process of cellulosic butanediol production cost-effective, we have also replaced yeast extract with corn-steep liquor. With all these optimizations, butanediol yield was obtained to be 0.33g/g.

## Graphical Description

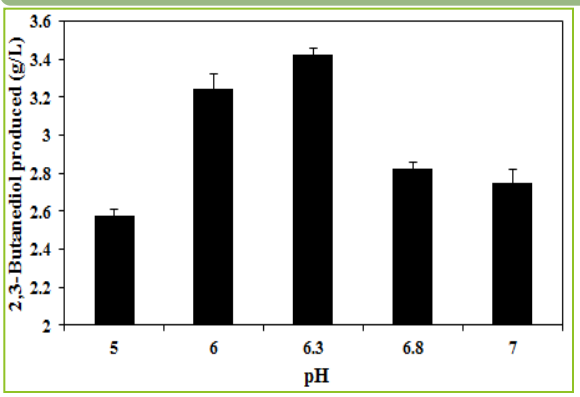


**Figure 1**: pH optimization for the production of 2,3-butanediol

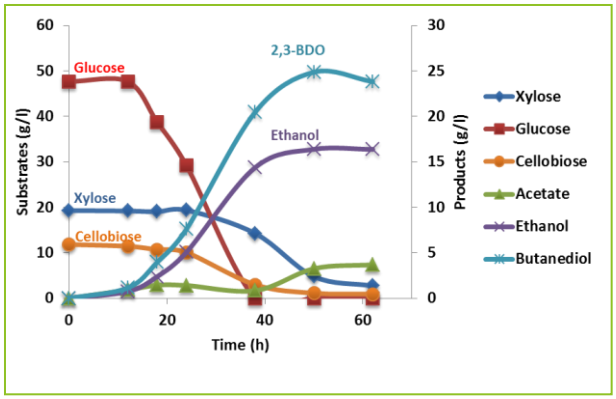


**Figure 2**: Fermentation in optimized media, with hydrolysate as substrate, for 2,3-butanediol

## Exploitable Technology

The lab scale fermentation technology is now ready to be *provisionally patented* and further upscaled industrially to meet the energy needs of human beings.

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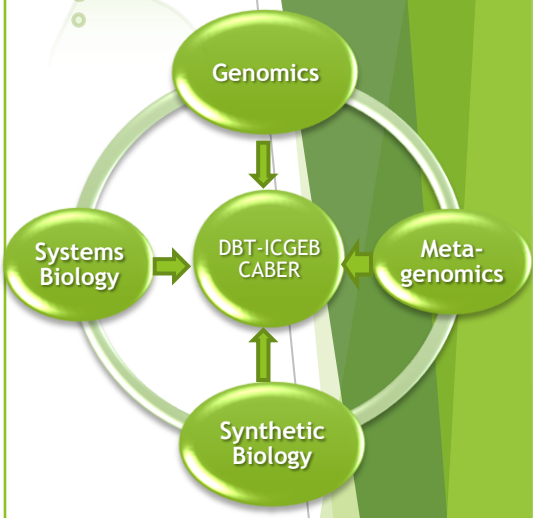



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