International Textile Manufacturers Federation (ITMF)
International Cotton Committee on Testing Methods (ICCTM)
Stickiness WG

Introduction

GOURLOT Jean-Paul
Bremen, March 2010

CIRAD UPR102
Laboratoire de Technologie et de Caractérisation des fibres naturelles
Agenda of the ITMF meeting
Stickiness WG/TF

**Gourlot** J.-P., CIRAD
Introduction, bibliography and latest information

**Gozé** E., CIRAD
Measurements based on counts: variability and methods of analysis

**Harzallah** O., ENSISA LPMT
Adhesion Energy study of some Physiological and Entomological sugars
Plan of presentation

✓ Introduction

✓ Stickiness: origins

✓ Stickiness: measurement
Introduction

The challenge for cotton today

To remain competitive with synthetic fibers

To maintain acceptable profitability in production

Reduction of the production and processing costs
The challenge for cotton today

Cotton fiber stickiness → Defects / Disruptions of the spinning processes

Price discount → Higher spinning cost

Additional operations → Lower yarn quality

Trader, Classer, Researcher, Spinner, Producer
Plan of presentation

✓ Introduction

✓ Stickiness: origins

✓ Stickiness: measurement
Origins of stickiness

- Vegeatl parts
- Oil traces
- Waxes
- Plant sugars
- Insect sugars

APHIDS

WHITEFLIES
Origins of stickiness

Mature boll covered with honeydew
Origins of stickiness

Mature boll covered with honeydew
## Origins of stickiness

Main sugars (in %) determined by HPLC in aphid, whitefly and aleurod honeydew, harvested on *G. hirsutum*

<table>
<thead>
<tr>
<th>Insect</th>
<th>Mono-saccharides</th>
<th>Polysaccharides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sucrose</td>
</tr>
<tr>
<td><em>Aphis gossypii</em></td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td><em>Bemisia tabaci</em></td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td><em>Trialeurodes abutilonea</em></td>
<td>44</td>
<td>33</td>
</tr>
</tbody>
</table>

Source Hendrix et al., 1992
Origins of stickiness

• The most important cause of stickiness is due to these entomological sugars.

• Honeydew has now become one of the main contaminants present in cotton.

• Sticky points remain in the cotton from the field up to the spinning processes where they cause production and quality losses.

• The behavior of contaminated fibres during processing is highly dependent upon the quantity and the type of the main sugars present in fibres.
Plan of presentation

- Introduction
- Stickiness: origins
- Stickiness: measurement
Stickiness measurement

Chemical methods
- Simple
  - Perkins Fehling Color reaction KOTITI
- Complex
  - HPLC GC

Physical techniques
- Infra-red

Mechanical
- Mini-card

ITMF Reference method
- SCT
- H2SD

ITMF Recommended method
- FCT / FQT
- Quickspin

Thermo-mechanical

Stickiness measurement

Some measuring devices for stickiness evaluation

Credit: M. Watson
Stickiness measurement

Some measuring devices for stickiness evaluation

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Credit: M. Watson
Bibliography on stickiness
Causes, measurements and consequences

GOURLOT J.-P.
ICCTM-ITMF, Stickiness WG
Bremen, March 2010

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In order to allow everyone to learn more about this contamination, we decided to prepare this extract of the available literature. We retained around 214 references out of thousands of available references, focusing on the cause of stickiness, on the possible means of evaluation and/or measurement and on major consequences during fibre processing.

The initial bibliography covers a period going from the 1960’s to 2008.
Observation

Number of documents on stickiness

- 1960-1964: 3
- 1965-1969: 1
- 1970-1974: 5
- 1975-1979: 9
- 1980-1984: 15
- 1985-1989: 20
- 1990-1994: 60
- 1995-1999: 40
- 2000-2004: 50
- 2005-2010: 70
PDF file

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Thanks for attention … and suggestions
International Textile Manufacturers Federation (ITMF)
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Latest information

GOURLOT Jean-Paul
Bremen, March 2010

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✓ SYDEL SA, Montpellier, France manufactures SCT and H2SD
✓ Lintronics: no news since 2008 and before
✓ KOTITI: prepared an ISO standards that currently comes to the National Standardization Bodies (AFNOR, DIN, …)
✓ No (public) patent this year
• SYDEL : Axes de développement de la nouvelle version (H2SDv2)
  – Coût Machine
  – Technologies Actuelles
  – Réduction du consommable
  – Des bases solides pour les développements futurs
    • Différentiation du type de collage Mouche Blanche / Puceron (US patents)
    • Evaluation du taux de collage par spectrométrie.
  – Un partenariat reconduit avec le CIRAD pour vérifier le niveau de lecture et sa précision
Observation

Number of documents on stickiness

- 1960-1964: 1
- 1965-1969: 1
- 1975-1979: 5
- 1980-1984: 10
- 1985-1989: 10
- 1990-1994: 60
- 1995-1999: 30
- 2000-2004: 50
- 2005-2010: 10

Cotton Contamination Survey 2009

Stickiness

Thanks to M. Christian Schindler, ITMF
Thank you
for
your attention