Richcore Lifesciences

INTEGRATED ENZYME PRODUCTION STRATEGIES FOR LOWERING THE COST OF CELLULOSIC ETHANOL

Delhi 7th March 2018
The Company...

**Integrated biotech**
- Research Driven
- Bio-Manufacturing Organization

**Products**
- Enzymes & Recombinant proteins

**130+ team based in Bangalore**
- Over 40% of personnel in R&D
Solving the right problem

- Biomass Aggregation
- Pretreatment
- Enzyme Hydrolysis
- fermentation
- Distillation
- Effluent management
Knowing enzymes
Harnessing the power of Genetic Engineering and Fermentation

Yeast → Modified yeast/microorganism

Fermentation

CO₂ and Alcohol

Gene of interest + Vector → rDNA

Modified yeast/microorganism

Fermentation

CO₂ and Protein/Enzyme
Typical enzyme manufacturing process

Key Cost Drivers

- Upstream productivity
- Downstream losses
- Packaging and transport
Parallels: 2G Enzymes & 2G Ethanol

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<thead>
<tr>
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<th>2G Ethanol</th>
<th>2G Enzymes</th>
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<tbody>
<tr>
<td>Method of production</td>
<td>Fermentation</td>
<td>Fermentation</td>
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<tr>
<td>Fermentation raw material</td>
<td>Sugars</td>
<td>Sugars</td>
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A 2G Ethanol Plant is best positioned to produce the lowest cost enzymes
Enzyme Industry

**Traditional Business Model**

- Hub and Spoke Model
  - Higher down-streaming costs
  - Additional transportation cost

**Optimized Business Model**

- Integrated Model
  - NO down-streaming costs
  - NO transportation cost
Harnessing the power of Integrated Enzyme Fermentation

Thank you
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