MICROBIAL RENNET for Cheese Production

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Project Leader
BIOTECH Microbial Rennet

• an effective milk coagulant produced by solid substrate fermentation using the fungus *Rhizopus chinensis* BIOTECH 3273

• developed by the National Institute of Molecular Biology and Biotechnology (BIOTECH) through funding from DOST and DA-BIOTECH.

• The product is a better substitute for traditionally produced animal rennet.

• It has been found to be better than imported rennet in terms of quality and volume of cheese produced
• Extract from animal abomasum
  ❖ Rennet from milk fed calf
    > Chymosin or rennin - 95%
    > Pepsin - 5%
  ❖ Rennet from older cows, sheep, carabao, etc
    > Chymosin – 5%
    > Pepsin – 95%

• Imported rennet
• Acid

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Weight (kg)</th>
<th>Trade Value (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>52,920.00</td>
<td>476,268.00</td>
</tr>
<tr>
<td>2008</td>
<td>33,681.00</td>
<td>369,758.00</td>
</tr>
<tr>
<td>2009</td>
<td>49,496.00</td>
<td>947,640.00</td>
</tr>
<tr>
<td>2010</td>
<td>45,365.67</td>
<td>868,752.52</td>
</tr>
</tbody>
</table>

Source: Based on United Nations Commodity Trade Statistics Database, 2007-2010
## BIOTECH RENNEN

<table>
<thead>
<tr>
<th>Product</th>
<th>Liquid</th>
<th>Granule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>60 IMCU</td>
<td>100 IMCU</td>
</tr>
<tr>
<td>Application rate</td>
<td>10 ml/L milk</td>
<td>5 grams/L milk</td>
</tr>
<tr>
<td>Price</td>
<td>PhP 480/L</td>
<td>PhP 750/Kg</td>
</tr>
<tr>
<td>Shelflife</td>
<td>5 months</td>
<td>1 year</td>
</tr>
<tr>
<td>Present Production</td>
<td>60 L/mo</td>
<td>30Kg/mo</td>
</tr>
</tbody>
</table>

- Projected annual demand: 43 tons
- PCIEERD project: Scale up target production is 20% of the total demand
- Technology adaptors/taker: PCC & Aust Phil Foods
Milk coagulant being used by local dairy processors and multinational companies compared to BIOTECH microbial rennet

<table>
<thead>
<tr>
<th></th>
<th>Cost of coagulant per 100 L milk</th>
<th>% Cheese Yield</th>
<th>Production Cost of Cheese/100 grams</th>
<th>Net benefit /100L milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Rennet*</td>
<td>700.00</td>
<td>18</td>
<td>20.53</td>
<td>5,305.00</td>
</tr>
<tr>
<td>Chymax**</td>
<td>56.00</td>
<td>18</td>
<td>16.95</td>
<td>5,949.00</td>
</tr>
<tr>
<td>Vinegar***</td>
<td>250.00</td>
<td>10</td>
<td>32.86</td>
<td>1,714.38</td>
</tr>
<tr>
<td>BIOTECH rennet Granules</td>
<td>350.00</td>
<td>23</td>
<td>14.54</td>
<td>8,155.00</td>
</tr>
<tr>
<td>BIOTECH Liquid rennet</td>
<td>480.00</td>
<td>23</td>
<td>15.11</td>
<td>8,025.00</td>
</tr>
</tbody>
</table>

*Rennet extracted from 4\textsuperscript{th} stomach of ruminant (PhP 70/L)
**Commercial rennet produced by Pizer and distributed by Christian Hansen, recombinant rennet, (PhP 21,000 per Kilogram, 2080 IMCU/gram)
***Commonly used in the Visayas and Mindanao (PhP 25/L)
Market

The market for microbial rennet is attractive because there is still no local producer or dominant distributor serving the small to medium cheese manufacturers.

Positioning: The “best quality and most efficient cheese coagulant” in the market.

Price: P 480.00 per liter and P 750.00 per Kg – similar price as the imported rennet to emphasize the best product image, better quality of the product and its efficiency as cheese coagulant.
LOCATION MAP OF BIOTECH RENNET CLIENTS

Ms. Olivia Reside
Baguio City

Ms. Joan Peralta
5th District of Pangasinan Dairy Farm, Laoac, Pangasinan

Mr. Emmerson Mananghaya
Lin-Mer's Bakeshop, Tibag, Balitwag, Bulacan

Mr. Ynigo Geniza
3 Fontaine Extension, East Tapinac, Olongapo City, Zambales

Ms. Jane Cajuquiran
D64B Villa Regina F. Antonio St., Bambang, Pasig City

Mr. Walfrido de Jesus, Jr.
San Jose Street, Molo, Iloilo City

Mr. Marc Nacionesto
Julio Teresita St. Food & Beverages Enterprise, 4 Garcia Apt., PHBC B-22 L-29 Mandaluyong, Iloilo City

Waffle Time, Inc.
Iloilo

PURO ORGANIC
Sitio Aning, Barangay Pahancocoy, Bacolod City, Negros Occidental

Mr. Annette Patdu
A-Farm, Sta. Barbara, Tarlac

Mr. Jason Gavino
Nueva Ecija

Aust Phil Food Manufacturing Corp.
#180 10th Street corner 8th Avenue, Grace Park Caloocan City

Ms. Socote Cajidec
Quezon City

Mr. Lester S. Orue
129 Caimito Street, Cembo, Makati City

Mr. Norman Mercado
Bagumbayan Dairy, Bagumbayan, Sta. Cruz, Laguna

Mr. Rico Diaz
Cabuyao, Laguna

Mr. Oliver John Gomez
Putoh, Los Banos, Laguna

Ms. Julie Tan
Visayas State University, Baybay, Leyte

Ms. Jaques Daguerre
Triple j Cheese, 3 Purok Bucac, Bayugan, Agusan Del Sur

Ms. Sylvia Aguirbo
Xavier University, Cagayan De Oro
## Profitability Analysis

<table>
<thead>
<tr>
<th></th>
<th>Liquid Concentrate</th>
<th>Rennet Granules</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net Present Value (15% discount rate)</strong></td>
<td>1,624,560.92</td>
<td>1,534,580.72</td>
</tr>
<tr>
<td><strong>Total Investment</strong></td>
<td>1,702,825.79</td>
<td>4,492,624.72</td>
</tr>
<tr>
<td><strong>Selling Price</strong></td>
<td>480.00/ Li</td>
<td>750.00/ kg</td>
</tr>
<tr>
<td><strong>Break-even point</strong></td>
<td>8,770.84 Li</td>
<td>11,845.88, kg</td>
</tr>
<tr>
<td><strong>Profit margin</strong></td>
<td>194.15/Li</td>
<td>379.26/kg</td>
</tr>
<tr>
<td><strong>Break-even period (in year)</strong></td>
<td>1.5 years</td>
<td>1.5 years</td>
</tr>
<tr>
<td><strong>Average net income/year</strong></td>
<td>1,072,168.85</td>
<td>1,916,675.97</td>
</tr>
<tr>
<td><strong>Average return of Investment/year (%)</strong></td>
<td>62.96</td>
<td>42.66</td>
</tr>
</tbody>
</table>
Opportunity sites
Opportunity sites
Opportunity sites
Opportunity sites