HEVEA / GUAYULE
Latexes & Gloves

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CTTM
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CIRAD
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PIERCAN
wet characterization

Hydrophilic Polymer Shell

COOH

COOH

COOH

Hydrophobic Polymer Core

isolated particle

flocculated particles
### Wet Characterizations

<table>
<thead>
<tr>
<th></th>
<th>Commercial HEVEA Latex</th>
<th>Commercial GUAYULE Latex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Content (%)</td>
<td>61.4</td>
<td>55.6</td>
</tr>
<tr>
<td>Viscosity (Cp)</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>pH</td>
<td>9.6</td>
<td>10.9</td>
</tr>
<tr>
<td>Average Size (µm)</td>
<td>1.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>

**Similar wet characteristics**

![Graph 1](image1.png)  
![Graph 2](image2.png)
dry characterizations

drying procedure:
• 2 week at ambient condition
• 2h at 110°C

1. concentration
2. deformation
3. coalescence

No additive, no vulcanisation
dry characterizations : great strain

- HEVEA film behaves like a “thermoset” polymer
- GUAYULE film behaves like a “thermoplastic” polymer
dry characterizations: linear domain

- HEVEA film behaves like a “solid” film as far as 200°C
- GUAYULE film behaves like a “liquid” film since 100°C

⇒ Very different dry characteristics
gloves production

1. coagulant surface treatment
2. latex surface coagulation
3. compaction

Coagulant surface treated

free particle

coagulated particle

surface coagulation process

with additives and vulcanisation
gloves production

quality progress after formulation and process adaptations
gloves production: quantitative evaluations

<table>
<thead>
<tr>
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<th>commercial HEVEA latex</th>
<th>commercial GUAYULE latex</th>
<th>EU-PEARLS GUAYULE light phase latex</th>
<th>EU-PEARLS GUAYULE heavy phase latex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid content (%)</td>
<td>61.4</td>
<td>55.6</td>
<td>37.7</td>
<td>15.5</td>
</tr>
<tr>
<td>Sleeve thickness (mm)</td>
<td>0.32</td>
<td>0.28</td>
<td>0.14</td>
<td>-</td>
</tr>
<tr>
<td>Hand thickness (mm)</td>
<td>0.37</td>
<td>0.31</td>
<td>0.14</td>
<td>-</td>
</tr>
</tbody>
</table>

GUAYULE gloves thickness ≈ HEVEA gloves thickness are equivalent if solid content are the same
**gloves production : qualitative evaluations**

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</tr>
</thead>
<tbody>
<tr>
<td>Vulcanising dispersion ratio</td>
<td>27</td>
<td>54</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Stress at break (Mpa)</td>
<td>17</td>
<td>7.0</td>
<td>13.3</td>
<td>-</td>
</tr>
<tr>
<td>Strain at break (%)</td>
<td>810</td>
<td>860</td>
<td>808</td>
<td>-</td>
</tr>
</tbody>
</table>

→ GUAYULE and HEVEA gloves mechanical properties are similar after slight formulation and process adaptations
CONCLUSIONS

- wet characterizations: HEVEA and GUAYULE latex are very similar

- dry characterizations:
  HEVEA latex gives “solid” film and GUAYULE latex “liquid” film

- gloves production: process behaviors are similar

- gloves characterizations:
  slight formulation and process adaptations bring to similar mechanical properties